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The President's Office
Boduthakurufaanu Magu
Male, Maldives'

Phone: 3336211

Mobile: 7242885

Website: www.gazette.gov.mv

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Maldives Civil Aviation Authority
Republic of Maldives

Maldivian Civil Aviation Regulations

MCAR-66 Certifying Staff

Issue 4.00, 24 April 2025

Foreword

Maldives Civil Aviation Authority, in exercise of the powers conferred on it under Articles 5 and 6 of the Maldives Civil Aviation Authority Act 2/2012 has adopted this Regulation.

This Regulation shall be cited as ‘MCAR-66 Certifying Staff’ and shall come into force on 24 April 2025.

Existing aviation requirements in the field of airworthiness as listed in ‘MCAR-66 Certifying Staff’ dated 30 March 2022 will be repealed as from 24 April 2025.

Any basic training course, or part thereof, that commenced before 24 April 2025 shall be finished, including any related examination, before 24 October 2027. The corresponding certificates of recognition shall also be issued before 24 October 2027.

For the purpose of the issue or change of an aircraft maintenance licence in accordance with MCAR-66 after 24 April 2025, the CAA will accept an applicant’s basic knowledge examination status corresponding to this Regulation in its version applicable before 24 April 2025, as meeting the requirements of this Regulation in its version applicable from 24 April 2025.

Definitions of the terms and abbreviations used in this regulation, unless the context requires otherwise, are in MCAR-1 Definitions and Abbreviations.

‘Acceptable Means of Compliance’ (AMC) illustrate a means, or several alternative means, but not necessarily the only possible means by which a requirement can be met.

‘Guidance Material’ (GM) helps to illustrate the meaning of a requirement.

[illegible]

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Section A — TECHNICAL REQUIREMENTS

Subpart A — AIRCRAFT MAINTENANCE LICENCE

MCAR-66.A.1 Scope

This section defines the aircraft maintenance licence and establishes the requirements for application, issue and continuation of its validity.

MCAR-66.A.3 Licence categories and subcategories

Aircraft maintenance licences include the following categories and, where applicable, subcategories and system ratings:

- (a) Category A, divided into the following subcategories:
 - A1 Aeroplanes Turbine;
 - A2 Aeroplanes Piston;
 - A3 Helicopters Turbine;
 - A4 Helicopters Piston.

- (b) Category B1, divided into the following subcategories:
 - B1.1 Aeroplanes Turbine;
 - B1.2 Aeroplanes Piston;
 - B1.3 Helicopters Turbine;
 - B1.4 Helicopters Piston.

- (c) Category B2
The B2 licence is applicable to all aircraft.

- (d) Category B2L
The B2L licence is applicable to all aircraft other than those in Group 1 as set out in point 66.A.5(1) and is divided into the following ‘system ratings’:
 - communication/navigation (com/nav),
 - instruments,
 - autoflight,
 - surveillance,
 - airframe systems.

A B2L licence shall contain, as a minimum, one system rating.

- (e) Category B3
The B3 licence is applicable to piston-engine non-pressurised aeroplanes of 2000kg Maximum Take-off Mass (MTOM) and below.

- (f) Category L, divided into the following subcategories:
 - L1C: composite sailplanes,
 - L1: sailplanes,
 - L2C: composite powered sailplanes and composite ELA1 aeroplanes,
 - L2: powered sailplanes and ELA1 aeroplanes,
 - L3H: hot-air balloons,
 - L3G: gas balloons,
 - L4H: hot-air airships,
 - L4G: ELA2 gas airships,

- L5: gas airships other than ELA2.

(g) Category C

The C licence is applicable to aeroplanes and helicopters.

GM 66.A.3 Licence categories

‘ELA1 aeroplanes’ refers to those aeroplanes which meet the definition of ‘ELA1 aircraft’

‘ELA2 gas airships’ refers to those gas airships which meet the definition of ‘ELA2 aircraft’.

‘Gas airships other than ELA2’ refers to those gas airships which do not meet at least one condition of the definition of ‘ELA2 aircraft’.

NOTE: The ‘ELA2 aircraft’ category includes all ‘ELA1 aircraft’.

The term ‘powered sailplane’ includes:

- those powered sailplanes which may take off solely by means of their own power (self-launching sailplanes); and
- self-sustaining powered sailplanes; and
- touring motor gliders (TMGs).

While the L1C subcategory only includes composite sailplanes, the L1 subcategory includes all sailplanes (composite, metal and wood).

While the L2C subcategory only includes composite powered sailplanes and composite ELA1 aeroplanes, the L2 subcategory includes all powered sailplanes and ELA1 aeroplanes (composite, metal and wood).

In the case of maintenance of mixed balloons (combination of gas and hot air), it is required to hold both L3G and L3H subcategories.

For the B2L licence, a ‘system rating’ is a rating which gives privileges to release maintenance on the aircraft systems covered by the ‘system rating’ and electrical systems.

The sentence ‘shall contain, as a minimum, one system rating’ refers to the fact that the application for a B2L licence should be made for any of the system ratings or any combination of the system ratings specified in 66.A.3.

There is no specific order in which the system ratings should be applied for. Any combination of system ratings is possible.

The description of systems covered by the different system ratings is provided in Appendix I 'Basic Knowledge Requirements' under paragraph '2. Modularisation', subparagraph related to 'Categories B2 and B2L'.

MCAR-66.A.5 Aircraft groups

For the purpose of ratings on aircraft maintenance licences, aircraft shall be classified into the following groups:

- (1) Group 1: complex motor-powered aircraft; multi-engine helicopters; other than piston-engine aeroplanes, with maximum certified operating altitude exceeding FL290; aircraft equipped with fly-by-wire systems; gas airships other than ELA2.

The CAA may decide to classify into Group 2, Group 3 or Group 4, as appropriate, an aircraft which meets the conditions set out in the first subparagraph, if it considers that the lower complexity of the particular aircraft justifies so.

- (2) Group 2: aircraft other than those in Group 1 belonging to the following subgroups:

(i) subgroup 2a:

- single turboprop engine aeroplanes,
- those turbine-engine aeroplanes classified by the CAA in this subgroup because of their lower complexity.

(ii) subgroup 2b:

- single turbine engine helicopters,
- those multiple turbine engine helicopters classified by the CAA in this subgroup because of their lower complexity.

(iii) subgroup 2c:

- single piston engine helicopters,
- those multiple piston engine helicopters classified by the CAA in this subgroup because of their lower complexity.

- (3) Group 3: piston engine aeroplanes other than those in Group 1.

- (4) Group 4: sailplanes, powered sailplanes, balloons and airships, other than those in Group 1.

GM1 66.A.5 Aircraft groups

The following table summarises the applicability of categories/subcategories of MCAR-66 licences versus the groups/subgroups of aircraft:

Category/subcategory Groups	A, B1 and C	B2	B2L	B3	L				
					L1C and L1	L2C and L2	L3H and L3G	L4H and L4G	L5
1 <ul style="list-style-type: none"> Complex motor-powered aircraft Multi-engine helicopters Other than piston-engine aeroplanes above FL290 Aircraft with fly-by-wire systems Any other aircraft when defined by the CAA 	x	x							
1 <ul style="list-style-type: none"> Gas airships other than ELA2 		x							x
2 <ul style="list-style-type: none"> 2a: Single-turboprop aeroplanes 2b: Single-turbine helicopters 2c: Single-piston-engine helicopters 	x	x	x						
3 <ul style="list-style-type: none"> Piston-engine aeroplanes 	x	x	x						
3 <ul style="list-style-type: none"> Non-pressurised ELA2 piston-engine aeroplanes 	x	x	x	x					
3 <ul style="list-style-type: none"> ELA1 piston-engine aeroplanes 	x	x	x	x		x			
4 <ul style="list-style-type: none"> Sailplanes Powered sailplanes Balloons Airships not in Group 1 		x	x		x	x			
		x	x			x			
		x	x				x		
		x	x					x	x

MCAR-66.A.10 Application

- (a) An application for an aircraft maintenance licence or change to such licence shall be made on CAA Form 19 and in a manner established by the CAA and submitted thereto.
- (b) (Reserved)
- (c) In addition to the documents required in points 66.A.10(a) and 66.B.105, as appropriate, the applicant for additional basic categories or subcategories to an aircraft maintenance licence shall submit his/her current original aircraft maintenance licence to the CAA together with CAA Form 19
- (d) (Reserved)
- (e) (Reserved)
- (f) Each application shall be supported by documentation to demonstrate compliance with the applicable theoretical knowledge, practical training and experience requirements at the time of application.

AMC 66.A.10 Application

1. Maintenance experience should be written up in a manner that the reader has a reasonable understanding of where, when and what maintenance constitutes the experience. A task by task account is not necessary but at the same time a bland statement “X years maintenance experience completed” is not acceptable. A log book of maintenance experience is desirable and the CAA may require such log books to be kept. It is acceptable to cross refer in CAA Form 19 to other documents containing information on maintenance.
2. Applicants claiming the maximum reduction in 66.A.30(a) total experience based upon having successfully completed 147.A.200 approved basic training, should include the MCAR-147 certificate of recognition for approved basic training.
3. Applicants claiming reduction in MCAR-66.A.30(a) total experience based upon having successfully completed technical training in an organisation or institute recognised by the CAA as a competent organisation or institute, should include the relevant certificate of successful completion of training.

GM 66.A.10(a) Application

When an application is made for a licence in the B2L category, the applicant should specify on the CAA Form 19:

- the system rating or the combination of system ratings the applicant applies for; and
- the aircraft rating,

considering that according to 66.A.45(e), a B2L licence endorsed with full subgroup 2b can be endorsed also with full subgroup 2c.

When applying for the addition of a system rating on a B2L licence, the applicant should provide together with the application, the demonstration of compliance with the experience requirements related to the system the applicant applies for.

When a B2L licence holder applies for the extension of a B2L licence to add a new system rating, he/she needs to demonstrate the practical experience required by 66.A.30(a)(2a) for the system rating but also the practical experience required by 66.A.45(e) and (f) in case the aircraft group is different.

When a B2L licence holder applies for the change of his/her B2L licence to the B2 category, he/she needs only to:

- demonstrate by examination the differences between the basic knowledge corresponding to the B2L licence held and the basic knowledge of the B2 licence, as described in Appendix I; and
- demonstrate the additional experience described in Appendix IV.

These requirements can be found also in 66.B.110.

When an applicant applies for the extension of his/her B2L licence to a B2 licence and he/she meets the relevant requirements, the B2L licence is replaced by the B2 licence.

MCAR-66.A.15 Eligibility

An applicant for an aircraft maintenance licence shall be at least 18 years of age.

MCAR-66.A.20 Privileges

(a) The following privileges shall apply:

1. A category A aircraft maintenance licence permits the holder to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation referred to in point MCAR-145.A.35. The certification privileges shall be restricted to work that the licence holder has personally performed in the maintenance organisation that issued the certification authorisation.
2. A category B1 aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B1 support staff following:
 - maintenance performed on aircraft structure, power plant and mechanical and electrical systems.
 - work on avionic systems, requiring simple tests to prove their serviceability and not requiring troubleshooting.

Category B1 includes the corresponding A subcategory.

3. A category B2 aircraft maintenance licence shall permit the holder:
 - i. to issue certificates of release to service and to act as B2 support staff for following:
 - maintenance performed on avionic and electrical systems, and
 - electrical and avionics tasks within powerplant and mechanical systems, requiring only simple tests to prove their serviceability; and
 - ii. to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation referred to in MCAR-145.A.35 . This certification privilege shall be restricted to work that the licence holder has personally performed in the maintenance organisation which issued the certification authorisation and limited to the ratings already endorsed in the B2 licence.

The category B2 licence does not include any A subcategory.

4. A category B2L aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B2L support staff for the following:
 - maintenance performed on electrical systems;

- maintenance performed on avionics systems within the limits of the system ratings specifically endorsed on the licence, and
 - when holding the ‘airframe system’ rating, performance of electrical and avionics tasks within power plant and mechanical systems, requiring only simple tests to prove their serviceability.
5. A category B3 aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B3 support staff for the following:
- maintenance performed on aeroplane structure, powerplant and mechanical and electrical systems; and
 - work on avionic systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.
6. A category L aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as L support staff for the following:
- maintenance performed on aircraft structure, power plant and mechanical and electrical systems;
 - work on radio, Emergency Locator Transmitters (ELT) and transponder systems; and
 - work on other avionics systems requiring simple tests to prove their serviceability.

Subcategory L2 includes subcategory L1. Any limitation to subcategory L2 in accordance with point 66.A.45(h) becomes also applicable to subcategory L1.

Subcategory L2C includes subcategory L1C.

7. A category C aircraft maintenance licence shall permit the holder to issue certificates of release to service following base maintenance on aircraft. The privileges apply to the aircraft in its entirety.

A Category C aircraft maintenance licence issued with respect to complex motor-powered aircraft shall include the privileges of category C aircraft maintenance licence also with respect to other than complex motor-powered aircraft.

(b) The holder of an aircraft maintenance licence may not exercise its privileges unless:

1. in compliance with the applicable requirements of MCAR-M, MCAR-145, MCAR-ML and MCAR-CAO; and

2. in the preceding two-year period he/she has, either had six months of maintenance experience in accordance with the privileges granted by the aircraft maintenance licence or, met the provision for the issue of the appropriate privileges; and
3. he/she has the adequate competence to certify maintenance on the corresponding aircraft; and
4. he/she is able to read, write and communicate to an understandable level in the language(s) in which the technical documentation and procedures necessary to support the issue of the certificate of release are written.

GM 66.A.20(a) Privileges

1. The following definitions apply:

Electrical system means the aircraft electrical power supply source, plus the distribution system to the different components contained in the aircraft and relevant connectors. Lighting systems are also included in this definition. When working on cables and connectors which are part of these electrical systems, the following typical practices are included in the privileges:

- Continuity, insulation and bonding techniques and testing;
- Crimping and testing of crimped joints;
- Connector pin removal and insertion;
- Wiring protection techniques.

Avionics system means an aircraft system that transfers, processes, displays or stores analogue or digital data using data lines, data buses, coaxial cables, wireless or other data transmission medium, and includes the system's components and connectors. Examples of avionics systems include the following:

- Autoflight;
- Communication, Radar and Navigation;
- Instruments (see NOTE below);
- In Flight Entertainment Systems;
- Integrated Modular Avionics (IMA);
- On-Board Maintenance Systems;
- Information Systems;
- Fly by Wire Systems (related to ATA27 "Flight Controls");
- Fibre Optic Control Systems.

NOTE: Instruments are formally included within the privileges of the B2 and B2L with system rating 'instruments'. However, maintenance on electromechanical and pitot-static components may also be released by a B1, B3 or L license holder.

Simple test means a test described in approved maintenance data and meeting all the following criteria:

- The serviceability of the system can be verified using aircraft controls, switches, Built-in Test Equipment (BITE), Central Maintenance Computer (CMC) or external test equipment not involving special training.
- The outcome of the test is a unique go – no go indication or parameter, which can be a single value or a value within an interval tolerance. No interpretation of the test result or interdependence of different values is allowed.
- The test does not involve more than 10 actions as described in the approved maintenance data (not including those required to configure the aircraft prior to the test, i.e. jacking, flaps down, etc, or to return the aircraft to its initial configuration). Pushing

a control, switch or button, and reading the corresponding outcome may be considered as a single step even if the maintenance data shows them separated.

Troubleshooting means the procedures and actions necessary, using approved maintenance data, in order to identify the root cause of a defect or malfunction. It may include the use of BITE or external test equipment.

Line maintenance: refer to AMC1 145.A.10

Base maintenance: refer to AMC1 145.A.10

2. The category B3 licence does not include any A subcategory. Nevertheless, this does not prevent the B3 licence holder from releasing maintenance tasks typical of the A1.2 subcategory for piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below, within the limitations contained in the B3 licence.
3. The B1.2 and B3 licences do not include any L subcategory. Nevertheless, the holder of a B1.2 or B3 licence with the appropriate ratings is entitled to receive, upon application, licences in the L1 and L2 subcategories under the conditions described in point 66.B.110(d).
4. The privileges of the B2 licence with given aircraft ratings include the privileges of the B2L licence for all the system ratings for the same aircraft ratings. Nevertheless, the holder of a B2 licence with given aircraft ratings may apply for a B2L licence in order to include a different aircraft rating if the applicant only wants to demonstrate compliance with the experience requirements for certain system ratings.
5. The category C licence permits certification of base maintenance by the issue of a single certificate of release to service for the complete aircraft after the completion of all such maintenance. The basis for this certification is that the maintenance has been carried out by competent mechanics and category B1, B2, B2L, B3 and L support staff, as appropriate, have signed for the maintenance tasks under their respective specialisation. The principal function of category C certifying staff is to ensure that all required maintenance has been called up and signed off by category B1, B2, B2L, B3 and L support staff, as appropriate, before issue of the certificate of release to service. Only category C personnel who also hold category B1, B2, B2L, B3 and L qualifications may perform both roles in base maintenance.

AMC 66.A.20(a)(4) Privileges

‘Within the limits of the system ratings specifically endorsed on the licence’ refers to the fact that the privileges of the licence holder are limited:

- to the group/subgroup of aircraft endorsed on the licence, but also
- to the system rating(s) endorsed.

When an applicant wishes to get the privilege to issue certificates of release to service and to act as support staff for electrical and avionics tasks within powerplant and mechanical systems,

he/she should apply for the rating 'airframe system' on the B2L licence. The reason is that the 'airframe systems' rating is the only rating which covers completely the electrical and avionics tasks of the powerplant and mechanical systems of the aircraft.

AMC 66.A.20(b)2 Privileges

The 6 months maintenance experience in 2 years should be understood as consisting of two elements, duration and nature of the experience. The minimum to meet the requirements for these elements may vary depending on the size and complexity of the aircraft and type of operation and maintenance.

1. Duration:

Within an approved maintenance organization:

- 6 months working with the same organisation; or
- 6 months split up into different blocks, working within the same or in different organisations.

The 6 months period can be replaced by 100 days of maintenance experience in accordance with the privileges, whether they have been performed within an approved organisation, or as independent certifying staff according to MCAR-M.A.801(b)1 or as a combination thereof.

When certifying staff maintains and releases aircraft in accordance with MCAR-M.A.801(b)1, in certain circumstances this number of days may even be reduced by 50% when agreed in advance by the CAA. These circumstances consider the cases where the holder of a MCAR-66 licence happens to be the owner of an aircraft and carries out maintenance on his own aircraft, or where a licence holder maintains an aircraft operated for low utilization, that does not allow the licence holder to accumulate the required experience. This reduction should not be combined with the 20% reduction permitted when carrying out technical support, or maintenance planning, continuing airworthiness management or engineering activities. To avoid a too long period without experience, the working days should be spread over the intended 6 months period.

2. Nature of the experience:

Depending on the category of the aircraft maintenance licence, the following activities are considered relevant for maintenance experience:

- Servicing;
- Inspection;
- Operational and functional testing;
- Troubleshooting;
- Repairing;
- Modifying;
- Changing component;
- Supervising these activities;
- Releasing aircraft to service.

For category A licence holders, the experience should include exercising the privileges, by means of performing tasks related to the authorization on at least one aircraft type for each

licence subcategory. This means tasks as mentioned in AMC 145.A.30(g), including servicing, component changes and simple defect rectifications.

For category B1, B2, B2L, B3 and L for every aircraft included in the authorization the experience should be on that particular aircraft or on a similar aircraft within the same licence (sub)category. Two aircraft can be considered as similar when they have similar technology, construction and comparable systems, which means equally equipped with the following (as applicable to the licence category):

- Propulsion systems (piston or turboprop or turbofan or turboshaft or jet-engine or push propellers); and
- Flight control systems (only mechanical controls or hydromechanically powered controls or electromechanically powered controls); and
- Avionic systems (analogue systems or digital systems); and
- Structure (manufactured of metal or composite or wood).

For licences endorsed with (sub)group ratings:

- In the case of B1 licence endorsed with group (sub)group ratings (either manufacturer sub-group or full (sub)group) as defined in MCAR-66.A.45 the holder should show experience on at least one aircraft type per (sub)group and per aircraft structure (metal, composite, wood).
- In the case of a B2 or B2L licence endorsed with (sub)group ratings (either manufacturer subgroup or full (sub)group) as defined in MCAR-66.A.45 the holder should show experience on at least one aircraft type per (sub)group.
- In the case of a B3 licence endorsed with the rating “piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below” as defined in 66.A.45, the holder should show experience on at least one aircraft type per aircraft structure (metal, metal-tubing with fabric, composite or wooden).

For category C, the experience should cover at least one of the aircraft types endorsed on the licence.

For a combination of categories, the experience should include some activities of the nature shown in paragraph 2 in each category.

A maximum of 20% of the experience duration required may be replaced by the following relevant activities on an aircraft type of similar technology, construction and with comparable systems:

- Aircraft maintenance related training as an instructor/assessor or as a student;
- Maintenance technical support/engineering;
- Maintenance management/planning.

The experience should be documented in an individual log book or in any other recording system (which may be an automated one) containing the following data:

- Date;
- Aircraft type;
- Aircraft identification i.e. registration;
- ATA chapter (optional);
- Operation performed i.e. 100 FH check, MLG wheel change, engine oil check and complement, SB embodiment, troubleshooting, structural repair, STC embodiment, etc;
- In the particular case of MCAR-145 organisations, the type of maintenance i.e. base, line;
- Type of activity i.e. perform, supervise, release;
- Subcategory used (A1, A2, A3, A4, B1.1, B1.2, B1.3, B1.4, B2, B2L, B3, C or L1, L1C, L2, L2C, L3G, L3H, L4G, L4H, L5);
- Duration in days or partial-days

GM 66.A.20(b)2 Privileges

The sentence “met the provision for the issue of the appropriate privileges” included in 66.A.20(b)2 means that during the previous 2 years the person has met all the requirements for the endorsement of the corresponding aircraft rating (for example, in the case of aircraft in Group 1, theoretical plus practical element plus, if applicable, on-the-job training). This supersedes the need for 6 months of experience for the first 2 years. However, the requirement of 6 months of experience in the preceding 2 years will need to be met after the second year.

AMC 66.A.20(b)3 Privileges

The wording “has the adequate competence to certify maintenance on the corresponding aircraft” means that the licence holder and, if applicable, the organisation where he/she is contracted/employed, should ensure that he/she has acquired the appropriate knowledge, skills, attitude and experience to release the aircraft being maintained. This is essential because some systems and technology present in the particular aircraft being maintained may not have been covered by the training/examination/experience required to obtain the licence and ratings.

This is typically the case, among others, in the following situations:

- Type ratings which have been endorsed on a licence in accordance with Appendix I to AMC to MCAR-66 “List of Type Ratings” after attending type training/on-the-job training which did not cover all the models/variants included in such rating. For example, a licence endorsed with the rating Airbus A318/A319/A320/A321 (CFM56) after attending type training/on-the-job training covering only the Airbus 320 (CFM56).
- Type ratings which have been endorsed on a licence in accordance with Appendix I to AMC to MCAR-66 “List of Type Ratings” after a new variant has been added to the rating in Appendix I, without performing difference training. For example, a licence endorsed with the rating Boeing 737-600/700/800/900 for a person who already had the rating Boeing 737-600/700/800, without performing any difference training for the 737-900.
- Work being carried out on a model/variant for which the technical design and maintenance techniques have significantly evolved from the original model used in the type training/on-the-job training.
- Specific technology and options selected by each customer which may not have been covered by the type training/on-the-job training.
- Changes in the basic knowledge requirements of Appendix I to MCAR-66 not requiring re-examination of existing licence holders (grandfathered privileges).
- The endorsement of group/subgroup ratings based on experience on a representative number of tasks/aircraft or based on type training/examination on a representative number of aircraft.
- Persons meeting the requirements of 6 months of experience every 2 years only on certain similar aircraft types as allowed by AMC 66.A.20(b)2.
- Persons holding a MCAR-66 licence with limitations, obtained through conversion of national qualifications (66.A.70), where such limitations are going to be lifted after performing the corresponding basic knowledge examinations. In this case, the type ratings endorsed in the licence may have been obtained in the national system without covering all the aircraft systems (because of the previous limitations) and there will be a need to assess and, if applicable, to train this person on the missing systems.

Additional information is provided in AMC 145.A.35(a).

GM 66.A.20(b)4 Privileges

1. Holders of a MCAR-66 aircraft maintenance licence may not exercise certification privileges unless they have a general knowledge of the language used within the maintenance environment including knowledge of common aeronautical terms in the language. The level of knowledge should be such that the licence holder is able to:
 - read and understand the instructions and technical manuals in use within the organisation;
 - make written technical entries and any maintenance documentation entries, which can be understood by those with whom they are normally required to communicate;
 - read and understand the maintenance organisation procedures;
 - communicate at such a level as to prevent any misunderstanding when exercising certification privileges.
2. In all cases, the level of understanding should be compatible with the level of certification privileges exercised.

MCAR-66.A.25 Basic knowledge requirements

- (a) The applicant for an aircraft maintenance licence shall demonstrate by examination a level of knowledge of the related subject modules in accordance with Appendix I (applicable to category A, B1, B2, B2L, B3 and C licences) or Appendix VII (applicable to category L licences).
- (b) The basic knowledge examinations shall comply with the standard set out in Appendix II (applicable to category A, B1, B2, B2L, B3 and C licences) or Appendix VIII (applicable to category L licences) to this Regulation and shall be conducted by either of the following:
 - (1) a training organisation approved in accordance with MCAR-147;
 - (2) the CAA;
 - (3) for category L licences, another organisation as agreed by the CAA.
- (c) The basic knowledge examinations shall have been passed within 10 years prior to the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence.

The 10 years' validity requirement applies to each individual module examination, except for those module examinations which were already passed as part of another licence category and the licence has already been issued

- (d) (Reserved)
- (e) A basic training course without Modules 1 and 2 of Appendix I to this Regulation is considered a full basic training course approved in accordance with MCAR-147 only when knowledge of those Modules is subsequently demonstrated by the applicant by examination and is credited by the CAA.
- (f) The holder of an aircraft maintenance licence applying for the addition of a different category or subcategory shall complement by examination the level of knowledge that is appropriate to the related subject modules in accordance with Appendix I (for category A, B1, B2, B2L, B3 and C licences) or Appendix VII (for category L licences).

Appendix IV details the modules of Appendix I (for category B1, B2, B2L, B3 and C licences) or Appendix VII (for category L licences) required for the addition of a new category or subcategory to an existing licence issued in accordance with this Regulation.

AMC 66.A.25 Basic knowledge requirements

1. For an applicant being a person qualified by holding an academic degree in an aeronautical, mechanical or electronic discipline from a recognised university or other higher educational institute the need for any examination will depend upon the course taken in relation to Appendix I to MCAR-66.
2. Knowledge gained and examinations passed during previous experiences, for example, in military aviation and civilian apprenticeships will be credited where the CAA is satisfied that such knowledge and examinations are equivalent to that required by Appendix I to MCAR-66.

GM 66.A.25(a) Basic knowledge requirements

The levels of knowledge for each licence (sub)category are directly related to the complexity of the certifications related to the corresponding (sub)category, which means that category A must demonstrate a limited but adequate level of knowledge, whereas category B1, B2, B2L and B3 must demonstrate a complete level of knowledge in the appropriate subject modules.

GM 66.A.25(b) Basic knowledge requirements

‘Or as agreed by the CAA’ refers to the examination that is conducted by an organisation under a formal agreement (and oversight) of the CAA.

MCAR-66.A.30 Basic Experience requirements

(a) An applicant for an aircraft maintenance licence shall have acquired:

1. for category A and subcategories B1.2 and B1.4 and category B3:
 - (i) three years of practical maintenance experience on operating aircraft, if the applicant has no previous relevant technical training; or
 - (ii) two years of practical maintenance experience on operating aircraft and completion of training considered relevant by the CAA as a skilled worker, in a technical trade; or
 - (iii) one year of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with MCAR-147.
2. for category B2 and subcategories B1.1 and B1.3:
 - (i) five years of practical maintenance experience on operating aircraft if the applicant has no previous relevant technical training; or
 - (ii) three years of practical maintenance experience on operating aircraft and completion of training considered relevant by the CAA as a skilled worker, in a technical trade; or
 - (iii) two years of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with MCAR-147.
- 2a. for category B2L:
 - (i) 3 years of practical maintenance experience in operating aircraft, covering the corresponding system rating(s), if the applicant has no previous relevant technical training; or
 - (ii) 2 years of practical maintenance experience in operating aircraft, covering the corresponding system rating(s), and completion of training, considered relevant by the CAA, as a skilled worker in a technical trade; or
 - (iii) 1 year of practical maintenance experience in operating aircraft, covering the corresponding system rating(s), and completion of a MCAR-147 approved basic training course. For the addition of (a) new system rating(s) to an existing B2L licence, 3 months of practical maintenance experience relevant to the new system rating(s) shall be required for each system rating added.

2b. for category L:

- (i) 2 years of practical maintenance experience in operating aircraft covering a representative cross section of maintenance activities in the corresponding subcategory;
 - (ii) as a derogation from point (i), 1 year of practical maintenance experience in operating aircraft covering a representative cross section of maintenance activities in the corresponding subcategory, subject to the introduction of the limitation provided for in point 66.A.45(h)(ii)(3).
- 3. for category C with respect to complex motor-powered aircraft (CMPA):
 - (i) 3 years of experience exercising category B1.1, B1.3 or B2 privileges as support staff, or both support staff and certifying staff, in accordance with point 145.A.35 of MCAR-145, at a maintenance organisation working on CMPA, including 12 months of experience as base maintenance support staff; or
 - (ii) 5 years of experience exercising category B1.2, B1.4 or L5 privileges as support staff, or both support staff and certifying staff, in accordance with point 145.A.35 of MCAR-145, at a maintenance organisation working on CMPA, including 12 months of experience as base maintenance support staff; or
 - (iii) for applicants holding an academic degree, 3 years of experience in working at an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance, including 6 months of participation in the performance of base maintenance tasks in operating CMPA;
 - (iv) to extend the endorsed category C with respect to other than CMPA to CMPA:
 - (a) 2 years of experience in exercising category B1.1, B1.2, B1.3, B1.4, B2 or L5 privileges as support staff, or both support staff and certifying staff, in accordance with point 145.A.35 of MCAR-145, at a maintenance organisation in operating CMPA, including 6 months of experience as base maintenance support staff; or
 - (b) when holding a category C licence based on an academic degree, 2 years of experience in working at an aircraft maintenance environment on a representative selection of tasks that are directly associated with aircraft maintenance, including 3 months of participation in the performance of base maintenance tasks in operating CMPA;
- 4. for category C with respect to other than CMPA:
 - (i) 3 years of experience in exercising category B1, B2, B2L, B3 or L privileges as support staff, or both support staff and certifying staff, in accordance with point 145.A.35 of MCAR-145, at a maintenance organisation in operating other than CMPA, including 6 months of experience as base maintenance support staff; or

- (ii) for holders of an academic degree, 3 years of experience in working at an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance, including 6 months of participation in the performance of base maintenance tasks in operating other than CMPA;
5. the academic degree shall be in a relevant technical discipline, issued by a university or any other higher educational institution recognised by the CAA.
- (b) An applicant for an extension to an aircraft maintenance licence shall have a minimum civil aircraft maintenance experience requirement appropriate to the additional category or subcategory of licence applied for as defined in Appendix IV to this MCAR.
 - (c) The experience shall be practical and involve a representative cross section of maintenance tasks on aircraft.
 - (d) At least one year of the required experience shall be recent maintenance experience on aircraft of the category/subcategory for which the initial aircraft maintenance licence is sought. For subsequent category/subcategory additions to an existing aircraft maintenance licence, the additional recent maintenance experience required may be less than one year, but shall be at least three months. The required experience shall be dependent upon the difference between the licence category/subcategory held and applied for. Such additional experience shall be typical of the new licence category/subcategory sought.
 - (e) Notwithstanding point (a), experience in aircraft maintenance gained in organisations not approved in accordance with MCAR-145 or MCAR-CAO may be recognised when such maintenance is equivalent to that required by this Regulation as established by the CAA.
- However, demonstration of additional experience in organisations approved in accordance with MCAR-145 or MCAR-CAO or under the supervision of independent certifying staff, shall be required.
- (f) Experience shall have been acquired within the ten years preceding the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence.

AMC1 66.A.30(a) Basic experience requirements

1. Maintenance experience on operating aircraft:

- Means the experience of being involved in maintenance tasks on aircraft which are being operated by airlines, air taxi organisations, aero clubs, owners, etc; as relevant to the licence category/subcategory;
- Should cover a wide range of tasks in length, complexity and variety;
- Aims at gaining sufficient experience in the real environment of maintenance as opposed to only the training school environment;
- May be gained within different types of maintenance organisations (MCAR-145, M.A. Subpart F, MCAR-CAO, FAR-145, etc) or under the supervision of independent certifying staff;
- May be combined with MCAR-147 approved training (or other training approved by the CAA) so that periods of training can be intermixed with periods of experience, similar to an apprenticeship;
- may be full-time or part-time, either as professional or on a voluntary basis;
- in the case of the L licence, it is acceptable that the 1 or 2 years of experience required by 66.A.30(a)(2b) covers maintenance performed only during the weekends (or equivalent periods) as long as the applicant has achieved a sufficient level of competency related to the applicable licence subcategory as attested by the corresponding statement(s) issued by the maintenance organisation(s) or independent certifying staff that supervised the applicant.

2. A skilled worker is a person who has successfully completed a training, acceptable to the CAA, involving the manufacture, repair, overhaul or inspection of mechanical, electrical or electronic equipment. The training would include the use of tools and measuring devices.

3. In the case of an applicant for a licence including several categories/subcategories, it is acceptable to combine the periods of experience as long as there is a sufficient experience for each category/subcategory during the required period. Examples:

- Application for a B1.1 (turbine aeroplanes) + B1.3 (turbine helicopters): The Regulation requires 5 years of experience for B1.1 and 5 years of experience for B1.3 for an applicant with no relevant previous technical training:
- It is not acceptable to combine the experience in a single 5-year period where the applicant has been working for 3 years on turbine aeroplanes and 2 years on turbine helicopters.

- However, it is acceptable to combine the experience in a single 5-year period if the applicant has been working for 5 years on turbine aeroplanes and turbine helicopters (for example, aeroplanes in the morning, helicopters in the afternoon, or a few days every week on aeroplanes and a few days every week on helicopters).
 - Application for a B1.1 (turbine aeroplanes) + B2 (avionics): The Regulation requires 5 years of experience for B1.1 and 5 years of experience for B2 for an applicant with no relevant previous technical training.
 - It is not acceptable to combine the experience in a single 5-year period where the applicant has been working for 3 years on turbine aeroplanes (with no avionics work) and 2 years on avionics systems.
 - However, it is acceptable to combine the experience in a single 5-year period if the applicant has been working for 5 years on structures, powerplant, mechanical and electrical systems and avionics (for B1.1 tasks in the morning, B2 tasks in the afternoon, or a few days every week for B1.1 tasks and a few days every week for B2 tasks).
 - Application for a B1.1, B1.2, B1.3, B1.4 and B2: The Regulation requires 5 years of experience for B1.1, B1.3 and B2 and 3 years of experience for B1.2 and B1.4 for an applicant with no relevant previous technical training.
 - In this case, it is very unlikely that the experience for each category/subcategory would be sufficient.
4. For a category C applicant that holds an academic degree, the participation in the performance of maintenance tasks on operating aircraft may include maintenance, maintenance planning, quality assurance, record-keeping, spare parts management and engineering development.
- ‘Experience in working in a civil aircraft maintenance environment on a representative selection of tasks directly associated with aircraft maintenance’ means experience gained at an organisation that is approved in accordance with MCAR-145, MCAR-CAO, MCAR-CAMO or similar, or experience in performing comparable work that is directly related to the continuing airworthiness of aircraft within a competent authority. Similar work performed on state aircraft may be acceptable as well.
 - ‘Including 6 months of participation in the performance of base maintenance tasks’ on operating aircraft means experience gained through the active participation in base maintenance checks at maintenance organisations.
 - If the applicant has acquired experience on operating CMPA, the corresponding category C licence should be issued. If the experience acquired has been limited to other

than CMPA, then only the corresponding category C licence with respect to other than CMPA should be issued.

- While it is strongly recommended that the participation in the performance of maintenance on aircraft should be at the level required for the issue of a B1 or B2 licence, the objective of the required experience is to gain insight into the performance of base maintenance. The applicant for an academic category C licence should be aware of the type of maintenance carried out before the signature of support staff and understand their roles in the release-to-service process of base maintenance. It is encouraged that the future category C licence holder participates in both simple and complex tasks during their experience in base maintenance and gains insight in some aircraft critical systems.
- In the case presented in point 66.A.30(e), for the required experience gained outside the Maldivian civil regulatory framework, at least 1 year should be in a MCAR-145 or MCAR-CAO environment, including participation in the performance of base maintenance tasks for 6 months

GM1 66.A.30(a) Basic experience requirements

The table below summarises the basic experience requirements for the category C licence.

From:	To:	Category C for CMPA	Category C for other than CMPA
Holder of a licence with B1.1, B1.3, B2, B3*, B2L*, or L*		3 years of experience as support staff, or both support staff and certifying staff, in operating CMPA, including 12 months as support staff in base maintenance.	3 years of experience as certifying staff or support staff, in operating other than CMPA, including 6 months as support staff in base maintenance.
Holder of a licence with B1.2, B1.4 or L5**		5 years of experience as support staff, or both support staff and certifying staff, in operating CMPA, including 12 months as support staff in base maintenance.	
Holder of an academic degree, in a relevant technical discipline, issued by a university or any other higher educational institution recognised by the CAA		3 years of experience in working in an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance of operating CMPA, including 6 months of participation in the performance of base maintenance tasks on operating CMPA.	3 years of experience in working in an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance of operating other than CMPA, including 6 months of participation in the performance of base maintenance tasks on operating other than CMPA.
Holder of a licence with category C for other than CMPA		2 years of experience as B1, B2 or L5 support staff, or both support staff and certifying staff, including 6 months as support staff in base maintenance.	
		Holding an academic degree: 2 years of experience in working in an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance of operating CMPA, including 3 months of participation in the performance of base maintenance tasks on operating CMPA.	
Holder of a licence with category C for CMPA			Category C for CMPA includes category C for other than CMPA

* Only applicable to category C for other than CMPA.

** Only applicable to category C for CMPA

AMC 66.A.30(c) Basic experience requirements

In the case of the category B2L licence, the sentence ‘a representative cross section of maintenance tasks on aircraft’ refers to the person that has carried out some maintenance tasks that are representative of the systems corresponding to the system ratings for which he/she applies (see 66.A.3). These tasks may include troubleshooting, modifications or repairs.

AMC 66.A.30(d) Basic experience requirements

To be considered as recent experience, at least 50% of the required 12 month experience should be gained within the 12 month period prior to the date of application for the MCAR-66 aircraft maintenance licence. The remainder of the experience should have been gained within the 7 year period prior to application. It must be noted that the rest of the basic experience required by 66.A.30 must be obtained within the 10 years prior to the application as required by 66.A.30(f).

AMC1 66.A.30(e) Basic experience requirements

(a) If the CAA has established that the experience gained outside an aircraft maintenance organisation approved in accordance with MCAR-145 or MCAR-CAO is equivalent to that required by MCAR-66, the minimum additional experience in aircraft maintenance organisation(s) that is (are) approved in accordance with MCAR-145 or MCAR-CAO should be:

(1) for categories A and L: 6 months;

(2) for categories B1, B2, B2L, B3 and C: 12 months.

(b) Experience in aircraft maintenance gained outside an aircraft maintenance organisation(s) that is (are) approved in accordance with MCAR-145 or MCAR-CAO may include experience in aircraft maintenance gained in the armed forces, coast guard, police, nationally approved organisations, organisations approved by foreign countries, etc., or in aircraft manufacturing.

MCAR-66.A.40 Continued validity of the aircraft maintenance licence

- (a) The aircraft maintenance licence becomes invalid five years after its last issue or change, unless the holder submits his/her aircraft maintenance licence to CAA, in order to verify that the information contained in the licence is the same as that contained in CAA records, pursuant to point 66.B.120.
- (b) The holder of an aircraft maintenance licence shall complete the relevant parts of CAA Form 19 (see Appendix V) and submit it with the holder's copy of the licence to the CAA.
- (c) Any certification privileges based upon an aircraft maintenance licence becomes invalid as soon as the aircraft maintenance licence is invalid.
- (d) The aircraft maintenance licence is only valid (i) when issued and/or changed by the CAA and (ii) when the holder has signed the document.

GM 66.A.40 Continued validity of the aircraft maintenance licence

Validity of the MCAR-66 aircraft maintenance licence is not affected by recency of maintenance experience whereas the validity of the MCAR 66.A.20 privileges is affected by maintenance experience as specified in MCAR 66.A.20(a).

MCAR-66.A.45 Endorsement with aircraft ratings

(a) In order to be entitled to exercise certification privileges on a specific aircraft type, the holder of an aircraft maintenance licence needs to have his/her licence endorsed with the relevant aircraft ratings:

- For category B1, B2 or C the relevant aircraft ratings are the following:
 - i. For group 1 aircraft, the appropriate aircraft type rating.
 - ii. For group 2 aircraft, the appropriate aircraft type rating, manufacturer sub-group rating or full sub-group rating.
 - iii. For group 3 aircraft, the appropriate aircraft type rating or full group rating.
 - iv. For Group 4 aircraft, for the category B2 licence, the full group rating.
- For category B2L, the relevant aircraft ratings are the following:
 - i. for Group 2 aircraft, the appropriate manufacturer subgroup rating or full subgroup rating;
 - ii. for Group 3 aircraft, the full group rating;
 - iii. for Group 4 aircraft, the full group rating.
- For category B3, the relevant rating is “piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below”
- For category L, the relevant aircraft ratings are the following:
 - i. for subcategory L1C, the rating ‘composite sailplanes’;
 - ii. for subcategory L1, the rating ‘sailplanes’;
 - iii. for subcategory L2C, the rating ‘composite powered sailplanes and composite ELA1 aeroplanes’;
 - iv. for subcategory L2, the rating ‘powered sailplanes and ELA1 aeroplanes’;
 - v. for subcategory L3H, the rating ‘hot-air balloons’;
 - vi. for subcategory L3G, the rating ‘gas balloons’;
 - vii. for subcategory L4H, the rating ‘hot-air airships’;
 - viii. for subcategory L4G, the rating ‘ELA2 gas airships’;
 - ix. for subcategory L5, the appropriate airship type rating.
- For category A, no rating is required, subject to compliance with the requirements of point 145.A.35 of MCAR-145.

(b) The endorsement of aircraft type ratings requires the satisfactory completion of the following:

- the relevant category B1, B2 or C aircraft type training in accordance with Appendix III to MCAR-66;
- in the case of gas airship type ratings on a B2 or L5 licence, a type training approved by the CAA in accordance with point 66.B.130.

- (c) For other than category C licences, in addition to the requirements of point (b), the endorsement of the first aircraft type rating within a given category/subcategory requires satisfactory completion of the corresponding on-the-job training. This on-the-job training shall comply with Appendix III to MCAR-66, except in the case of gas airships, where it shall be directly approved by the CAA.
- (d) By derogation from points (b) and (c), for group 2 and 3 aircraft, aircraft type ratings may also be endorsed on a licence after completing the following steps:
- satisfactory completion of the relevant category B1, B2 or C aircraft type evaluation in accordance with Appendix III to this regulation, and
 - in the case of B1 and B2 category, demonstration of practical experience on the aircraft type. In that case, the practical experience shall include a representative cross section of maintenance activities relevant to the licence category.

In the case of a category C rating, for a person qualified through the academic route as referred to in point (a)(5) of point 66.A.30, the first relevant aircraft type evaluation shall be at the category B1 or B2 level.

- (e) For group 2 aircraft:
- i. the endorsement of manufacturer sub-group ratings for category B1 and C licence holders requires complying with the aircraft type rating requirements of at least two aircraft types from the same manufacturer which combined are representative of the applicable manufacturer sub-group;
 - ii. the endorsement of full sub-group ratings for category B1 and C licence holders requires complying with the aircraft type rating requirements of at least three aircraft types from different manufacturers which combined are representative of the applicable sub-group;
 - iii. the endorsement of manufacturer sub-groups and full sub-group ratings for category B2 and B2L licence holders requires demonstration of practical experience which shall include a representative cross section of maintenance activities relevant to the licence category and to the applicable aircraft sub-group and, in the case of the B2L licence, relevant to the applicable system rating(s);
 - iv. by derogation from point (e)(iii), the holder of a B2 or B2L licence, endorsed with a full subgroup 2b, is entitled to be endorsed with a full subgroup 2c.
- (f) For group 3 and 4 aircraft:
- i. the endorsement of the full group 3 rating for category B1, B2, B2L and C licence holders and the endorsement of the full Group 4 rating for B2 and B2L licence holders require

demonstration of practical experience, which shall include a representative cross section of maintenance activities relevant to the licence category and to Group 3 or 4, as applicable;

- ii. for category B1, unless the applicant provides evidence of appropriate experience, the group 3 rating shall be subject to the following limitations, which shall be endorsed on the licence:
 - pressurized aeroplanes
 - metal structure aeroplanes
 - composite structure aeroplanes
 - wooden structure aeroplanes
 - aeroplanes with metal tubing structure covered with fabric.

(g) For the B3 licence:

- i. the endorsement of the rating “piston-engine non-pressurized aeroplanes of 2000 Kg MTOM and below” requires demonstration of practical experience which shall include a representative cross-section of maintenance activities relevant to the licence category.
- ii. unless the applicant provides evidence of appropriate experience, the rating referred to in point 1 shall be subject to the following limitations, which shall be endorsed on the licence:
 - wooden structure aeroplanes
 - aeroplanes with metal tubing structure covered with fabric
 - metal structure aeroplanes
 - composite structure aeroplanes.

(h) For all L licence subcategories, other than L5:

- i. the endorsement of ratings requires demonstration of practical experience which shall include a representative cross section of maintenance activities relevant to the licence subcategory;
- ii. unless the applicant provides evidence of appropriate experience, the ratings shall be subject to the following limitations, which shall be endorsed on the licence:
 - (1) for ratings ‘sailplanes’ and ‘powered sailplanes and ELA1 aeroplanes’:
 - wooden-structure aircraft covered with fabric,
 - aircraft with metal-tubing structure covered with fabric,
 - metal-structure aircraft,
 - composite-structure aircraft,
 - (2) for the rating ‘gas balloons’:
 - other than ELA1 gas balloons; and

- (3) if the applicant has only provided evidence of one-year experience in accordance with the derogation contained in point 66.A.30(a)(2b)(ii), the following limitation shall be endorsed on the licence:

‘complex maintenance tasks provided for in Appendix VII to MCAR-M, standard changes provided for in point 21.A.90B of MCAR-21 and standard repairs provided for in point 21.A.431B of MCAR-21.’

GM1 66.A.45 Endorsement with aircraft ratings

The following table shows a summary of the aircraft rating requirements contained in MCAR-66.A.45, MCAR-66.A.50 and Appendix III to MCAR-66.

The table contains the following:

- The different aircraft groups.
- For each licence (sub)category, which ratings are possible (at the choice of the applicant):
- Individual type ratings.
- Full and/or Manufacturer (sub)group ratings
- For each rating option, which are the qualification options.
- For the B1.2 licence (Group 3 aircraft), the B3 licence (piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below) and the L licences, which are the possible limitations and ratings to be included in the licence if not sufficient experience can be demonstrated in those areas.

Note: OJT means ‘On-the-Job Training’ (Appendix III to MCAR-66, Section 6) and is only required for the first aircraft rating in the licence (sub)category.

Aircraft rating requirements			
Aircraft	B1/B3/L licence	B2/B2L licence	C licence
<u>Group 1 aircraft, except airships</u> - Complex motor-powered aircraft. - Multiple-engine helicopters. - Other than piston-engine aeroplanes certified above FL290. - Aircraft equipped with fly-by-wire. - Other aircraft when defined by the CAA.	(For B1) Individual TYPE RATING Type training: - Theory + examination - Practical + assessment PLUS OJT (for first aircraft in licence subcategory)	(For B2) Individual TYPE RATING Type training: - Theory + examination - Practical + assessment PLUS OJT (for first aircraft in licence subcategory)	Individual TYPE RATING Type training: - Theory + examination

<u>Group 1 airships</u>	(For L5 licence) Individual TYPE RATING Type training: - Theory + examination - Practical + assessment PLUS OJT (for first aircraft in licence subcategory)	(For B2) Individual TYPE RATING Type training: - Theory + examination - Practical + assessment PLUS OJT (for first aircraft in licence category)	Not applicable
<u>Group 2 aircraft</u> Subgroups: 2a: single turboprop aeroplanes (*) 2b: single turbine engine helicopters (*) 2c: single piston engine helicopters (*) (*) Except those classified in Group 1.	(For B1.1, B1.3, B1.4) Individual TYPE RATING (type training + OJT) or (type evaluation + practical experience) Full SUBGROUP RATING (type training + OJT) or (type evaluation + practical experience) on at least 3 aircraft representative of that subgroup Manufacturer SUBGROUP RATING (type training + OJT) or (type evaluation + practical experience) on at least 2 aircraft representative of that manufacturer subgroup	(For B2) Individual TYPE RATING (type training + OJT) or (type evaluation + practical experience) (For B2 and B2L) Full SUBGROUP RATING based on demonstration of practical experience Manufacturer SUBGROUP RATING based on demonstration of practical experience	Individual TYPE RATING type training or type evaluation Full SUBGROUP RATING type training or type evaluation on at least 3 aircraft representative of that subgroup Manufacturer SUBGROUP RATING type training or type evaluation on at least 2 aircraft representative of that manufacturer subgroup

Aircraft rating requirements			
Aircraft	B1/B3/L licence	B2/B2L licence	C licence
<u>Group 3 aircraft</u> Piston engine aeroplanes (except those classified in Group 1)	(For B1.2) Individual TYPE RATING (type training + OJT) or (type evaluation + practical experience) Full GROUP 3 RATING based on demonstration of practical experience Limitations: - Pressurised aeroplanes - Metal aeroplanes - Composite aeroplanes - Wooden aeroplanes - Metal tubing and fabric aeroplanes	(For B2) Individual TYPE RATING (type training + OJT) or (type evaluation + practical experience) (For B2 and B2L) Full GROUP 3 RATING based on demonstration of appropriate experience	Individual TYPE RATING type training or type evaluation Full GROUP 3 RATING based on demonstration of practical experience
<u>Piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below</u>	(For B3) FULL RATING "Piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below" based on demonstration of practical experience Limitations: - Metal aeroplanes - Composite aeroplanes - Wooden aeroplanes - Metal tubing & fabric aeroplanes	This rating cannot be endorsed on a B2/B2L licence. These aircraft are already covered by the endorsement of ratings for Group 3 aircraft (see box above)	This rating cannot be endorsed on a C licence. These aircraft are already covered by the endorsement of ratings for Group 3 aircraft (see box above)
<u>Group 4 aircraft:</u> Sailplanes, powered sailplanes, balloons and airships other than those in Group 1	(For all L subcategories, except L5) - For L1C: 'composite sailplanes' rating, - For L1: 'sailplanes' rating, - For L2C: 'composite powered sailplanes and composite ELA1 aeroplanes' rating, - For L2: 'powered sailplanes and ELA1 aeroplanes' rating, - For L3H: 'hot-air balloons' rating,	(For B2 and B2L) Full GROUP 4 RATING based on demonstration of practical experience	Not applicable

	<ul style="list-style-type: none"> – For L3G: ‘gas balloons’ rating, – For L4H: ‘hot-air airships’ rating, – For L4G: ‘ELA2 gas airships’ rating, <p>all based on demonstration of practical experience</p> <p>Limitations: see 66.A.45(h)</p>		
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GM 66.A.45(b) Endorsement with aircraft type ratings

An aircraft type rating includes all the aircraft models/variants listed in column 2 of Appendix I to AMC to MCAR-66.

When a person already holds a type rating on the licence and such type rating is amended in the Appendix I to AMC to MCAR-66 in order to include additional models/variants, there is no need for additional type training for the purpose of amending the type rating in the licence. The rating should be amended to include the new variants, upon request by the applicant, without additional requirements. However, it is the responsibility of the licence holder and, if applicable, the maintenance organisation where he/she is employed to comply with 66.A.20(b)3, MCAR-145.A.35(a) and MCAR-M.A.607(a), and MCAR-CAO.A.040 as applicable, before he/she exercises certification privileges.

Similarly, type training courses covering certain, but not all the models/variants included in a type rating, are valid for the purpose of endorsing the full type rating.

AMC 66.A.45(d);(e)3;(f)1;(g)1;(h) Endorsement with aircraft ratings

1. The ‘practical experience’ should cover a representative cross section including at least:

- for categories B1, B2, B2L and B3: 50 % of the tasks contained in Appendix II to the AMC relevant to the licence category and to the applicable aircraft type ratings or aircraft (sub)group ratings being endorsed;
- for category L:
 - in the subcategories L1, L1C, L2 or L2C: 50 % as in the paragraph related to B1, B2, B2L or B3;
 - in the subcategories L3H and L3G for ‘Balloons’ or L4H, L4G and L5 for ‘Airships’, 80 % of the tasks should be demonstrated, and should include the tasks identified with an asterisk (*) in the Appendix;

This experience should cover tasks from each paragraph of the Appendix II list. Other tasks than those in the Appendix II may be considered as a replacement when they are relevant. In the case of (sub)group ratings, this experience may be shown by covering one or several aircraft types of the applicable (sub)group and may include experience on aircraft classified in group 1, 2 and/or 3 as long as the experience is relevant. The practical experience should be obtained under the supervision of authorised certifying staff.

2. In the case of endorsement of individual type ratings for Group 2 and Group 3 aircraft, for the second aircraft type of each manufacturer (sub)group the practical experience should be reduced to 30% of the tasks contained in Appendix II to AMC relevant to the licence category and to the applicable aircraft type. For subsequent aircraft types of each manufacturer (sub) group this should be reduced to 20%.
3. Practical experience should be demonstrated by the submission of records or a log book showing the Appendix II tasks performed by the applicant. Typical data to be recorded are similar to those described in AMC 66.A.20(b)2.

AMC 66.A.45(e) Endorsement with aircraft ratings

1. For the granting of manufacturer subgroup ratings for Group 2 aircraft, for B1 and C licence holders, the sentence “at least two aircraft types from the same manufacturer which combined are representative of the applicable manufacturer subgroup” means that the selected aircraft types should cover the technologies relevant to the manufacturer subgroup in the following areas:

- Flight control systems (mechanical controls / hydromechanically powered controls / electromechanically powered controls); and
- Avionic systems (analogue systems / digital systems); and
- Structure (manufactured of metal / composite / wood).

In cases where there are very different aircraft types within the same manufacturer subgroup, it may be necessary to cover more than two aircraft types to ensure adequate representation.

For this purpose it may be possible to use aircraft types from the same manufacturer classified in Group 1 as long as the selected aircraft belong to the same licence subcategory for which the rating will be endorsed.

2. For the granting of full subgroup ratings for Group 2 aircraft, for B1 and C licence holders, the sentence “at least three aircraft types from different manufacturers which combined are representative of the applicable subgroup” means that the selected aircraft types should cover all the technologies relevant to the manufacturer subgroup in the following areas:

- Flight control systems (mechanical controls / hydromechanically powered controls / electromechanically powered controls); and
- Avionic systems (analogue systems / digital systems); and
- Structure (manufactured of metal / composite / wood).

In cases where there are very different aircraft types within the same subgroup, it may be necessary to cover more than three aircraft types to ensure adequate representation.

For this purpose it may be possible to use aircraft types from different manufacturers classified in Group 1 as long as the selected aircraft belong to the same licence subcategory for which the rating will be endorsed.

3. For manufacturer subgroup ratings, the term “manufacturer” means the TC holder defined in the certification data sheet, which is reflected in the list of type ratings in Appendix I to AMC to MCAR-66.

In the case of an aircraft rating where the type rating refers to a TC holder made of a combination of two manufacturers which produce a similar aircraft (i.e. AGUSTA / BELL HELICOPTER TEXTRON or any case of aircraft similarly built by another manufacturer) this combination should be considered as one manufacturer.

As a consequence:

- When a licence holder gets a manufacturer type or a manufacturer subgroup rating made of a combination of manufacturers, it covers the combination of such manufacturers.
- When a licence holder who intends to endorse a full subgroup rating selects three aircraft from different manufacturers, this means from different combinations of manufacturers as applicable.

GM1 66.A.45(h)(ii) Endorsement with aircraft ratings

For subcategories L1 and L2, it is possible to endorse the corresponding ratings with limitations depending on the type of structures covered by the experience gained.

For subcategory L3G, it is possible to endorse the rating 'gas balloons' with a limitation to 'other than ELA1 gas balloons' if the experience gained only covers ELA1 gas balloons.

However, the limitations referred to in 66.A.45(h)(ii) do not apply for subcategories L1C, L2C, L3H, L4H and L4G. The ratings on these licences can only be obtained after demonstration of the appropriate experience representative of the full scope of the licence subcategory.

MCAR-66.A.50 Limitations

- (a) Limitations introduced on an aircraft maintenance licence are exclusions from the certification privileges and, in the case of limitations referred to in point 66.A.45, they affect the aircraft in its entirety.
- (b) For limitations referred to in point 66.A.45, limitations shall be removed upon:
 - 1. demonstration of appropriate experience, or
 - 2. after a satisfactory practical assessment performed by the CAA.
- (c) For limitations referred to in point 66.A.70, limitations shall be removed upon satisfactory completion of examination on those modules/subjects defined in the applicable conversion report.

AMC 66.A.50(b) Limitations

1. The appropriate experience required to remove the limitations referred in 66.A.45(f)(g) and (h) should consist of the performance of a variety of tasks appropriate to the limitations under the supervision of authorised certifying staff. This should include the tasks required by a scheduled annual inspection. Alternatively, this experience may also be gained, if agreed by the competent authority, by theoretical and practical training provided by the manufacturer, as long as an assessment is further carried out and recorded by this manufacturer.
2. It is acceptable to have this experience on just one aircraft type, provided this type is representative of the (sub)group in relation to the limitation being removed.
3. (Reserved)
4. The application for the limitation removal should be supported by a record of experience signed by the authorised certifying staff or by an assessment signed by the manufacturer after completion of the applicable theoretical and practical training.

MCAR-66.A.55 Evidence of qualification

Personnel exercising certification privileges as well as support staff shall produce their licence, as evidence of qualification, within 24 hours upon request by an authorised person.

MCAR-66.A.70 Conversion Provisions

- (a) The holder of a valid certifying staff qualification issued by the CAA, prior to the date of entry into force of MCAR-66 shall be issued an aircraft maintenance licence without further examinations subject to conditions specified in Section B Subpart D.
- (b) A person undergoing a certifying staff qualification process approved by the CAA, prior to the date of entry into force of MCAR-66 may continue to be qualified. The holder of a certifying staff qualification gained following such qualification process shall be issued an aircraft maintenance licence without further examination subject to the conditions specified in the applicable conversion report.
- (c) Where necessary, the aircraft maintenance licence shall contain limitations in accordance with point 66.A.50 to reflect the differences between:
 - i. the scope of the certifying staff qualification valid in the Maldives before the entry into force of MCAR-66 and
 - ii. the basic knowledge requirements and the basic examination standards laid down in Appendix I and II to MCAR-66.
- (d) By derogation from point (c), for aircraft not used by licenced air carriers in accordance with MCAR-Air Operations, other than complex motor-powered aircraft, and for balloons, sailplanes, motor-powered sailplanes and airships, the aircraft maintenance licence shall contain limitations in accordance with MCAR-66.A.50 to ensure that the certifying staff privileges valid in the Maldives before the entry into force of the applicable MCAR-66 licence category/subcategory and those of the converted MCAR-66 aircraft maintenance licence remain the same.

GM 66.A.70 Conversion provisions

1. As described in point 66.A.70, the conversion provisions apply to the holder of a valid certifying staff qualification issued by the CAA prior to the date of entry into force of MCAR-66. The sentence “the holder of a valid certifying staff qualification issued by the CAA” means any person who had a qualification issued by the CAA allowing that person the performance of activities identical to the privileges of “certifying staff” contained in MCAR-66. This means that the signature of that person was sufficient to declare that the maintenance had been properly performed and the aircraft was ready for service and fit for flight in respect to such maintenance.
2. The conversion applies to “certifying staff qualifications” such as , for example:
 - holding a Maldivian licence (or completed the process to obtain such a licence);
 - having completed a qualification process defined by the CAA;
 - having completed the qualification requirements for certifying staff within a maintenance organisation, as defined in their procedures.

This does not mean that in order to be entitled to a conversion process, the applicant has to be exercising certification privileges. A person may hold a “certifying staff qualification” while not having certification privileges (or while exercising very limited certification privileges below his/her qualification) for different reasons such as, for example, the following:

- The person is working as “support staff” in the base maintenance environment;
- The person has been authorised only for a very limited range of tasks (lower than what he/she would be entitled if his/her qualification is considered) since the person is working in a line station where the scope of tasks is very limited;
- The person holds a licence with a wider scope than the scope of the organisation where he/she is employed;
- The person is working outside the aviation industry or is temporarily on leave due to different reasons (medical, personal, etc).

These persons are entitled to have the conversion performed in accordance with the full scope of their qualification and the full privileges that they would be entitled to hold on the basis of such qualification.

3. As described in point 66.A.70, certifying staff qualifications eligible for conversion are those valid “prior to the date of entry into force of MCAR-66”, which means those qualifications valid before 15 July 2007.

Nevertheless, since the B3, B2L and L licences did not exist at those dates, certifying staff qualifications eligible for conversion to a B3, B2L and L licences are those valid before the

date where the CAA has the obligation to start issuing such licences, which means the following:

- for the B3 licence, those qualifications valid before 31 December 2015;
- for the B2L licence, those qualifications valid before 31 August 2021;
- for the L licence, those qualifications valid before 31 August 2021.

4. (Reserved).

5. A certifying staff qualification can be subject to more than one conversion process and can also be converted to more than one licence (sub)category (with any applicable limitations). This could be the case, for example, of a person who already had the certifying staff qualification converted to a B1.2 licence with limitations linked to some missing elements of the MCAR-66 Appendix I and II standard (following 66.A.70(c)). This person would be entitled to apply and have his/her certifying staff qualification converted to a B1.2 or a B3 or L licence on the basis of 66.A.70(d), which would mean no need to compare with the MCAR-66 Appendix I and II standard, introducing only those limitations required in order to maintain the existing privileges.

GM 66.A.70(c) Conversion provisions

For example, a limitation could be where a person holds a pre-existing certifying staff qualification which covered, to the standard of MCAR-66 Appendix I and II, all the modules/subjects corresponding to the B1 licence except for electrical power systems. This person would be issued an MCAR-66 aircraft maintenance licence in the B1 category with a limitation (exclusion) on electrical power systems.

For removal of limitations, refer to 66.A.50(c).

GM 66.A.70(d) Conversion provisions

For aircraft not used by air carriers licensed in accordance with MCAR-Air Operations other than complex motor-powered aircraft, an example of limitations could be where a person holds a pre-MCAR-66 qualification which covered privileges to release work performed on aircraft structures, powerplant, mechanical and electrical systems but excluded privileges on aircraft equipped with turbine engine, aircraft above 2 000 kg MTOM, pressurised aircraft and aircraft equipped with retractable landing gear. This person would be issued with a MCAR-66 aircraft maintenance licence in the B1.2 or B3 (sub)category with the following limitations (exclusions):

- aircraft used by air carriers licensed in accordance with MCAR- Air Operations (this limitation always exists);
- aircraft above 2 000 kg MTOM;
- pressurised aircraft;
- aircraft equipped with retractable landing gear.

Another example of limitations could be where a pilot-owner holds a pre-MCAR-66 qualification which covered privileges to release work performed on aircraft structures, powerplant, mechanical and electrical systems but limited to their own aircraft and limited to a particular

aircraft type (for example, a Cessna 172). This pilot-owner would receive a MCAR-66 aircraft maintenance licence in the B1.2 or B3 (sub)category with the following limitations (exclusions):

- aircraft used by air carriers licensed in accordance with MCAR-Air Operations (this limitation always exists);
- aircraft other than a Cessna 172;
- aircraft not owned by the licence holder.

One more example would be the case where a person holds a pre-MCAR-66 qualification that covers privileges to release work on composite and metal sailplanes and powered sailplanes, covering aircraft structures, powerplant, mechanical and electrical systems. This person would be issued a MCAR-66 aircraft maintenance licence in the L2 subcategory, with the following limitations (exclusions):

- ELA1 aeroplanes;
- wooden-structure aircraft covered with fabric;
- aeroplanes with metal-tubing structure covered with fabric.

And one more example would be the case where a person holds a pre-MCAR-66 qualification that covers privileges to release work on composite sailplanes up to the annual inspection but not including complex maintenance tasks, repairs and changes. This person would be issued a MCAR-66 aircraft maintenance licence in the L1C subcategory, with the following limitations:

- complex maintenance tasks described in Appendix VII to MCAR-M, standard changes described in MCAR-21.A.90B, and standard repairs described in MCAR-21.A.431B.

The essential aspect is that the limitations are established in order to maintain the privileges of the MCAR-66 qualification without comparing the previous qualification with the standard of MCAR-66 Appendix I and II.

For removal of limitations, refer to MCAR-66.A.50(c).

Subpart B — RESERVED

Subpart C — COMPONENTS

MCAR-66.A.200 General

This subpart is reserved.

Section B — PROCEDURES FOR THE CAA

Subpart A — GENERAL

MCAR-66.B.1 Scope

This section establishes the procedures including the administrative requirements followed by the CAA in the implementation and the enforcement of Section A of this Regulation.

Subpart B — ISSUE OF AN AIRCRAFT MAINTENANCE LICENCE

This Subpart provides the procedures followed by the CAA to issue, change or continue an aircraft maintenance licence.

MCAR-66.B.100 Procedure for the issue of an aircraft maintenance licence by the CAA

- (a) On receipt of CAA Form 19 and any supporting documentation, the CAA will verify CAA Form 19 for completeness and ensure that the experience claimed meets the requirements of this Regulation.
- (b) The CAA will verify an applicant's examination status to ensure that all module requirements of Appendix I or Appendix VII, as applicable, have been met as required by this Regulation.
- (c) When having verified the identity and date of birth of the applicant and being satisfied that the applicant meets the standards of knowledge and experience required by this Regulation, the CAA will issue the relevant aircraft maintenance licence to the applicant.
- (d) In the case where aircraft types or groups are endorsed at the time of the issuance of the first aircraft maintenance licence, the CAA will verify compliance with point 66.B.115.

AMC 66.B.100 Procedure for the issue of an aircraft maintenance licence by the CAA

- 1. Applicants claiming the maximum reduction in 66.A.30(a) total experience based upon successful completion of a MCAR-147.A.200 approved basic training course should include the MCAR-147 certificate of recognition for approved basic training.
- 2. Applicants claiming reduction in 66.A.30(a) total experience based upon successful completion of training considered relevant by the CAA as a skilled worker in a technical trade, should include the relevant certificate of successful completion of training.
- 3. Applicants claiming credit against the 66.A.30(a) total experience requirement by virtue of 66.A.30(a) non-civil aircraft maintenance experience may only be granted such credit where the CAA has recognised such non-civil aircraft maintenance experience. The applicant should include a detailed statement of such maintenance experience signed by the non-civil maintenance authority in accordance with the conditions specified by the CAA.
- 4. The CAA will check that the experience record satisfies above paragraphs in terms of content and the countersigning signature.

GM 66.B.100 Procedure for the issue of an aircraft maintenance licence by the CAA

At the issue or renewal of a B2L licence:

- one or several system ratings; and
- one or several group/subgroup ratings,

may be endorsed on the licence (MCAR-66 AML).

A licences will be issued with a subcategory without type ratings.

B1, B2 and C licences may be issued without an aircraft type or group rating.

B2L licences may be issued without an aircraft type or group rating. The B2L licence will always be issued with at least one system rating. This is based on the demonstrated initial experience that at least should be sufficient to endorse one system rating.

B3 licences will be issued with the rating 'piston engine non-pressurised aeroplanes of 2 000 kg MTOM and below' endorsed as the experience requirement for the rating is at least covered by the 1, 2 or 3 years of experience for that category.

L licences will be issued with at least one subcategory and the relevant aircraft rating.

MCAR-66.B.105 Procedure for the issue of an aircraft maintenance licence via a maintenance organisation approved in accordance with MCAR-145 or MCAR-CAO

- (a) A maintenance organisation approved in accordance with MCAR-145 or MCAR-CAO, when authorised to carry out this activity by the CAA, may make recommendations to the CAA regarding the application from an individual for an aircraft maintenance licence so that the CAA may prepare and issue such licence.
- (b) Maintenance organisations referred to in point (a) shall ensure compliance with points 66.B.100(a) and (b).
- (c) The aircraft maintenance licence can only be issued to the applicant by the CAA.

AMC 66.B.105 Procedure for the issue of an aircraft maintenance licence via the Part-145 approved maintenance organisation

- 1. The maintenance organisation approved under MCAR-145 should include the procedure in the organisation's exposition (Chapter 3.21), and this procedure will be audited by the CAA at least once in each 12-month period.
- 2. The MCAR-145 organisation should check that the experience records have been properly countersigned.
- 3. The maintenance organisation approved under MCAR-145 may keep the experience record of applicants in a different form from that of application CAA Form 19 but such different form or manner should be acceptable to the CAA.

MCAR-66.B.110 Procedure for the change of an aircraft maintenance licence to include an additional basic category or subcategory

- (a) At the completion of the procedures specified in points 66.B.100 or 66.B.105, the CAA will endorse the additional basic category, subcategory or, for category B2L, system rating(s) on the aircraft maintenance licence by stamp and signature or will reissue the licence.
- (b) The record system of the CAA will be changed accordingly.
- (c) Upon request by the applicant, the CAA will replace a licence in category B2L with a licence in category B2 endorsed with the same aircraft rating(s) when the holder has demonstrated both of the following:
 - i. by examination the differences between the basic knowledge corresponding to the B2L licence held and the basic knowledge of the B2 licence, as set out in Appendix I;
 - ii. the practical experience required in Appendix IV.
- (d) The experience and basic knowledge modules or partial modules required for adding a new licence category or subcategory to an existing licence issued in accordance with this Regulation are outlined in the tables of Appendix IV.

AMC 66.B.110 Procedure for the change of an aircraft maintenance licence to include an additional basic category or subcategory

When the conditions set in the rule for extending a B2L licence to include the B2 category are met, the B2L licence will be replaced by a B2 licence.

The B2L licence replaced by a B2 licence will be retained by the CAA.

MCAR-66.B.115 Procedure for the change of an aircraft maintenance licence to include an aircraft rating or to remove limitations

- (a) On receipt of a satisfactory CAA Form 19 and any supporting documentation demonstrating compliance with the requirements of the applicable rating together with the accompanying aircraft maintenance licence, the CAA will either:
1. endorse the applicant's aircraft maintenance licence with the applicable aircraft rating; or
 2. reissue the said licence to include the applicable aircraft rating; or
 3. remove the applicable limitations in accordance with point 66.A.50.

The CAA record system will be changed accordingly.

- (b) In the case where the complete type training is not conducted by maintenance training organisation appropriately approved in accordance with MCAR-147, the CAA must be satisfied that all type training requirements are complied with before the type rating is issued.
- (c) In the case where the On the Job Training is not required, the aircraft type rating will be endorsed based on a Certificate of Recognition issued by a maintenance training organisation approved in accordance with MCAR-147
- (d) In the case where the aircraft type training is not covered by a single course, the CAA must be satisfied prior to the type rating endorsement that the content and length of the courses fully satisfy the scope of the licence category and that the interface areas have been appropriately addressed.
- (e) In the case of differences training, the CAA must be satisfied that (i) the applicant's previous qualification, supplemented by (ii) either a course approved in accordance with MCAR-147 or a course directly approved by the CAA, are acceptable for type rating endorsement.
- (f) The CAA will ensure that compliance with the practical elements of the type training is demonstrated by one of the following:
- i. by the provision of detailed practical training records or a logbook provided by the organisation which delivered the course directly approved by the CAA in accordance with point 66.B.130;
 - ii. where available, by a training certificate, covering the practical training element, issued by a maintenance training organisation appropriately approved in accordance with MCAR-147
- (g) Aircraft type endorsement shall use the aircraft type ratings specified by the CAA.

AMC 66.B.115 Procedure for the change of an aircraft maintenance licence to include an aircraft rating or to remove limitations

- (a) Where the type training has not been conducted by a MCAR-147 organisation, there should be supporting documents confirming to the CAA that:
- The type training has been approved by the CAA in accordance with 66.B.130,
 - the applicant has completed the elements of the approved type training; and
 - the trainee has been successfully examined/assessed.
- (b) Aircraft type training may be subdivided in airframe and/or powerplant and/or avionics/electrical systems type training courses.
1. Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.
 2. Powerplant type training course means a type training course on the bare engine, including the build-up to a quick engine change unit.
 3. The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course. In some cases, such as for general aviation, it may be more appropriate to cover the interface during the airframe course due to the large variety of aircraft that can have the same engine type installed.
 4. Avionics/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to ATA Chapters 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73 and 77 or equivalent.
- (c) For the acceptance of the OJT tasks and programme, the CAA will use procedures compliant with Section 6 of Appendix III to MCAR-66.

MCAR-66.B.120 Procedure for the renewal of an aircraft maintenance licence validity

- (a) The CAA shall compare the holder's aircraft maintenance licence with the CAA records and verify any pending revocation, suspension or change action pursuant to point 66.B.500. If the documents are identical and no action is pending pursuant to point 66.B.500, the holder's copy shall be renewed for 5 years and the file endorsed accordingly.
- (b) If the CAA records are different from the aircraft maintenance licence held by the licence holder
1. the CAA will investigate the reasons for such differences and may choose not to renew the aircraft maintenance licence.
 2. the CAA will inform the licence holder and any known maintenance organisation approved in accordance with MCAR-M Subpart F, MCAR-145 or MCAR-CAO that may be directly affected of such fact.
 3. the CAA will, if necessary, take action in accordance with point 66.B.500 to revoke, suspend or change the licence in question.

AMC 66.B.120 Procedure for the renewal of an aircraft maintenance licence validity

The CAA will not carry out any investigation to ensure that the licence holder is in current maintenance practice as this is not a condition for the renewal of a licence. Ensuring the continued validity of the certification privileges is a matter for the approved MCAR-145 / M.A. Subpart F / MCAR-CAO maintenance organisation or the certifying staff in accordance with M.A.801(b)1.

For the purpose of ensuring the continued validity of the certification privileges, the CAA may, when periodically reviewing the organisations in accordance with 145.B.305, M.B.604 or CAO.B.055, or during on-the-spot checks, request the licence holder to provide documentary evidence of compliance with 66.A.20(b) when exercising certification privileges.

MCAR-66.B.125 Procedure for the conversion of licences including group ratings

(a) Individual aircraft type ratings already endorsed on the aircraft maintenance licence referred to in MCAR.A.10 shall remain on the licence and shall not be converted to new ratings unless the licence holder fully meets the requirements for endorsement defined in point 66.A.45 of MCAR-66 for the corresponding group/sub-group ratings.

(b) The conversion shall be performed in accordance with the following conversion table:

1. for category B1 or C:

- helicopter piston engine, full group: converted to ‘full subgroup 2c’ plus the aircraft type ratings for those single piston engine helicopters which are in Group 1;
- helicopter piston engine, manufacturer group: converted to the corresponding ‘manufacturer subgroup 2c’ plus the aircraft type ratings for those single piston engine helicopters of that manufacturer which are in Group 1;
- helicopter turbine engine, full group: converted to ‘full subgroup 2b’ plus the aircraft type ratings for those single turbine engine helicopters which are in Group 1;
- helicopter turbine engine, manufacturer group: converted to the corresponding ‘manufacturer subgroup 2b’ plus the aircraft type ratings for those single turbine engine helicopters of that manufacturer which are in Group 1;
- aeroplane single piston engine — metal structure, either full group or manufacturer group: converted to ‘full group 3’. For the B1 licence, the following limitations shall be included: composite-structure aeroplanes, wooden-structure aeroplanes, and metal-tubing and fabric aeroplanes;
- aeroplane multiple piston engines — metal structure, either full group or manufacturer group: converted to ‘full group 3’ plus the aircraft type ratings for those aeroplanes with multiple piston engines of the corresponding full/manufacturer group which are in Group 1. For the B1 licence, the following limitations shall be included: composite-structure aeroplanes, wooden-structure aeroplanes and metal-tubing and fabric aeroplanes;
- aeroplane single piston engine — wooden structure, either full group or manufacturer group: converted to ‘full group 3’. For the B1 licence, the following limitations shall be included: pressurised aeroplanes, metal-structure aeroplanes, composite-structure aeroplanes and metal-tubing and fabric aeroplanes;
- aeroplane multiple piston engines — wooden structure, either full group or manufacturer group: converted to ‘full group 3’. For the B1 licence, the following limitations shall be included: pressurised aeroplanes, metal-structure aeroplanes, composite-structure aeroplanes and metal-tubing and fabric aeroplanes;

- aeroplane single piston engine — composite structure, either full group or manufacturer group: converted to ‘full group 3’. For the B1 licence, the following limitations shall be included: pressurised aeroplanes, metal-structure aeroplanes, wooden-structure aeroplanes and metal-tubing and fabric aeroplanes;
- aeroplane multiple piston engines — composite structure, either full group or manufacturer group: converted to ‘full group 3’. For the B1 licence, the following limitations shall be included: pressurised aeroplanes, metal-structure aeroplanes, wooden-structure aeroplanes and metal-tubing and fabric aeroplanes;
- aeroplane turbine — single engine, full group: converted to ‘full sub-group 2a’ plus the aircraft type ratings for those single turboprop aeroplanes which did not require an aircraft type rating in the previous system and are in Group 1;
- aeroplane turbine — single engine, manufacturer group: converted to the corresponding ‘manufacturer subgroup 2a’ plus the aircraft type ratings for those single turboprop aeroplanes of that manufacturer which did not require an aircraft type rating in the previous system and are in Group 1;
- aeroplane turbine — multiple engines, full group: converted to the aircraft type ratings for those aeroplanes with multiple turboprop engines which did not require an aircraft type rating in the previous system.

2. for category B2:

- aeroplane: converted to ‘full sub-group 2a’ and ‘full group 3’, plus the aircraft type ratings for those aeroplanes which did not require an aircraft type rating in the previous system and are in group 1,
- helicopter: converted to ‘full sub-groups 2b and 2c’, plus the aircraft type ratings for those helicopters which did not require an aircraft type rating in the previous system and are in group 1;

3. for category C:

- aeroplane: converted to ‘full sub-group 2a’ and ‘full group 3’, plus the aircraft type ratings for those aeroplanes which did not require an aircraft type rating in the previous system and are in group 1,
- helicopter: converted to ‘full sub-groups 2b and 2c’, plus the aircraft type ratings for those helicopters which did not require an aircraft type rating in the previous system and are in group 1.

(c) If the licence was subject to limitations following the conversion process referred to in point 66.A.70, these limitations shall remain on the licence, unless they are removed under the conditions defined in the relevant conversion report.

MCAR-66.B.130 Procedure for the direct approval of aircraft type training

- (a) In the case of type training for aircraft other than airships, the CAA may approve aircraft type training not conducted by a maintenance training organisation approved in accordance with MCAR-147, pursuant to point 1 of Appendix III to MCAR-66. In such case, the CAA will have a procedure to ensure that the aircraft type training complies with Appendix III to MCAR-66.
- (b) In the case of type training for airships in Group 1, the courses will be directly approved by the CAA in all cases. The CAA will have a procedure to ensure that the syllabus of the airship-type training covers all the elements contained in the maintenance data from the Design Approval Holder (DAH).
- (c) The Certificate of Recognition (CoR) (CAA Form 149b) of Appendix III to MCAR-147 shall be used for the recognition of completion of either the theoretical elements, the practical elements or both the theoretical and practical elements of the type rating training course.

AMC 66.B.130 Procedure for the direct approval of aircraft type training

In the case of type training for aircraft other than airships:

1. The procedure for the direct approval of type training courses by the CAA will require that the following aspects are described by the organisation providing the training:
 - The content and the duration of the theoretical and/or practical elements, as applicable, in accordance with Appendix III to MCAR-66, including the Training Need Analysis (TNA);
 - The teaching methods and instructional equipment;
 - The material and documentation provided to the student;
 - The qualification of instructors, examiners and/or assessors, as applicable;
 - The examination and/or assessment procedure, as applicable. Further guidance about the assessment and the designated assessors is given in Appendix III to AMC to MCAR-66.
 - The documentation and records to be provided to the student to justify the satisfactory completion of the training course and related examination/assessment. This should include not only a certificate of completion but enough documentation and records to justify that the content and duration approved has been met and that the examination/assessment has been successfully passed.
2. The above criteria apply to a full course as well as to a partial course such as the practical element of a type training course and its assessment.
3. The procedure will also indicate how the CAA is going to audit the proper performance of the approved course.

4. The direct approval of aircraft type training will be done on a case by case basis and will not be granted for long term periods, since it is not a privilege of the organisation providing the training.

MCAR-66.B.135 Procedure for the approval of multimedia-based training (MBT) courses

The CAA, whenever it approves courses, including multimedia-based training (MBT) courses, which are delivered in a physical environment or virtual environment or both, will verify that the aircraft basic training and the aircraft type training comply with Appendix I and Appendix III respectively.

The approval procedure will include the principles and criteria of Appendix IX.

Subpart C — EXAMINATIONS

This Subpart provides the procedures followed for the examinations conducted by the CAA.

MCAR-66.B.200 Examination by the CAA

- (a) All examination questions will be kept in a secure manner prior to an examination, to ensure that candidates will not know which particular questions will form the basis of the examination.
- (b) The CAA will nominate:
 - 1. persons who control the questions to be used for each examination;
 - 2. examiners who shall be present during all examinations to ensure the integrity of the examination.

- (c) Basic examinations shall follow the standard specified in Appendices I and II or in Appendices VII and VIII as applicable.

The Certificate of Recognition (CoR) (CAA Form 148b) of Appendix III to MCAR-147 shall be used to attest completion of basic examinations

- (d) Type training examinations and type evaluations will follow the standard specified in Appendix III.

The Certificate of Recognition (CoR) (CAA Form 149b) of Appendix III to MCAR-147 shall be used to attest completion of aircraft type training or type evaluations.

- (e) New essay questions shall be raised at least every 6 months and questions already used withdrawn or rested from use. A record of the questions used shall be retained in the records for reference.
- (f) All examination papers shall be handed out at the start of the examination to the candidate and handed back to the examiner at the end of the allotted examination time period. No examination paper may be removed from the examination room during the allotted examination time period.
- (g) Apart from specific documentation needed for type evaluations, only the examination documents may be available to the candidate during the evaluation.
- (h) Examination candidates will be separated from each other so that they cannot read each other's examination papers. They may not speak to any person other than the examiner.

- (i) Candidates who are proven to be cheating shall be banned from taking any further examination within 12 months of the date of the examination in which they were found cheating.

Subpart D — CONVERSION OF CERTIFYING STAFF QUALIFICATIONS

(This Subpart is reserved)

Subpart E — EXAMINATION CREDITS

(This Subpart is reserved)

Subpart F — CONTINUING OVERSIGHT

This Subpart describes the procedures for the continuing oversight of the aircraft maintenance licence and in particular for the revocation, suspension or limitation of the aircraft maintenance licence.

MCAR-66.B.500 Revocation, suspension or limitation of the aircraft maintenance licence

The CAA will suspend, limit or revoke the aircraft maintenance licence where it has identified a safety issue or if it has clear evidence that the person has carried out or been involved in one or more of the following activities:

1. obtaining the aircraft maintenance licence and/or the certification privileges by falsification of documentary evidence;
2. failing to carry out requested maintenance combined with failure to report such fact to the organisation or person who requested the maintenance;
3. failing to carry out required maintenance resulting from own inspection combined with failure to report such fact to the organisation or person for whom the maintenance was intended to be carried out;
4. negligent maintenance;
5. falsification of the maintenance record;
6. issuing a certificate of release to service knowing that the maintenance specified on the certificate of release to service has not been carried out or without verifying that such maintenance has been carried out;
7. carrying out maintenance or issuing a certificate of release to service when adversely affected by alcohol or drugs;
8. issuing certificate of release to service while not in compliance with this Regulation.

APPENDICES TO THE REGULATIONS

Appendix I Basic Knowledge Requirements (except for category L licence)

1. Knowledge levels for Category A, B1, B2, B2L, B3 and C Aircraft Maintenance Licences

Basic knowledge for categories A, B1, B2, B2L and B3 are indicated by the allocation of knowledge levels indicators (1, 2 or 3) against each applicable subject. Category C applicants shall meet either the category B1 or the category B2 basic knowledge levels.

The knowledge level indicators are defined as follows:

LEVEL 1: A familiarisation with the principal elements of the subject.

Objectives:

- (a) The applicant should be familiar with the basic elements of the subject.
- (b) The applicant should be able to give a simple description of the whole subject, using common words and examples.
- (c) The applicant should be able to use typical terms.

LEVEL 2: A general knowledge of the theoretical and practical aspects of the subject and an ability to apply that knowledge.

Objectives:

- (a) The applicant should be able to understand the theoretical fundamentals of the subject.
- (b) The applicant should be able to give a general description of the subject using, as appropriate, typical examples.
- (c) The applicant should be able to use mathematical formulae in conjunction with physical laws describing the subject.
- (d) The applicant should be able to read and understand sketches, drawings and schematics describing the subject.

- (e) The applicant should be able to apply his knowledge in a practical manner using detailed procedures.

LEVEL 3: A detailed knowledge of the theoretical and practical aspects of the subject and a capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner.

Objectives:

- (a) The applicant should know the theory of the subject and interrelationships with other subjects.
- (b) The applicant should be able to give a detailed description of the subject using theoretical fundamentals and specific examples.
- (c) The applicant should understand and be able to use mathematical formulae related to the subject.
- (d) The applicant should be able to read, understand and prepare sketches, simple drawings and schematics describing the subject.
- (e) The applicant should be able to apply his knowledge in a practical manner using manufacturer's instructions.
- (f) The applicant should be able to interpret results from various sources and measurements and apply corrective action where appropriate.

2. Modularisation

Qualification on basic subjects for each aircraft maintenance licence category or subcategory shall be in accordance with the following matrix, where applicable subjects are indicated by an 'X', while 'n/a' means that the subject module is neither applicable nor required:

[[All tables under this heading have been moved. Colour not changed to green for ease of reading. Some highlights for content changes]]

Subject module	B1.1 A1	B1.2 A2	B1.3 A3	B1.4 A4	B3	B2	B2L	C
	Turbine engine	Piston engine	Turbine engine	Piston engine	Piston-engine non-pressurised aeroplanes MTOM ≤ 2 t			
1. Mathematics	X	X	X	X	X	X	X	X
2. Physics	X	X	X	X	X	X	X	X
3. Electrical Fundamentals	X	X	X	X	X	X	X	X
4. Electronic Fundamentals	X (n/a for A1)	X (n/a for A2)	X (n/a for A3)	X (n/a for A4)	X	X	X	X
5. Digital Techniques / Electronic Instrument Systems	X	X	X	X	X	X	X	X
6. Materials and Hardware	X	X	X	X	X	X	X	X
7. Maintenance Practices	X	X	X	X	X	X	X	X
8. Basic Aerodynamics	X	X	X	X	X	X	X	X
9. Human Factors	X	X	X	X	X	X	X	X
10. Aviation Legislation	X	X	X	X	X	X	X	X
11. Aeroplane Aerodynamics, Structures and Systems	X	X	n/a	n/a	X	n/a	n/a	11, 15 & 17 as B1.1 or

Subject module	B1.1 A1	B1.2 A2	B1.3 A3	B1.4 A4	B3	B2	B2L	C
	Turbine engine	Piston engine	Turbine engine	Piston engine	Piston-engine non-pressurised aeroplanes MTOM ≤ 2 t			
12. Helicopter Aerodynamics, Structures and Systems	n/a	n/a	X	X	n/a	n/a	n/a	11, 16 & 17 as B1.2 or 12 & 15 as B1.3 or 12 & 16 as B1.4 or 13 & 14 as B2
13. Aircraft Aerodynamics, Structures and Systems	n/a	n/a	n/a	n/a	n/a	X	X	
14. Propulsion	n/a	n/a	n/a	n/a	n/a	X	X	
15. Gas Turbine Engines	X	n/a	X	n/a	n/a	n/a	n/a	
16. Piston Engine	n/a	X	n/a	X	X	n/a	n/a	
17. Propeller	X	X	n/a	n/a	X	n/a	n/a	

MODULE 1. MATHEMATICS

MODULE 1. MATHEMATICS		Level	
		A	B1 B2 B2L B3
1.1	Arithmetic	1	2
1.2	Algebra		
(a)	Simple algebraic expressions;	1	2
(b)	Equations;	—	1
1.3	Geometry		
(a)	Simple geometrical constructions;	—	1
(b)	Graphical representation;	2	2
(c)	Trigonometry.	—	2

MODULE 2. PHYSICS

MODULE 2. PHYSICS	Level	
	A B3	B1 B2 B2L
2.1 Matter	1	2
2.2 Mechanics		
2.2.1 Statics	1	2
2.2.2 Kinetics	1	2
2.2.3 Dynamics		
(a) Mass, force and energy;	1	2
(b) Momentum and conservation of momentum;	1	2
2.2.4 Fluid dynamics		
(a) Gravity and density;	2	2
(b) Viscosity; compressibility on fluids; static, dynamic and total pressure	1	2
2.3 Thermodynamics		
(a) Temperature.	2	2
(b) Heat.	1	2
2.4 Optics (Light)	—	2
2.5 Wave Motion and Sound	—	2

MODULE 3. ELECTRICAL FUNDAMENTALS

MODULE 3. ELECTRICAL FUNDAMENTALS		Level		
		A	B1 B2 B2L	B3
3.1	Electron Theory	1	1	1
3.2	Static Electricity and Conduction	1	2	1
3.3	Electrical Terminology	1	2	1
3.4	Generation of Electricity	1	1	1
3.5	Sources of DC Electricity	1	2	2
3.6	DC Circuits	1	2	1
3.7	Resistance/Resistor			
(a)	Resistance;	—	2	1
(b)	Resistors.	—	1	—
3.8	Power	—	2	1
3.9	Capacitance/Capacitor	—	2	1
3.10	Magnetism			
(a)	Theory of magnetism;	—	2	1
(b)	Magnetomotive force.	—	2	1
3.11	Inductance/Inductor	—	2	1
3.12	DC Motor/Generator Theory	—	2	1
3.13	AC Theory	1	2	1
3.14	Resistive (R), Capacitive (C) and Inductive (L) Circuits	—	2	1
3.15	Transformers	—	2	1
3.16	Filters	—	1	—

3.17 AC Generators	—	2	1
3.18 AC Motors	—	2	1

MODULE 4. ELECTRONIC FUNDAMENTALS

MODULE 4. ELECTRONIC FUNDAMENTALS	Level		
	A	B1 B3	B2 B2L
4.1 Semiconductors			
<i>4.1.1 Diodes</i>			
(a) Description and characteristics;	—	2	2
(b) Operation and function.	—	—	2
<i>4.1.2 Transistors</i>			
(a) Description and characteristics;	—	1	2
(b) Construction and operation.	—	—	2
<i>4.1.3 Integrated Circuits</i>			
(a) Basic Description and operation;	—	1	2
(b) Description and operation.	—	—	2
4.2 Printed Circuit Boards	—	1	2
4.3 Servomechanisms			
(a) Principles	—	1	2
(b) Construction, operation and use;	—	—	2

MODULE 5. DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

MODULE 5. DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS		Level			
		A	B3	B1	B2 B2L
5.1	Electronic Instrument Systems	1	1	1	1
5.2	Numbering Systems	—	—	1	2
5.3	Data Conversion	—	—	1	2
5.4	Data Buses	—	—	2	2
5.5	Logic Circuits				
(a)	Identification and applications;	—	—	2	2
(b)	Interpretation of logic diagrams.	—	—	—	2
5.6	Basic Computer Structure				
(a)	Computer terminology and technology;	1	1	2	2
(b)	Computer operation;	—	—	—	2
5.7	Microprocessors	—	—	—	2
5.8	Integrated Circuits	—	—	—	2
5.9	Multiplexing	—	—	—	2
5.10	Fibre Optics	—	—	1	2
5.11	Electronic Displays	1	1	2	2
5.12	Electrostatic sensitive devices	1	1	2	2
5.13	Software Management Control	—	1	2	2
5.14	Electromagnetic Environment	—	1	2	2
5.15	Typical Electronic/Digital Aircraft Systems	1	1	1	1

MODULE 6. MATERIALS AND HARDWARE

MODULE 6. MATERIALS AND HARDWARE		Level		
		A	B1 B3	B2 B2L
6.1 Aircraft Materials — Ferrous				
(a) Alloy steel used in aircraft;		1	2	1
(b) Testing of ferrous materials;		—	1	1
(c) Repair and inspection procedures.		—	2	1
6.2 Aircraft Materials — Non-Ferrous				
(a) Characteristics;		1	2	1
(b) Testing of non-ferrous material;		—	1	1
(c) Repair and inspection procedures.		—	2	1
6.3 Aircraft Materials — Composite and Non-Metallic				
<i>6.3.1 Composite and non-metallic other than wood and fabric</i>				
(a) Characteristics;		1	2	2
(b) Detection of defects;		1	2	—
(c) Repair and inspection procedures.		—	2	1
<i>6.3.2 Wooden structures</i>		1	1	—
<i>6.3.3 Fabric covering</i>		—	1	—
<i>6.4 Corrosion</i>				
(a) Chemical fundamentals;		1	1	1
(b) Types of corrosion;		2	3	2
6.5 Fasteners				
<i>6.5.1 Screw threads</i>		2	2	2
<i>6.5.2 Bolts, studs and screws</i>		2	2	2

6.5.3	<i>Locking devices</i>	2	2	2
6.5.4	<i>Aircraft rivets</i>	1	2	1
6.6	Pipes and Unions			
(a)	Identification;	2	2	2
(b)	Standard unions.	2	2	1
6.7	Springs	—	2	1
6.8	Bearings	1	2	2
6.9	Transmissions	1	2	2
6.10	Control Cables	1	2	1
6.11	Electrical Cables and Connectors	1	2	2

MODULE 7. MAINTENANCE PRACTICES

MODULE 7. MAINTENANCE PRACTICES	Level		
	A	B1 B3	B2 B2L
7.1 Safety Precautions — Aircraft and Workshop	3	3	3
7.2 Workshop Practices	3	3	3
7.3 Tools	3	3	3
7.4 (Reserved)	—	—	—
7.5 Engineering drawings, diagrams and standards	1	2	2
7.6 Fits and Clearances	1	2	1
7.7 Electrical Wiring Interconnection System (EWIS)	1	3	3
7.8 Riveting	1	2	—
7.9 Pipes and Hoses	1	2	—
7.10 Springs	1	2	—
7.11 Bearings	1	2	—
7.12 Transmissions	1	2	—
7.13 Control Cables	1	2	—
7.14 Material handling			
7.14.1 <i>Sheet Metal</i>	—	2	—
7.14.2 <i>Composite and non-metallic</i>	—	2	—
7.14.3 <i>Additive manufacturing</i>	1	1	1
7.15 (Reserved)	—	—	—
7.16 Aircraft Weight and Balance			

(a)	Centre-of-gravity calculation;	—	2	2
(b)	Aircraft weighing;	—	2	—
7.17	Aircraft Handling and Storage	2	2	2
7.18	Disassembly, Inspection, Repair and Assembly Techniques			
(a)	Types of defects and visual inspection techniques;	2	3	3
(b)	General repair methods, Structural Repair Manual;	—	2	—
(c)	Non-destructive inspection techniques;	—	2	1
(d)	Disassembly and reassembly techniques;	2	2	2
(e)	Trouble shooting techniques.	—	2	2
7.19	Abnormal Events			
(a)	Inspections following lightning strikes and HIRF penetration;	2	2	2
(b)	Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	—
7.20	Maintenance Procedures	1	2	2
7.21	Documentation and communication	1	2	2

MODULE 8. BASIC AERODYNAMICS

MODULE 8. BASIC AERODYNAMICS		Level	
		A B3	B1 B2 B2L
8.1 Physics of the Atmosphere	International Standard Atmosphere (ISA), application to aerodynamics.	1	2
8.2 Aerodynamics		1	2
8.3 Theory of Flight		1	2
8.4 High-speed airflow		1	2
8.5 Flight Stability and Dynamics		1	2

MODULE 9. HUMAN FACTORS

MODULE 9. HUMAN FACTORS		Level
		ALL
9.1	General	2
9.2	Human Performance and Limitations	2
9.3	Social Psychology	1
9.4	Factors that affect performance	2
9.5	Physical Environment	1
9.6	Tasks	1
9.7	Communication	2
9.8	Human Error	2
9.9	Safety Management	2
9.10	The 'Dirty Dozen' and risk-mitigation	2

MODULE 10. AVIATION LEGISLATION

MODULE 10. AVIATION LEGISLATION		Level	
		A	B1 B2 B2L B3
10.1	Regulatory Framework	1	1
10.2	Certifying Staff - Maintenance	2	2
10.3	Approved Maintenance Organisations	2	2
10.4	Independent certifying staff	—	3
10.5	Air Operations	1	1
10.6	Certification of aircraft, parts and appliances	2	2
10.7	Continuing Airworthiness	2	2
10.8	Oversight principles in continuing airworthiness	1	1
10.9	Requirements for component maintenance, welding, painting, NDT, etc	—	1
10.10	Cybersecurity in aviation maintenance	1	1

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	Level				
	A1	A2	B1.1	B1.2	B3
11.1 Theory of Flight					
(a) Aeroplane Aerodynamics and Flight Controls	1	1	2	2	1
(b) Aeroplane: other aerodynamics devices	1	1	2	2	1
11.2 Airframe Structures (ATA 51)					
(a) General concepts:	2	2	2	2	2
(b) Airworthiness requirements for structural strength;	2	2	2	2	2
(c) Construction methods.	1	1	2	2	2
11.3 Airframe Structures — Aeroplanes					
<i>11.3.1 Fuselage, doors, windows (ATA 52/53/56)</i>					
(a) Construction principles;	1	1	2	2	1
(b) Airborne towing devices;	1	1	1	1	1
(c) Doors.	1	1	2	1	—
<i>11.3.2 Wings (ATA 57)</i>	1	1	2	2	1
<i>11.3.3 Stabilisers (ATA 55)</i>	1	1	2	2	1
<i>11.3.4 Flight Control Surfaces (ATA 55/57)</i>	1	1	2	2	1
<i>11.3.5 Nacelles/Pylons (ATA 54)</i>	1	1	2	2	1
11.4 Air Conditioning and Cabin Pressurisation (ATA21)					
(a) Pressurisation;	1	1	3	3	—
(b) Air supply;	1	—	3	—	—
(c) Air conditioning;	1	—	3	—	—

(d) Safety and warning devices;	1	1	3	3	—
(e) Heating and ventilation systems.	—	1	—	3	1
11.5 Instruments/Avionics Systems					
<i>11.5.1 Instrument Systems (ATA 31)</i>	1	1	2	2	2
<i>11.5.2 Avionic Systems</i>	1	1	1	1	1
Fundamentals of system lay-outs and operation of;					
— Auto Flight (ATA 22);					
— Communications (ATA 23)					
— Navigation Systems (ATA 34).					
11.6 Electrical Power (ATA 24)	1	1	3	3	3
11.7 Equipment and Furnishings (ATA 25)					
(a) Emergency equipment;	2	2	2	2	2
(b) Cabin and cargo layout.	1	1	1	1	—
11.8 Fire Protection (ATA 26)					
(a) Fire and smoke detection system, and fire-extinguishing systems;	1	1	1	1	—
(b) Portable fire extinguisher	1	1	1	1	1
11.9 Flight Controls (ATA 27)					
(a) Primary and secondary flight controls;	1	1	3	3	2
(b) Actuation and protection;	1	—	3	—	—
(c) System operation;	1	—	3	—	—
(d) Balancing and rigging.	1	1	3	3	2
11.10 Fuel Systems (ATA 28, ATA 47)					
(a) Systems layout;	1	1	3	3	1
(b) Fuel handling;	1	1	3	3	1

(c)	Indications and warnings;	1	1	3	3	1
(d)	Special systems;	1	—	3	—	—
(e)	Balancing.	1	—	3	—	—
11.11 Hydraulic Power (ATA 29)						
(a)	System description;	1	1	3	3	2
(b)	System operation (1);	1	1	3	3	2
(c)	System operation (2);	1	—	3	—	—
11.12 Ice and Rain Protection (ATA 30)						
(a)	Principles;	1	1	3	3	1
(b)	De-icing;	1	1	3	3	1
(c)	Anti-icing;	1	—	3	—	—
(d)	Wipers;	1	1	3	3	1
(e)	Rain repellent systems.	1	—	3	—	—
11.13 Landing Gear (ATA 32)						
(a)	Description;	2	2	3	3	2
(b)	System operation;	2	2	3	3	2
(c)	Air-ground sensing;	2	—	3	—	—
(d)	Tail protection.	2	2	3	3	2
11.14 Lights (ATA 33)		2	2	3	3	2
11.15 Oxygen (ATA 35)		1	1	3	3	2
11.16 Pneumatic/Vacuum (ATA 36)						
(a)	Systems;	1	1	3	3	2
(b)	Pumps.	1	1	3	3	2
11.17 Water/Waste (ATA 38)						

(a) Systems;	2	2	3	3	2
(b) Corrosion.	2	2	3	3	2
11.18 Onboard Maintenance Systems (ATA 45)	1	—	2	—	—
11.19 Integrated Modular Avionics (IMA) (ATA 42)					
(a) Overall system description and theory;	1	—	2	—	—
(b) Typical system layouts.	1	—	2	—	—
11.20 Cabin Systems (ATA 44)	1	—	2	—	—
11.21 Information Systems (ATA 46)	1	—	2	—	—

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	Level	
	A3 A4	B1.3 B1.4
12.1 Theory of Flight — Rotary Wing Aerodynamics	1	2
12.2 Flight Control Systems (ATA 67)	2	3
12.3 Blade Tracking and Vibration Analysis (ATA 18)	1	3
12.4 Transmission	1	3
12.5 Airframe Structures		
(a) General concept;	2	2
(b) Construction methods for the principal elements.	1	2
12.6 Air Conditioning (ATA 21)		
12.6.1 Air supply;	1	2
12.6.2 Air Conditioning.	1	3
12.7 Instruments/Avionic Systems		
12.7.1 Instrument Systems (ATA 31)	1	2
12.7.2 Avionic Systems	1	1
Fundamentals of system layouts and operation of:		
— Autoflight (ATA 22)		
— Communication systems (ATA 23);		
— Navigation Systems (ATA 34).		
12.8 Electrical Power (ATA 24)	1	3
12.9 Equipment and Furnishings (ATA 25)		
(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.	2	2

(b)	Emergency flotation systems; Cabin layout, cargo retention; Equipment lay-out; Cabin Furnishing Installation.	1	1
12.10	Fire Protection (ATA 26)		
(a)	Fire and smoke detection systems and Fire-extinguishing systems;	1	3
(b)	Portable fire extinguishers.	1	1
12.11	Fuel Systems (ATA 28)	1	3
12.12	Hydraulic Power (ATA 29)	1	3
12.13	Ice and Rain Protection (ATA 30)	1	3
12.14	Landing Gear (ATA 32)		
(a)	System description and operation;	2	3
(b)	Sensors.	2	3
12.15	Lights (ATA 33)	2	3
12.16	(Reserved)	—	—
12.17	Integrated Modular Avionics (IMA) (ATA 42)		
(a)	Overall system description and theory;	1	2
(b)	Typical system layouts.	1	2
12.18	Onboard Maintenance Systems (ATA 45)	1	2
	Central maintenance computers; Data-loading system; Electronic library system;		
12.19	Information Systems (ATA 46)	1	2

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

C/N: Communication and Navigation; Ins.: Instruments; A/F: Autoflight; Sur.: Surveillance; A/S: Airframe and Systems

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	Level						
	B2	B2L Basic	B2L C/N	B2L Ins.	B2L A/F	B2L Sur.	B2L A/S
13.1 Theory of Flight							
(a) Aeroplane Aerodynamics and Flight Controls;	1	1	—	—	—	—	—
(b) Rotary wing aerodynamics.	1	1	—	—	—	—	—
13.2 Structures – general concepts (ATA 51)							
(a) General concepts;	2	2	—	—	—	—	—
(b) Fundamentals of structural systems.	1	1	—	—	—	—	—
13.3 Autoflight (ATA 22)							
(a) Fundamentals of automatic flight control;	3	—	—	—	3	—	—
(b) Autothrottle systems and automatic landing systems.	3	—	—	—	3	—	—
13.4 Communication navigation (ATA 23/34)							
(a) Fundamentals of communication and navigation systems;	3	—	3	—	—	—	—
(b) Fundamentals of aircraft surveillance systems.	3	—	—	—	—	3	—
13.5 Electrical Power (ATA 24)	3	3	—	—	—	—	—
13.6 Equipment and furnishings (ATA 25)	3	—	—	—	—	—	—
13.7 Flight Controls							
(a) Primary and secondary flight controls (ATA 27);	2	—	—	—	2	—	—
(b) Actuation and protection;	2	—	—	—	2	—	—
(c) System operation;	3	—	—	—	3	—	—

(d) Rotorcraft flight controls (ATA 67).	2	—	—	—	2	—	—
13.8 Instruments (ATA 31)	3	—	—	3	—	—	—
13.9 Lights (ATA 33)	3	3	—	—	—	—	—
13.10 Onboard maintenance systems (ATA 45)	3	—	—	—	—	—	—
13.11 Airconditioning and cabin pressurisation (ATA 21)							
(a) Pressurisation;	3	—	—	—	—	—	3
(b) Air Supply;	1	—	—	—	—	—	1
(c) Air conditioning;	3	—	—	—	—	—	3
(d) Safety and warning devices.	3	—	—	—	—	—	3
13.12 Fire protection (ATA 26)							
(a) Fire and smoke detection system and fire-extinguishing systems;	3	—	—	—	—	—	3
(b) Portable fire extinguisher.	1	—	—	—	—	—	1
13.13 Fuel Systems (ATA 28, ATA 47)							
(a) System layout:	1	—	—	—	—	—	1
(b) Fuel handling:	2	—	—	—	—	—	2
(c) Indications and warnings;	3	—	—	—	—	—	3
(d) Special systems:	1	—	—	—	—	—	1
(e) Balancing:	3	—	—	—	—	—	3
13.14 Hydraulic Power (ATA 29)							
(a) System layout;	1	—	—	—	—	—	1
(b) System operation (1)	3	—	—	—	—	—	3
(c) System operation (2)	3	—	—	—	—	—	3

13.15 Ice and Rain Protection (ATA 30)							
(a) Principles:	2	—	—	—	—	—	2
(b) De-icing:	3	—	—	—	—	—	3
(c) Anti-icing:	2	—	—	—	—	—	2
(d) Wiper systems.	1	—	—	—	—	—	1
(e) Rain repellent.	1	—	—	—	—	—	1
13.16 Landing Gear (ATA 32)							
(a) Description;	1	—	—	—	—	—	1
(b) Systems;	3	—	—	—	—	—	3
(c) Air-ground sensing.	3	—	—	—	—	—	3
13.17 Oxygen (ATA 35)	3	—	—	—	—	—	3
13.18 Pneumatic/Vacuum (ATA 36)	2	—	—	—	—	—	2
13.19 Water/Waste (ATA 38)	2	—	—	—	—	—	2
13.20 Integrated Modular Avionics (IMA) (ATA 42)							
(a) Overall system description and theory:	3	—	—	—	—	—	—
(b) Typical system layout.	3	—	—	—	—	—	—
13.21 Cabin Systems (ATA 44)	3	—	—	—	—	—	—
13.22 Information Systems (ATA 46)	3	—	—	—	—	—	—

MODULE 14 PROPULSION

MODULE 14 PROPULSION	Level
	B2 B2L Instruments B2L Airframe & Systems
14.1 Engines	
(a) Turbine engines;	1
(b) Auxiliary power units (APUs);	1
(c) Piston engines;	1
(d) Electric and hybrid engines;	2
(e) Engine control.	2
14.2 Electric/electronic engine Indication systems	2
14.3 Propeller systems	2
14.4 Starting and Ignition Systems	2

MODULE 15. GAS TURBINE ENGINE

MODULE 15. GAS TURBINE ENGINE	Level	
	A1 A3	B1.1 B1.3
15.1 Fundamentals	1	2
15.2 Engine Performance	—	2
15.3 Inlet	2	2
15.4 Compressors	1	2
15.5 Combustion Section	1	2
15.6 Turbine Section	2	2
15.7 Exhaust	1	2
15.8 Bearings and Seals	—	2
15.9 Lubricants and Fuels	1	2
15.10 Lubrication Systems	1	2
15.11 Fuel Systems	1	2
15.12 Air Systems	1	2
15.13 Starting and Ignition Systems	1	2
15.14 Engine Indication Systems	1	2
15.15 Alternate turbine constructions	—	1
15.16 Turboprop Engines	1	2
15.17 Turboshift engines	1	2
15.18 Auxiliary Power Units (APUs)	1	2
15.19 Powerplant Installation	1	2
15.20 Fire Protection Systems	1	2

15.21 Engine Monitoring and Ground Operation	1	3
15.22 Engine Storage and Preservation	—	2

MODULE 16. PISTON ENGINE

MODULE 16. PISTON ENGINE	Level	
	A2 A4	B1.2 B1.4 B3
16.1 Fundamentals	1	2
16.2 Engine Performance	1	2
16.3 Engine Construction	1	2
16.4 Engine Fuel Systems		
16.4.1 Carburettors	1	2
16.4.2 Fuel injection systems	1	2
16.4.3 Electronic engine control	1	2
16.5 Starting and Ignition Systems	1	2
16.6 Induction, Exhaust and Cooling Systems	1	2
16.7 Supercharging/Turbocharging	1	2
16.8 Lubricants and Fuels	1	2
16.9 Lubrication Systems	1	2
16.10 Engine Indication Systems	1	2
16.11 Powerplant Installation	1	2
16.12 Engine Monitoring and Ground Operation	1	3
16.13 Engine Storage and Preservation	—	2
16.14 Alternate piston-engine constructions	1	1

MODULE 17. PROPELLER

MODULE 17. PROPELLER	Level	
	A1 A2	B1.1 B1.2 B3
17.1 Fundamentals of propellers	1	2
17.2 Propeller Construction	1	2
17.3 Propeller Pitch Control	1	2
17.4 Propeller Synchronising	—	2
17.5 Propeller Ice Protection	1	2
17.6 Propeller Maintenance	1	3
17.7 Propeller Storage and Preservation	1	2

3. Basic training methods

An appropriate training method, or combination of methods, shall be determined for the entire course or for each of its modules or submodules, with regard to the scope and objectives of each training phase and taking into consideration the benefits and limitations of the available training methods.

Multimedia-based training (MBT) methods may be used in order to achieve the training objectives either in a physically or in a virtually controlled environment.

AMC1 Appendix I — Basic Knowledge Requirements (except for category L licence) Section 2

MODULARISATION

MODULE 1. MATHEMATICS

MODULE 1. MATHEMATICS		Level	
		A1	B1
		A2	B2
		A3	B2L
		A4	B3
1.1 Arithmetic	Arithmetical terms and signs, methods of multiplication and division, fractions and decimals, factors and multiples, weights, measures and conversion factors, ratio and proportion, averages and percentages, areas and volumes, squares, cubes, square and cube roots.	1	2
1.2 Algebra			
(a)	Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;	1	2
(b)	Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second-degree equations with one unknown; logarithms;	—	1
1.3 Geometry			
(a)	Simple geometrical constructions;	—	1
(b)	Graphical representation; nature and uses of graphs, graphs of equations/functions;	2	2
(c)	Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	—	2

MODULE 2. PHYSICS

MODULE 2. PHYSICS		Level	
		A1 A2 A3 A4 B3	B1 B2 B2L
2.1 Matter Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds. States: solid, liquid and gaseous; Changes between states.		1	2
2.2 Mechanics			
2.2.1 Statics Forces, moments and couples, representation as vectors; Centre of gravity. Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas matter; Pressure and buoyancy in liquids (barometers).		1	2
2.2.2 Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency.		1	2
2.2.3 Dynamics			
(a) Mass Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;		1	2
(b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance).		1	2

2.2.4 Fluid dynamics		
(a)	Specific gravity and density;	2 2
(b)	Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	1 2
2.3 Thermodynamics		
(a)	Temperature: thermometers and temperature scales: (Celsius, Fahrenheit and Kelvin); definition of heat.	2 2
(b)	Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.	1 2
2.4 Optics (Light)		
	Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses; Fibre optics.	— 2
2.5 Wave Motion and Sound		
	Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves; Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.	— 2

MODULE 3. ELECTRICAL FUNDAMENTALS

MODULE 3. ELECTRICAL FUNDAMENTALS		Level		
		A1 A2 A3 A4	B1 B2 B2L	B3
3.1	Electron Theory Structure and distribution of electrical charges within atoms, molecules, ions, and compounds; Molecular structure of conductors, semiconductors and insulators.	1	1	1
3.2	Static Electricity and Conduction Static electricity and distribution of electrostatic charges; Electrostatic laws of attraction and repulsion; Units of charge, Coulomb's Law; Conduction of electricity in solids, liquids, gases and in vacuum.	1	2	1
3.3	Electrical Terminology The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	1	2	1
3.4	Generation of Electricity Production of electricity by the following methods: light, heat, friction, pressure, chemical reaction, magnetism and motion.	1	1	1
3.5	DC Sources of Electricity Construction and basic chemical reaction of primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells; Cells connected in series and parallel; Internal resistance and its effect on a battery; Construction, materials and operation of thermocouples; Operation of photocells.	1	2	2
3.6	DC Circuits Ohms Law, Kirchoff's voltage, and current Laws; Calculations using the above laws to find resistance, voltage and current; Significance of the internal resistance of a supply.	1	2	1
3.7	Resistance/Resistor			
(a)	Resistance	—	2	1

	Specific resistance; Calculation of total resistance using series, parallel and series-parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge.			
(b)	Resistor Positive and negative temperature coefficient conductance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Fixed resistors, stability, tolerance and limitations, methods of construction; Variable resistors, thermistors, voltage-dependent resistors; Construction of potentiometers and rheostats; Construction of Wheatstone Bridge;	—	1	—
3.8	Power Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	—	2	1
3.9	Capacitance/Capacitor Operation and function of a capacitor; Factors that affect the capacitance: area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating; Capacitor types, construction and function; Capacitor colour-coding; Calculations of capacitance and voltage in series and in parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	—	2	1
3.10	Magnetism			
(a)	Theory of magnetism; Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnet construction and principles of operation; Handclasp rules to determine magnetic field around current-carrying conductor.	—	2	1

(b)	Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	—	2	1
3.11	Inductance/Inductor	—	2	1
	Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect that the rates of change of primary current and mutual inductance have on induced voltage; Factors that affect mutual inductance: number of turns in the coil, physical size of the coil, permeability of the coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self-induction; Saturation point; Principle uses of inductors;			
3.12	DC Motor/Generator Theory	—	2	1
	Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of and factors that affect the output and direction of the current in DC generators; Operation of and factors that affect the output power, torque, speed and direction of rotation of DC motors; Series-wound, shunt-wound and compound motors; Starter Generator construction.			
3.13	AC Theory	1	2	1
	Sinusoidal waveform: phase, period, frequency, cycle; Instantaneous, average, root mean square, peak, peak-to-peak current values and calculations of these values in relation to voltage, current and power Triangular/Square waves; Single-phase/Three-phase principles.			
3.14	Resistive (R), Capacitive (C) and Inductive (L) Circuits	—	2	1

<p>Phase relationship of voltage and current in L, C and R circuits, parallel, series and series-parallel; Power dissipation in L, C and R circuits; Impedance, phase angle, power factor and current calculations; True power, apparent power and reactive power calculations.</p>			
<p>3.15 Transformers</p> <p>Transformer construction principles and operation; Transformer losses and methods for overcoming them; Transformer action under load and no-load conditions; Power transfer, efficiency, polarity markings; Line and phase voltages and currents; Power in a three-phase system; Primary and secondary current, voltage, turns ratio, power, efficiency; Auto transformers.</p>	—	2	1
<p>3.16 Filters</p> <p>Operation, application, and uses of the following filters: low pass, high pass, band pass, band stop.</p>	—	1	—
<p>3.17 AC Generators</p> <p>Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single-phase, two-phase and three-phase alternators; Three-phase star and delta connections advantages, and uses; Permanent Magnet Generators.</p>	—	2	1
<p>3.18 AC Motors</p> <p>Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, shaded or split pole.</p>	—	2	1

MODULE 4. ELECTRONIC FUNDAMENTALS

MODULE 4. ELECTRONIC FUNDAMENTALS		Level		
		A1 A2 A3 A4	B1 B3	B2 B2L
4.1 Semiconductors				
4.1.1 Diodes				
(a)	Description and characteristics Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; P-N junction in a semiconductor, development of a potential across a P-N junction in unbiased, forward biased and reverse biased conditions; Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation; Main characteristics and use of silicon-controlled rectifiers (thyristors), light-emitting diodes (LEDs), photo-conductive diodes, varistor, rectifier diodes; Functional testing of diodes.	—	2	2
(b)	Operation and function Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon-controlled rectifier (thyristor), light-emitting diode (LED), Schottky diode, photo-conductive diode, varactor diode, varistor, rectifier diodes, Zener diode. Functional testing of diodes	—	—	2
4.1.2 Transistors				
(a)	Description and characteristics Transistor symbols; Component description and orientation; Transistor characteristics and properties.	—	1	2

(b)	<p>Construction and operation Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types, including types of FET and their uses. Application of transistors: classes of amplifier (A, B, C); Simple circuits including bias, decoupling, feedback and stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.</p>	—	—	2
4.1.3 Integrated Circuits				
(a)	<p>Description and operation of logic circuits and linear circuits/operational amplifiers.</p>	—	1	2
(b)	<p>Introduction to operation and function of an operational amplifier used as: an integrator, a differentiator, a voltage follower, a comparator; Advantages and disadvantages of positive and negative feedback.</p>	—	—	2
4.2 Printed Circuit Boards		—	1	2
Description and use of printed circuit boards.				
4.3 Servomechanisms				
(a)	<p>Principles Understanding of the following principles: Open- and closed-loop systems, servomechanism, feedback, follow-up, null, overshoot, damping, deadband, hunting, proximity switches, analogue transducers, synchro systems and components, digital tachometers and encoders, inductance, and capacitance transmitters; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters.</p>	—	1	2
(b)	<p>Construction, operation and use of the following synchro-system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Fault-finding of servo defects, reversal of synchro leads, hunting.</p>	—	—	2

MODULE 5. DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

MODULE 5. DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS	Level			
	A1 A2 A3 A4	B3	B1	B2 B2L
5.1 Electronic Instrument Systems Typical arrangements of systems and cockpit layout of electronic instrument systems.	1	1	1	1
5.2 Numbering Systems Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	—	—	1	2
5.3 Data Conversion Analogue Data, Digital Data; Operation and application of analogue-to-digital, and digital-to-analogue converters, inputs and outputs, limitations of various types.	—	—	1	2
5.4 Data Buses Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Aircraft Network / Ethernet.	—	—	2	2
5.5 Logic Circuits (a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.	—	—	2	2
(b) Interpretation of logic diagrams.	—	—	—	2
5.6 Basic Computer Structure (a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).	1	1	2	2

(b)	<p>Operation, layout and interface of the major components in a microcomputer, including their associated bus systems; Information contained in single- and multi-address instruction words; Memory-associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.</p>	—	—	—	2
5.7	Microprocessors	—	—	—	2
	<p>Functions performed and overall operation of a microprocessor; Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.</p>				
5.8	Integrated Circuits	—	—	—	2
	<p>Operation and use of encoders and decoders; Function of encoder types;</p>				
5.9	Multiplexing	—	—	—	2
	<p>Operation, application and identification in logic diagrams of multiplexers and demultiplexers.</p>				
5.10	Fibre Optics	—	—	1	2
	<p>Advantages and disadvantages of fibre optic data transmission over electrical wire propagation; Fibre-optic data bus; Fibre-optic related terms; Terminations; Couplers, control terminals, remote terminals; Application of fibre optics in aircraft systems.</p>				
5.11	Electronic Displays	1	1	2	2
	<p>Principles of operation of common types of displays used in modern aircraft, including cathode-ray tubes (CRTs), Light-emitting diodes (LEDs) and Liquid crystal display (LCDs).</p>				
5.12	Electrostatic-sensitive devices	1	1	2	2

<p>Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component, and personnel antistatic protection devices.</p>				
<p>5.13 Software Management Control</p> <p>Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.</p>	—	1	2	2
<p>5.14 Electromagnetic Environment</p> <p>Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High-Intensity Radiated Field Lightning/lightning protection</p>	—	1	2	2
<p>5.15 Typical Electronic/Digital Aircraft Systems</p> <p>General arrangement of typical electronic / digital aircraft systems and associated BITE (Built-In Test Equipment), such as:</p> <p>(a)</p> <p>ACARS - ARINC Communication and Addressing and Reporting System FBW - Fly-by-Wire FMS - Flight Management System IRS - Inertial Reference System;</p> <p>(b)</p> <p>ECAM - Electronic Centralised Aircraft Monitoring EICAS - Engine Indication and Crew Alerting System EFIS - Electronic Flight Instrument System GPS - Global Positioning System TCAS - Traffic Alert Collision Avoidance System Integrated Modular Avionics Cabin Systems Information Systems</p>	1	1	1	1

MODULE 6. MATERIALS AND HARDWARE

MODULE 6. MATERIALS AND HARDWARE		Level		
		A1 A2 A3 A4	B1 B3	B2 B2L
6.1 Aircraft Materials — Ferrous				
(a)	Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels;	1	2	1
(b)	Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1
(c)	Repair and inspection procedures for ferrous materials, structures, and airframes.	—	2	1
6.2 Aircraft Materials — Non-Ferrous				
(a)	Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	1	2	1
(b)	Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1
(c)	Repair and inspection procedures for non-ferrous materials, structures, and airframes.	—	2	1
6.3 Aircraft Materials — Composite and Non-Metallic				
<i>6.3.1 Composite and non-metallic other than wood and fabric</i>				
(a)	Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents.	1	2	2
(b)	The detection of defects/deterioration in composite and non-metallic material.	1	2	—
(c)	Repair of and inspection procedures for composite and non-metallic materials, structures, and airframes.	—	2	1
<i>6.3.2 Wooden structures</i>		1	1	—

Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; Preservation and maintenance of wooden structures; Types of defects in wood material and wooden structures; Detection of defects in wooden structures; Repair of wooden structures.				
6.3.3	<i>Fabric covering</i>	—	1	—
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabrics; Types of defects in fabrics; Repair of fabric covering.				
6.4	<i>Corrosion</i>			
(a)	Chemical fundamentals; Formation by galvanic action process, microbiological contamination, mechanical stress;	1	1	1
(b)	Types of corrosion and their identification; Causes of corrosion; Material types, and their susceptibility to corrosion.	2	3	2
6.5	Fasteners			
6.5.1	<i>Screw threads</i>	2	2	2
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads;				
6.5.2	<i>Bolts, studs and screws</i>	2	2	2
Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self-locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self-tapping screws, dowels.				
6.5.3	<i>Locking devices</i>	2	2	2
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick-release fasteners, keys, circlips, cotter pins.				

<p>6.5.4 Aircraft rivets</p> <p>Types of solid and blind rivets: specifications and identification, heat treatment.</p>	1	2	1
<p>6.6 Pipes and Unions</p>			
<p>(a) Identification and types of rigid and flexible pipes and their connectors used in aircraft;</p>	2	2	2
<p>(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.</p>	2	2	1
<p>6.7 Springs</p> <p>Types of springs, materials, characteristics and applications.</p>	—	2	1
<p>6.8 Bearings</p> <p>Purpose of bearings, loads, material, construction; Types of bearings and their application.</p>	1	2	2
<p>6.9 Transmissions</p> <p>Gear types and their application; Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; Belts and pulleys, chains and sprockets.</p>	1	2	2
<p>6.10 Control Cables</p> <p>Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.</p>	1	2	1
<p>6.11 Electrical Cables and Connectors</p> <p>Cable types, construction and characteristics; High-tension and co-axial cables; Crimping; Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.</p>	1	2	2

MODULE 7. MAINTENANCE PRACTICES

MODULE 7. MAINTENANCE PRACTICES	Level		
	A1		
	A2		
	A3	B1	B2
	A4	B3	B2L
7.1 Safety Precautions — Aircraft and Workshop Aspects of safe working practices including precautions to take when working with electricity, gases (especially oxygen), oils, and chemicals. Fuel tank safety and fuel tank entry procedures and precautions. Awareness and precautions regarding aircraft equipped with ballistic recovery systems. Also, instruction for the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on fire-extinguishing agents.	3	3	3
7.2 Workshop Practices Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.	3	3	3
7.3 Tools Common hand-tool types; Common power-tool types; Operation and use of precision-measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;	3	3	3
7.4 (Reserved)			
7.5 Engineering drawings, diagrams and standards Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identification of title block information; Microfilm, microfiche and computerised presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL;	1	2	2

	Wiring diagrams and schematic diagrams.			
7.6	Fits and Clearances	1	2	1
	Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.			
7.7	Electrical Wiring Interconnection System (EWIS)	1	3	3
	Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Coaxial cables: testing and installation precautions. Identification of wire types, their inspection criteria and damage tolerance. Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding. High-Intensity Radiated Fields (HIRF) and protection principles. Soldering of electrical wires, EWIS installations, inspection, repair, maintenance, and cleanliness standards.			
7.8	Riveting	1	2	—
	Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.			
7.9	Pipes and Hoses	1	2	—
	Bending and beelling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.			
7.10	Springs	1	2	—
	Inspection and testing of springs.			
7.11	Bearings	1	2	—
	Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.			

7.12 Transmissions	1	2	—
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.			
7.13 Control Cables	1	2	—
Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.			
7.14 Material handling			
<i>7.14.1 Sheet Metal</i>	—	2	—
Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.			
<i>7.14.2 Composite and non-metallic</i>	—	2	—
Bonding practices; Environmental conditions; Inspection methods.			
<i>7.14.3 Additive manufacturing</i>	1	1	1
Common additive manufacturing techniques and their influence on the mechanical properties of the finished part; Inspection of additive manufactured parts and common production failures.			
7.15 (Reserved)			
7.16 Aircraft Weight and Balance			
(a) Calculation of centre-of-gravity/balance limits: use of relevant documents;	—	2	2
(b) Preparation of aircraft for weighing; Aircraft weighing;	—	2	—
7.17 Aircraft Handling and Storage	2	2	2
Aircraft taxiing/towing and associated safety precautions;			

Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling/defuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.				
7.18	Disassembly, Inspection, Repair and Assembly Techniques			
(a)	Types of defects and visual inspection techniques; Corrosion removal, assessment and reprotection;	2	3	3
(b)	General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes;	—	2	—
(c)	Non-destructive inspection techniques including penetrant, radiographic, eddy current, magnetic particle, ultrasonic and borescope inspections; including practical training in colour contrast penetrant inspection	—	2	1
(d)	Disassembly and reassembly techniques;	2	2	2
(e)	Trouble shooting techniques.	—	2	2
7.19	Abnormal Events			
(a)	Inspections following lightning strikes and HIRF penetration;	2	2	2
(b)	Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	—
7.20	Maintenance Procedures	1	2	2
Maintenance planning; Modification procedures; Stores procedures; Certification/release procedures; Interface with aircraft operation; Maintenance Inspection/Quality Control/Quality Assurance; Additional maintenance procedures; Control of life-limited components.				
7.21	Documentation and communication	1	2	2

Documentation: elements and criteria for writing work reports, troubleshooting reports, and shift handover instructions. Communication: clear, comprehensive, and concise.			
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MODULE 8. BASIC AERODYNAMICS

MODULE 8. BASIC AERODYNAMICS		Level	
		A1	
		A2	
		A3	B1
		A4	B2
		B3	B2L
8.1	Physics of the Atmosphere International Standard Atmosphere (ISA), and its application to aerodynamics.	1	2
8.2	Aerodynamics Airflow around a body; Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation; The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash-in and wash-out, fineness ratio, wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.	1	2
8.3	Theory of Flight Relationship between lift, weight, thrust and drag; Glide ratio; Steady-state flights, performance; Theory of the turn; Influence of load factor: stall, flight envelope, and structural limitations; Lift augmentation.	1	2
8.4	High-speed airflow Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; Factors that affect airflow in engine intakes of high-speed aircraft; Effects of sweepback on critical Mach number.	1	2
8.5	Flight Stability and Dynamics Longitudinal, lateral and directional stability (active and passive).	1	2

MODULE 9. HUMAN FACTORS

MODULE 9. HUMAN FACTORS		Level
		ALL
9.1 General		2
The need to take human factors into account when performing maintenance; Incidents attributable to human factors/human error; “Murphy's” law.		
9.2 Human Performance and Limitations		2
Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.		
9.3 Social Psychology		1
Accountability and responsibility: individual and group; Motivation and demotivation; Peer pressure; Cultural issues; Teamwork; Management, supervision and leadership.		
9.4 Factors that affect performance		2
Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload, underload, and workload management; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse; Lack of manpower.		
9.5 Physical Environment		1
Noise and fumes; Illumination;		

	<p>Climate and temperature; Motion and vibration; Working environment; Situational awareness.</p>	
9.6	<p>Tasks</p> <p>Physical work; Repetitive tasks, complacency; Visual inspection; Complex systems; Critical maintenance tasks and error-capturing methods; Technical documentation: access, use, and quality.</p>	1
9.7	<p>Communication</p> <p>Within and between teams; Work logging and recording; Shift handover; Keeping up to date, currency; Dissemination of information.</p>	2
9.8	<p>Human Error</p> <p>Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Organisational errors; Avoiding and managing errors.</p>	2
9.9	<p>Safety Management</p> <p>Risk management; Occurrence reporting; Safety culture; Just culture; Identifying, avoiding, and reporting hazards; Organisational human-factors programme, professionalism and integrity, error-provoking behaviour, reporting errors, disciplinary policy, error investigation, action to address problems, feedback and assertiveness; Dealing with emergencies.</p>	2
9.10	<p>The 'Dirty dozen' and risk-mitigation</p> <p>The 'Dirty Dozen': the twelve most common human-factors errors in maintenance:</p>	2

Lack of communication, Lack of teamwork, Lack of assertiveness, Complacency, Fatigue, Stress, Lack of knowledge, Lack of resources, Lack of awareness, Distraction, Pressure, Norms. Risk-mitigation methods.	
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MODULE 10. AVIATION LEGISLATION

MODULE 10. AVIATION LEGISLATION	Level	
	A1	B1
	A2	B2
	A3	B2L
	A4	B3
10.1 Regulatory Framework Role of: <ul style="list-style-type: none"> — the International Civil Aviation Organisation (ICAO); — the CAA; — Maldives Civil Aviation Act 2/2001; — Maldives Civil Aviation Authority Act 2/2012; — the relationship between regulations (hard law) and AMC, GM and CSs (soft law); — Regulation ASC 00-1 Maintenance Personnel Duty Time Limitations; — occurrence reporting according to Regulation MCAR-13B; — the relationship between MCAR-1, MCAR-A, MCAR-145, MCAR-66, MCAR-147, MCAR-21, MCAR- M, MCAR-ML, MCAR-CAMO, MCAR-CAO, MCAR-T, ASC 00-1, airworthiness notices, MCAR-Air Operations and MCAR-Air Crew; — Relationship with other Aviation Authorities. 	1	1
10.2 Certifying Staff - Maintenance Deep understanding of MCAR-66 maintenance licences with the associated privileges and authorisations, and how to exercise them properly for the different aircraft categories.	2	2
10.3 Approved Maintenance Organisations General understanding of MCAR-145 and MCAR-CAO.	2	2
10.4 Independent certifying staff Privileges, responsibilities, record-keeping, limitations, and oversight according to MCAR-M, MCAR-66 and MCAR-ML.	—	3
10.5 Air Operations General understanding of MCAR-Air Operations; Differences between commercial and non-commercial air operations, and their influence on maintenance; Air Operator Certificates (AOCs) and self-declaration authorisations;	1	1

<p>Air operator responsibilities, in particular regarding continuing airworthiness and maintenance; Specialised operations / specific approvals: ETOPS, CAT I/II/III, and BRNAV Minimum Equipment List (MEL) and Configuration Deviation List (CDL) ; Aircraft placarding and markings ; Documents to be carried on board; — Certificate of Airworthiness / Restricted Certificate of Airworthiness; — Airworthiness Review Certificate; — Permit to Fly; — Certificate of Registration; — Noise Certificate; — Weight and Balance report; — Radio Station Licence.</p>		
<p>10.6 Certification of aircraft, parts and appliances</p> <p>Basic understanding of MCAR-21 and of the following EASA certification specifications: CS-22, CS-23, CS-25, CS-27, CS-29, and CS-STAN</p>	2	2
<p>10.7 Continuing Airworthiness</p> <p>General understanding of MCAR-21 requirements on continuing airworthiness; General understanding of MCAR-M, MCAR-ML and MCAR-CAMO; Aircraft Maintenance Programme.</p>	2	2
<p>10.8 Oversight principles in continuing airworthiness</p>	1	1
<p>10.9 Requirements for component maintenance, welding, painting, NDT, etc</p>	—	1
<p>10.10 Cybersecurity in aviation maintenance</p> <p>Regulation on the introduction of organisation requirements for the management of information security risks related to aeronautical information systems used in civil aviation.</p>	1	1

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	Level				
	A1	A2	B1.1	B1.2	B3
11.1 Theory of Flight					
(a) Aeroplane Aerodynamics and Flight Controls	1	1	2	2	1
Operation and effect of:					
— roll control: ailerons and spoilers;					
— pitch control: elevators, stabilators, variable incidence stabilisers and canards;					
— yaw control, rudder limiters;					
— elevons, ruddervators;					
— high-lift devices, slots, slats, flaps, flaperons;					
— drag-inducing devices, spoilers, lift dumpers, speed brakes;					
— trim tabs, servo tabs, control surface bias.					
(b) Aeroplane: other aerodynamics devices	1	1	2	2	1
Operation and effect of:					
— balance and antibalance (leading) tabs;					
— spring tabs, mass balance, aerodynamic balance panels;					
— mass balance, aerodynamic balance panels;					
— effects of wing fences, saw tooth leading edges;					
— boundary layer control using vortex generators, stall wedges or leading-edge devices					
11.2 Airframe Structures (ATA 51)					
(a) General concepts:	2	2	2	2	2
— Zonal and station identification systems;					
— Electrical bonding					
— Lightning strike protection provisions.					
(b) Airworthiness requirements for structural strength;	2	2	2	2	2
— Structural classification, primary, secondary and tertiary;					
— Fail-safe, safe-life, damage-tolerance concepts;					
— Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;					
— Drains and ventilation provisions;					

— System installation provisions;					
(c) Construction methods	1	1	2	2	2
— stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, skinning, anticorrosive protection, wing, empennage and engine attachments;					
— Structure assembly techniques: riveting, bolting, bonding;					
— Methods of surface protection, such as chromating, anodising, painting;					
— Surface cleaning;					
— Airframe symmetry: methods of alignment and symmetry checks.					
11.3 Airframe Structures — Aeroplanes					
<i>11.3.1 Fuselage, doors, windows (ATA 52/53/56)</i>					
(a) Construction principles	1	1	2	2	1
— Construction and pressurisation sealing;					
— Wing, stabiliser, pylon and undercarriage attachments;					
— Seat installation and cargo loading system;					
— Doors and emergency exits: construction, mechanisms, operation and safety devices;					
— Windows and windscreen construction and mechanisms.					
(b) Airborne towing devices (glider, banner, target)	1	1	1	1	1
(c) Doors	1	1	2	1	—
— Doors and emergency exits: safety devices;					
— Cargo loading system					
<i>11.3.2 Wings (ATA 57)</i>	1	1	2	2	1
Construction;					
Fuel storage;					
Landing gear, pylon, control surface and high lift/drag attachments.					
<i>11.3.3 Stabilisers (ATA 55)</i>	1	1	2	2	1
Construction;					
Control surface attachment					

11.3.4 <i>Flight Control Surfaces (ATA 55/57)</i>	1	1	2	2	1
Construction and attachment; Balancing — mass and aerodynamic.					
11.3.5 <i>Nacelles/Pylons (ATA 54)</i>	1	1	2	2	1
Nacelles/Pylons: - Construction, - Firewalls, - Engine mounts.					
11.4 Air Conditioning and Cabin Pressurisation (ATA21)					
(a) Pressurisation Pressurisation systems; Cabin pressure controllers, control and safety valves Control and indication	1	1	3	3	—
(b) Air supply Sources of air supply including engine bleed, APU and ground cart; Distribution systems	1	—	3	—	—
(c) Air conditioning Air-conditioning systems; Air cycle and vapour cycle machines; Flow, temperature and humidity control system. Control and indication control valves	1	—	3	—	—
(d) Safety and warning devices Protection and warning devices	1	1	3	3	—
(e) Heating and ventilation systems	—	1	—	3	1
11.5 Instruments/Avionics Systems					
11.5.1 <i>Instrument Systems (ATA 31)</i>	1	1	2	2	2
Pitot-static: Airspeed indicators, Vertical speed indicators, Altimeters; Gyroscopic: Gyroscopic principles,					

Artificial horizons, Attitude directors, Direction indicators Horizontal situation indicators (HSI), Slip indicators, Turn indicators, Turn coordinators; Compass systems: systems, direct reading, remote reading, Stall-warning systems and angle-of-attack indicating systems, Glass cockpit Indications of other aircraft systems					
<i>11.5.2 Avionic Systems</i>	1	1	1	1	1
Fundamentals of system lay-outs and operation of; Auto Flight (ATA 22); Communication systems (ATA 23); — Very High Frequency (VHF) communications, — High Frequency (HF) communications, — Satellite Communications (SATCOM), — Controller–pilot data link communications (CPDLC), — Audio systems, — Emergency Locator Transmitters (ELTs), — Cockpit Voice Recorder (CVR); Navigation Systems (ATA 34). — Very high frequency omnidirectional range (VOR), — Automatic direction finder (ADF) — Instrument landing system (ILS), — Microwave landing system (MLS), — Flight director systems (FDSs), distance-measuring equipment (DME), — Area navigation (RNAV) systems, — Flight management systems (FMSs), — Satellite navigation systems, — Air traffic control transponder, secondary surveillance radar, — Traffic alert and collision avoidance system (TCAS), — Weather avoidance radar, — Radio altimeter, — Inertial navigation system (INS), — ARINC (Aeronautical Radio Incorporated) communication and reporting. Types and uses of avionics general test equipment					

11.6 Electrical Power (ATA 24)	1	1	3	3	3
<ul style="list-style-type: none"> — Installation and Operation of Batteries; — DC power generation; — AC power generation; — Emergency power generation; — Voltage regulation; — Power distribution; — Inverters, transformers, rectifiers; — Circuit protection. — External/Ground power; 					
11.7 Equipment and Furnishings (ATA 25)					
(a) Emergency equipment: Emergency equipment requirements.	2	2	2	2	2
(b) Cabin and cargo layout <ul style="list-style-type: none"> — Seats, harness, and belts — Cabin lay-out; — Equipment lay-out; — Cabin Furnishing Installation; — Galley installation; — Cargo handling and retention equipment; — Airstairs. 	1	1	1	1	—
11.8 Fire Protection (ATA 26)					
(a) Fire and smoke detection, and fire-extinguishing systems; <ul style="list-style-type: none"> — Fire and smoke detection and warning systems — Fire extinguishing systems; — System tests. 	1	1	1	1	—
(b) Portable fire extinguisher	1	1	1	1	1
11.9 Flight Controls (ATA 27)					
(a) Primary and secondary flight controls: <ul style="list-style-type: none"> — Primary controls: aileron, elevator, rudder, spoiler; — Trim control, trim tabs; — High-lift devices; — System operation: manual; — Gust locks and gust lock systems; — Artificial feel, yaw damper, Mach trim, rudder limiter; — Stall-warning systems; 	1	1	3	3	2

(b)	Actuation and protection: — Active load control; — Lift dump, speed brakes; — Hydraulic, pneumatic systems; — Stall-protection systems	1	—	3	—	—
(c)	System operation: Electrical systems, fly-by-wire systems	1	—	3	—	—
(d)	Balancing and rigging	1	1	3	3	2
11.10 Fuel Systems (ATA 28, ATA 47)						
(a)	Systems: — System lay-out; — Fuel tanks; — Supply systems;	1	1	3	3	1
(b)	Fuel handling: — Cross-feed and transfer; — Refuelling and defuelling;	1	1	3	3	1
(c)	Indications and warnings;	1	1	3	3	1
(d)	Special systems: — Dumping, venting, and draining — Inert gas systems	1	—	3	—	—
(e)	Balancing: Longitudinal balance fuel systems.	1	—	3	—	—
11.11 Hydraulic Power (ATA 29)						
(a)	System description: System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Filters; Power distribution. Emergency pressure generation;	1	1	3	3	2
(b)	System operation (1) Pressure generation: electric and mechanical; Pressure Control; Indication and warning systems; Servicing	1	1	3	3	2

(c)	System operation (2) Pressure generation: pneumatic; Emergency pressure generation; Interface with other systems.	1	—	3	—	—
11.12 Ice and Rain Protection (ATA 30)						
(a)	Principles: Ice formation, classification and detection;	1	1	3	3	1
(b)	De-icing: De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating.	1	1	3	3	1
(c)	Anti-icing: Anti-icing systems: electrical, hot air and chemical;	1	—	3	—	—
(d)	Wipers: Wiper systems.	1	1	3	3	1
(e)	Rain-repellent systems.	1	—	3	—	—
11.13 Landing Gear (ATA 32)						
(a)	Description: Construction, shock absorbing; Tyres	2	2	3	3	2
(b)	Systems: Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Steering;	2	2	3	3	2
(c)	Air-ground sensing.	2	—	3	—	—
(d)	Tail protection: Skids	2	2	3	3	2
11.14 Lights (ATA 33)		2	2	3	3	2
	External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.					

11.15 Oxygen (ATA 35)	1	1	3	3	2
System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;					
11.16 Pneumatic/Vacuum (ATA 36)					
(a) Systems: System lay-out; Sources: engine/APU (Auxiliary Power Unit), compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interface with other systems.	1	1	3	3	2
(b) Pumps: Pressure and vacuum pumps;	1	1	3	3	2
11.17 Water/Waste (ATA 38)					
(a) Systems: Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing;	2	2	3	3	2
(b) Corrosion: Corrosion aspects.	2	2	3	3	2
11.18 Onboard Maintenance Systems (ATA 45)	1	—	2	—	—
Central maintenance computers; Data-loading system; Electronic library system; Printing systems; Structure monitoring (damage-tolerance monitoring).					
11.19 Integrated Modular Avionics (IMA) (ATA 42)					
(a) Overall system description and theory: Core system; network components; Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:	1	—	2	—	—

<p>Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.</p>					
(b) Typical system layout.	1	—	2	—	—
11.20 Cabin Systems (ATA 44)	1	—	2	—	—
<p>System architecture, operation, and control systems for:</p> <ul style="list-style-type: none"> — passenger in-flight entertainment; — communication within the aircraft (Cabin intercommunication data system (CIDS); — communication between the aircraft cabin and ground stations; — including voice, data, music, and video transmission. <p>CIDS interface between cockpit/cabin crew and cabin systems.</p> <p>Data exchange between the different related line replaceable units (LRUs).</p> <p>Flight attendant panels (FAPs).</p> <p>Cabin network server (CNS) and interfaces with the following systems:</p> <ul style="list-style-type: none"> — Data/radio communication; — Cabin core system (CCS); — In-flight entertainment system (IFES); — External communication system (ECS); — Cabin mass memory system (CMMS); — Cabin monitoring system (CMS); — Miscellaneous cabin systems (MCSs); and — Other systems. <p>Cabin network server (CNS) hosting functions:</p> <ul style="list-style-type: none"> — Access to predeparture/departure reports; — Email/intranet/internet access; passenger database; — In-flight entertainment system; — External communication system; — Cabin mass memory system; — Cabin monitoring system; — Miscellaneous cabin system 					

<p>11.21 Information Systems (ATA 46)</p> <p>System architecture, operation, and control of:</p> <ul style="list-style-type: none"> — Storage and electronic library; — Updating; — Retrieving pf digital information; — Air Traffic and Information Management Systems (ATIMS) and Network Server Systems; — Aircraft General Information System; — Flight Deck Information System; — Maintenance Information System; — Passenger Cabin Information System; — Miscellaneous Information Systems; — Other linked systems 	1	—	2	—	—
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MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	Level	
	A3 A4	B1.3 B1.4
12.1 Theory of Flight — Rotary Wing Aerodynamics Terminology; Effects of gyroscopic precession; Torque reaction and directional control; Dissymmetry of lift, Blade tip stall; Translating tendency and its correction; Coriolis effect and compensation; Vortex ring state, power setting, overpitching; Auto-rotation; Ground effect.	1	2
12.2 Flight Control Systems (ATA 67) Cyclic control; Collective control; Swashplate; Yaw control: Antitorque Control, Tail rotor, bleed air; Main-rotor head: Design and Operation features; Blade Dampers: Function and construction; Rotor Blades: Main- and tail-rotor blade construction and attachment; Trim control, fixed and adjustable stabilisers; System operation: manual, hydraulic, electrical and fly-by- wire; Artificial feel; Balancing and Rigging.	2	3
12.3 Blade Tracking and Vibration Analysis (ATA 18) Rotor alignment; Main-rotor and tail-rotor tracking; Static and dynamic balancing; Vibration types, vibration reduction methods; Ground resonance.	1	3
12.4 Transmission Gear boxes, main and tail rotors; Clutches, free wheel units and rotor brake;	1	3

Tail-rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.		
12.5 Airframe Structures		
(a) General concept Airworthiness requirements for structural strength; Structural classification, primary, secondary and tertiary; Fail-safe, safe-life, damage-tolerance concepts; Zonal and station identification systems; Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue; Drains and ventilation provisions; System installation provisions; Lightning strike protection provision.	2	2
(b) Construction methods for the principal elements stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, skinning and anticorrosive protection. Pylon, stabiliser and undercarriage attachments; Seat installation; Doors: construction, mechanisms, operation and safety devices; Windows and windscreen construction; Fuel storage; Firewalls; Engine mounts; Structure assembly techniques: riveting, bolting, bonding; Methods for surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods for alignment and symmetry checks.	1	2
12.6 Air Conditioning (ATA 21)		
12.6.1 <i>Air supply</i> Sources of air supply including engine bleed and ground cart;	1	2
12.6.2 <i>Air Conditioning</i> Air-conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.	1	3
12.7 Instruments/Avionic Systems		
12.7.1 <i>Instrument Systems (ATA 31)</i>	1	2

<p>Pitot static: altimeter, air speed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; Compasses: direct reading, remote reading; Vibration indicating systems / health and usage monitoring systems (HUMSs); Glass cockpit; Indications of other aircraft systems.</p>		
<p>12.7.2 Avionic Systems</p> <p>Fundamentals of system layouts and operation of:</p> <p>Autoflight (ATA 22);</p> <p>Communication (ATA 23):</p> <ul style="list-style-type: none"> — Very High Frequency (VHF) communications, — High Frequency (HF) communications, — Satellite Communications (SATCOM), — Controller–pilot data link communications (CPDLC), — Audio systems, — Emergency Locator Transmitters (ELTs), — Cockpit Voice Recorder (CVR); <p>Navigation Systems (ATA 34):</p> <ul style="list-style-type: none"> — Very high frequency omnidirectional range (VOR), — Automatic direction finder (ADF) — Instrument landing system (ILS), — Microwave landing system (MLS), — Flight director systems (FDSs), distance-measuring equipment (DME), — Area navigation (RNAV) systems, — Flight management systems (FMSs), — Satellite navigation systems, — Inertial navigation system (INS), — Air traffic control transponder, secondary surveillance radar, — Traffic alert and collision avoidance system (TCAS), — Weather avoidance radar, — Radio altimeter, — ARINC communication and reporting. <p>Types and uses of general test equipment for avionics</p>	<p>1</p>	<p>1</p>
<p>12.8 Electrical Power (ATA 24)</p>	<p>1</p>	<p>3</p>

<p>Installation and Operation of Batteries; DC power generation, AC power generation; Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.</p>		
<p>12.9 Equipment and Furnishings (ATA 25)</p>		
<p>(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.</p>	2	2
<p>(b) Emergency flotation systems; Cabin layout, cargo retention; Equipment lay-out; Cabin Furnishing Installation.</p>	1	1
<p>12.10 Fire Protection (ATA 26)</p>		
<p>(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.</p>	1	3
<p>(b) Portable fire extinguishers.</p>	1	1
<p>12.11 Fuel Systems (ATA 28)</p>	1	3
<p>System layout; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.</p>		
<p>12.12 Hydraulic Power (ATA 29)</p>	1	3
<p>System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution;</p>		

<p>Indication and warning systems; Interface with other systems. Servicing</p>		
<p>12.13 Ice and Rain Protection (ATA 30)</p>	1	3
<p>Ice formation, classification and detection; Anti-icing and de-icing systems: electrical, hot air and chemical; Rain repellant and removal; Probe and drain heating; Wiper system.</p>		
<p>12.14 Landing Gear (ATA 32)</p>		
<p>(a) System description and operation: Construction, shock absorbing; Extension and retraction systems: normal and emergency; Wheels, tyres, brakes; Steering; Skids, floats.</p>	2	3
<p>(b) Sensors: Indications and warning; Air-ground sensing;</p>	2	3
<p>12.15 Lights (ATA 33)</p>	2	3
<p>External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.</p>		
<p>12.16 (Reserved)</p>		
<p>12.17 Integrated Modular Avionics (IMA) (ATA 42)</p>		
<p>(a) Overall system description and theory Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules: Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc. Core System; Network Components.</p>	1	2

(b) Typical system layouts.	1	2
12.18 Onboard Maintenance Systems (ATA 45) Central maintenance computers; Data-loading system; Electronic library system;	1	2
12.19 Information Systems (ATA 46) The units and components which furnish a means of storing, updating, and retrieving digital information traditionally provided on paper, microfilm or microfiche. They include units that are dedicated to the information storage and retrieval function, such as the electronic library mass storage and controller. They do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general-use display. Typical examples include Air Traffic and Information Management Systems and Network Server Systems Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System.	1	2

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

C/N: Communication and Navigation; Ins.: Instruments; A/F: Autoflight; Sur.: Surveillance; A/S: Airframe and Systems

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	Level						
	B2	B2L Basic	B2L C/N	B2L Ins.	B2L A/F	B2L Sur.	B2L A/S
13.1 Theory of Flight							
(a) Aeroplane Aerodynamics and Flight Controls	1	1	—	—	—	—	—
Operation and effect of:							
— roll control: ailerons and spoilers;							
— pitch control: elevators, stabilators, variable incidence stabilisers and canards;							
— yaw control, rudder limiters;							
— control using elevons, ruddervators;							
— high-lift devices, slots, slats, flaps;							
— drag-inducing devices, spoilers, lift dumpers, speed brakes;							
— trim tabs, servo tabs, and control surface bias.							
(b) Rotary wing aerodynamics	1	1	—	—	—	—	—
Terminology							
Operation and effect of cyclic, collective, and antitorque controls.							
13.2 Structures – general concepts							
(a) General concepts: Zonal and station identification systems; Electrical bonding Lightning strike protection provisions.	2	2	—	—	—	—	—
(b) Fundamentals of structural systems.	1	1	—	—	—	—	—
13.3 Autoflight (ATA 22)							
(a) Fundamentals of automatic flight control: — working principles and current terminology; — Command signal processing;	3	—	—	—	3	—	—

	<ul style="list-style-type: none">— Modes of operation: roll, pitch, and yaw channels;— Yaw dampers;— Stability augmentation system in helicopters;— Automatic trim control;— Autopilot navigation aids interface.							
(b)	Autothrottle systems and automatic landing systems: <ul style="list-style-type: none">— Principles and categories;— Modes of operation— Approach— Glideslope— Land, go-around— System monitors and failure conditions	3	—	—	—	3	—	—
13.4 Communication navigation (ATA 23/34)								
(a)	Fundamentals of communication and navigation systems: <ul style="list-style-type: none">— Radio wave propagation, antennas, transmission lines, communication, receiver, and transmitter; <p>Working principles of the following systems:</p> <ul style="list-style-type: none">— Very high frequency (VHF) communications;— High-frequency (HF) communications;— Satellite communications (SATCOM);— Controller-pilot data link communications (CPDLC);— Audio systems;— Emergency locator transmitters (ELTs);— Cockpit voice recorder (CVR);— Very high frequency omnidirectional range (VOR);— Automatic direction finding (ADF);— Instrument landing system (ILS);— Flight director systems (FDSs), distance measuring equipment (DME);— Area navigation (RNAV) systems;— Flight management systems (FMSs);	3	—	3	—	—	—	—

<ul style="list-style-type: none"> — Global navigation satellite systems (GNSSs), Global Positioning System (GPS), ground-based augmentation system (GBAS), satellite-based augmentation system (SBAS) such as the European geostationary navigation overlay service (EGNOS) and the wide area augmentation system (WAAS); — Data link and two-way data link 							
<p>(b) Fundamentals of aircraft surveillance systems:</p> <ul style="list-style-type: none"> — Air traffic control transponder, secondary surveillance radar; — Traffic alert and collision avoidance system (TCAS); — Weather avoidance radar; — Radio altimeter; — Automatic dependent surveillance — broadcast (ADS-B) and its other associated services such as FIS-B, TIS-B and multilink; — Inertial navigation system (INS); — ARINC (Aeronautical Radio Incorporated) communication and reporting 	3	—	—	—	—	3	—
<p>13.5 Electrical Power (ATA 24)</p> <ul style="list-style-type: none"> — Installation and Operation of Batteries; — DC power generation; — AC power generation; — Emergency power generation; — Voltage regulation; — Power distribution; — Inverters, transformers, rectifiers; — Circuit protection. — External/Ground power; 	3	3	—	—	—	—	—
<p>13.6 Equipment and furnishings (ATA 25)</p> <p>Electronic emergency equipment requirements.</p>	3	—	—	—	—	—	—
<p>13.7 Flight Controls</p>							

(a)	Primary and secondary flight controls (ATA 27): — Primary controls: aileron, elevator, rudder, spoiler; — Trim control, trim tabs; — High-lift devices; — System operation: manual; — Gust locks and gust lock systems; — Artificial feel, yaw damper, Mach trim, rudder limiter; — Stall-warning systems;	2	—	—	—	2	—	—
(b)	Actuation and protection: — Active load control; — Lift dump, speed brakes; — Hydraulic, pneumatic systems; — Stall-protection systems	2	—	—	—	2	—	—
(c)	System operation: — System operation: electrical, fly-by-wire	3	—	—	—	3	—	—
(d)	Rotorcraft flight controls (ATA 67) Rotorcraft controls: cyclic controls, collective control, swashplate, yaw control	2	—	—	—	2	—	—
13.8	Instruments (ATA 31) — Classification; — Atmosphere; — Terminology; — Pressure-measuring devices and systems; — Pitot-static systems; — Altimeters; — Vertical speed indicators; — Airspeed indicators; — Machmeters; — Altitude-reporting/-alerting systems; — Air-data computers; — Instrument pneumatic systems; — Direct-reading pressure and temperature gauges; — Temperature-indicating systems; — Gyroscopic principles; — Artificial horizons; — Slip indicators;	3	—	—	3	—	—	—

<ul style="list-style-type: none"> — Directional gyros; — Ground proximity warning systems (GPWSs); — Compass systems; — Flight data recording systems (FDRSs); — Electronic flight instrument systems (EFISs) — typical system arrangements and cockpit layout; — Instrument warning systems, including master warning systems and centralised warning panels; — Stall-warning systems and angle-of-attack indicating systems; — Vibration measurement and indication; — Glass cockpit; — Types and uses of general test equipment for avionics 							
<p>13.9 Lights (ATA 33)</p> <p>External: navigation, anticollision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency</p>	3	3	—	—	—	—	—
<p>13.10 Onboard maintenance systems (ATA 45)</p> <p>Central maintenance concepts; Data-loading system; Electronic library system; Printing system; Structure monitoring system (damage-tolerance monitoring).</p>	3	—	—	—	—	—	—
<p>13.11 Airconditioning and cabin pressurisation (ATA 21)</p> <p>(a) Pressurisation:</p> <ul style="list-style-type: none"> — Pressurisation systems; — Cabin pressure controllers, control and safety valves; — Control and indication <p>(b) Air Supply:</p> <p>Sources of air supply including engine bleed, APU and ground cart;</p>	3	—	—	—	—	—	3
	1	—	—	—	—	—	1

	Distribution system.							
(c)	Air conditioning	3	—	—	—	—	—	3
(d)	Safety and warning devices.	3	—	—	—	—	—	3
13.12 Fire protection (ATA 26)								
(a)	Fire and smoke detection system and fire-extinguishing systems; — Fire and smoke detection and warning systems; — Fire-extinguishing systems; — System tests	3	—	—	—	—	—	3
(b)	Portable fire extinguisher.	1	—	—	—	—	—	1
13.13 Fuel Systems (ATA 28, ATA 47)								
(a)	System layout: — System layout; — Fuel tanks; — Supply systems;	1	—	—	—	—	—	1
(b)	Fuel handling: — Cross-feed and transfer; — Refuelling and defuelling;	2	—	—	—	—	—	2
(c)	Indications and warnings;	3	—	—	—	—	—	3
(d)	Special systems: — Dumping, venting, and draining — Inert gas systems	1	—	—	—	—	—	1
(e)	Balancing: Longitudinal balance fuel systems.	3	—	—	—	—	—	3
13.14 Hydraulic Power (ATA 29)								
(a)	System description: System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Filters; Power distribution.	1	—	—	—	—	—	1
(b)	System operation (1)	3	—	—	—	—	—	3

	Pressure generation: electric and mechanical; Pressure Control; Indication and warning systems; Servicing						
(c)	System operation (2) Pressure generation: pneumatic; Emergency pressure generation; Interface with other systems.	3	—	—	—	—	3
13.15 Ice and Rain Protection (ATA 30)							
(a)	Principles: Ice formation, classification and detection;	2	—	—	—	—	2
(b)	De-icing: De-icing systems: electrical, hot air, pneumatic, and chemical; Probe and drain heating.	3	—	—	—	—	3
(c)	Anti-icing: Anti-icing systems: electrical, hot air, and chemical;	2	—	—	—	—	2
(d)	Wiper systems.	1	—	—	—	—	1
(e)	Rain repellent systems.	1	—	—	—	—	1
13.16 Landing Gear (ATA 32)							
(a)	Description: Construction, shock absorbing; Tyres	1	—	—	—	—	1
(b)	Systems: Extension and retraction systems: normal and emergency; Indications and warnings; Wheels, brakes, antiskid and autobraking; Steering;	3	—	—	—	—	3
(c)	Air-ground sensing.	3	—	—	—	—	3
13.17 Oxygen (ATA 35)							
	— System layout: cockpit, cabin;	3	—	—	—	—	3

<ul style="list-style-type: none"> — Sources, storage, charging and distribution; — Supply regulation; — Indications and warnings; 							
13.18 Pneumatic/Vacuum (ATA 36)	2	—	—	—	—	—	2
<ul style="list-style-type: none"> — System layout; — Sources: engine/APU, compressors, reservoirs, ground supply; — Pressure control; — Distribution; — Indications and warnings; — Interface with other systems. 							
13.19 Water/Waste (ATA 38)	2	—	—	—	—	—	2
<ul style="list-style-type: none"> — Water system layout, supply, distribution, servicing and draining; — Toilet system layout, flushing and servicing; 							
13.20 Integrated Modular Avionics (IMA) (ATA 42)							
<p>(a) Overall system description and theory: Core system; network components; Note: Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:</p> <ul style="list-style-type: none"> — Bleed management; — Air pressure control; — Air ventilation and control; — Avionics and cockpit ventilation control, temperature control; — Air traffic communication; — Avionics communication router; — Electrical load management; — Circuit breaker monitoring; — Electrical system built-in test equipment (BITE); — Fuel management; — Braking control; — Steering control; — Landing gear extension and retraction; 	3	—	—	—	—	—	—

<ul style="list-style-type: none"> — Tyre pressure indication; — Oleo pressure indication; — Brake temperature monitoring 							
(b) Typical system layout.	3	—	—	—	—	—	—
13.21 Cabin Systems (ATA 44)	3	—	—	—	—	—	—
<p>System architecture, operation, and control systems for:</p> <ul style="list-style-type: none"> — passenger in-flight entertainment; — communication within the aircraft (Cabin intercommunication data system (CIDS); — communication between the aircraft cabin and ground stations including voice, data, music, and video transmission. <p>CIDS interface between cockpit/cabin crew and cabin systems.</p> <p>Data exchange between the different related line replaceable units (LRUs).</p> <p>Flight attendant panels (FAPs).</p> <p>Cabin network server (CNS) and interfaces with the following systems:</p> <ul style="list-style-type: none"> — Data/radio communication system; — Cabin core system (CCS); — In-flight entertainment system (IFES); — External communication system (ECS); — Cabin mass memory system (CMMS); — Cabin monitoring system (CMS); — Miscellaneous cabin systems (MCSs); <p>The CNS may host functions such as:</p> <ul style="list-style-type: none"> — Access to predeparture/departure reports; — Email/intranet/internet access; — passenger database; — In-flight entertainment system; 							
13.22 Information Systems (ATA 46)	3	—	—	—	—	—	—
<p>The units and components which furnish a means of storing, updating, and retrieving digital information traditionally provided on paper, microfilm or microfiche.</p>							

<p>They include units that are dedicated to the information storage and retrieval function, such as the electronic library mass storage and controller, but they do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general-use display.</p> <p>Typical examples include:</p> <ul style="list-style-type: none"> — Air Traffic and Information Management Systems and Network Server Systems; — Aircraft General Information System; — Flight Deck Information System; — Maintenance Information System; — Passenger Cabin Information System; — Miscellaneous Information Systems; — Other linked systems 							
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MODULE 14 PROPULSION

MODULE 14 PROPULSION	Level
	B2 B2L Instruments B2L Airframe and Systems
14.1 Engines	
(a) Constructional arrangement and operation of turbojet, turbofan, turboshaft and turboprop engines;	1
(b) Constructional arrangement and operation of auxiliary power units (APUs).	1
(c) Constructional arrangement and operation of piston engines.	1
(d) Constructional arrangement and operation of electric and hybrid engines, their electric energy storage and control systems.	2
(e) Electronic engine control and fuel-metering systems (full authority digital engine control (FADEC)).	2
14.2 Electric/electronic engine Indication systems	2
<ul style="list-style-type: none"> — Exhaust gas temperature/Interstage turbine temperature systems; — Cylinder head temperature, engine coolant temperature, Engine speed; — Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; — Vibration measurement systems; — Oil pressure and temperature; — Fuel pressure, temperature and flow; — Manifold pressure; — Engine torque; 	
14.3 Propeller systems	2
<ul style="list-style-type: none"> — Propeller speed indication; — Speed control and pitch change methods — electrical/electronic; — Synchronising and synchrophasing equipment; — Electrical anti-icing/de-icing equipment 	

14.4 Starting and Ignition Systems — Operation of engine start systems and components; — Ignition systems and components; — Maintenance safety requirements.	2
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MODULE 15. GAS TURBINE ENGINE

MODULE 15. GAS TURBINE ENGINE	Level	
	A1 A3	B1.1 B1.3
15.1 Fundamentals <ul style="list-style-type: none"> — Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; — The relationship between force, work, power, energy, velocity, and acceleration; — Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop and geared turbofan engines. 	1	2
15.2 Engine Performance <ul style="list-style-type: none"> — Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; — Engine efficiencies; — By-pass ratio and engine pressure ratio; — Pressure, temperature and velocity of the gas flow; — Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations. 	—	2
15.3 Inlet <ul style="list-style-type: none"> — Compressor inlet ducts — Effects of various inlet configurations; — Ice protection. 	2	2
15.4 Compressors <ul style="list-style-type: none"> — Axial and centrifugal types; — Constructional features and operating principles and applications; — Fan balancing; — Operation: <ul style="list-style-type: none"> ○ Causes and effects of compressor stall and surge; ○ Methods of air-flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; ○ Compressor ratio. 	1	2
15.5 Combustion Section <p>Constructional features and principles of operation.</p>	1	2

15.6 Turbine Section	2	2
<ul style="list-style-type: none"> — Operation and characteristics of different turbine blade types; — Blade-to-disk attachment; — Nozzle guide vanes; — Causes and effects of turbine blade stress and creep. 		
15.7 Exhaust	1	2
<ul style="list-style-type: none"> — Constructional features and principles of operation; — Convergent, divergent and variable area nozzles; — Engine noise reduction; — Thrust reversers. 		
15.8 Bearings and Seals	—	2
Constructional features and principles of operation.		
15.9 Lubricants and Fuels	1	2
<ul style="list-style-type: none"> — Properties and specifications of standard, alternate, and drop-in fuel; — Properties and specifications of lubricants — Fuel additives; — Safety precautions. 		
15.10 Lubrication Systems	1	2
System operation/layout and components.		
15.11 Fuel Systems	1	2
<ul style="list-style-type: none"> — Operation of engine control and fuel-metering systems including electronic engine control (full authority digital engine control (FADEC)) and electronic power augmentation; — Systems layout and components. 		
15.12 Air Systems	1	2
Operation of engine air distribution and anti-icing control systems, including internal cooling and sealing, and external air services.		
15.13 Starting and Ignition Systems	1	2
<ul style="list-style-type: none"> — Operation of engine start systems and components; — Ignition systems and components; 		

— Maintenance safety requirements.		
15.14 Engine Indication Systems	1	2
<ul style="list-style-type: none"> — Exhaust Gas Temperature/Interstage Turbine Temperature; — Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; — Oil pressure and temperature; — Fuel pressure and flow; — Engine speed; — Vibration measurement and indication; — Torque; — Power. 		
15.15 Alternate turbine constructions	—	1
<ul style="list-style-type: none"> — Geard turbofan; — Variable fan blades; — Open rotor/propfan; — Hybrid turbine-electric concepts and electric power augmentation — Future trends and developments 		
15.16 Turbo-prop Engines	1	2
<ul style="list-style-type: none"> — Gas coupled/free turbine and gear-coupled turbines; — Reduction gears; — Integrated engine and propeller controls; — Overspeed safety devices. 		
15.17 Turboshift engines	1	2
Arrangements, drive systems, reduction gearing, couplings, control systems.		
15.18 Auxiliary Power Units (APUs)	1	2
Purpose, operation, protective systems.		
15.19 Powerplant Installation	1	2
Configuration of firewalls, cowlings, acoustic panels, engine mounts, antivibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		
15.20 Fire Protection Systems	1	2
Operation of fire-detection and fire-extinguishing systems.		

<p>15.21 Engine Monitoring and Ground Operation</p> <ul style="list-style-type: none"> — Procedures for starting and ground run-up; — Interpretation of engine power output and parameters; — Trend (including oil analysis, vibration and borescope) monitoring; — Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; — Compressor washing/cleaning; — Foreign Object Damage (FOD). 	1	3
<p>15.22 Engine Storage and Preservation</p> <p>Preservation and depreservation for the engine and its accessories /systems.</p>	—	2

MODULE 16. PISTON ENGINE

MODULE 16. PISTON ENGINE	Level	
	A2 A4	B1.2 B1.4 B3
16.1 Fundamentals <ul style="list-style-type: none"> — Mechanical, thermal and volumetric efficiencies; — Operating principles: 2-stroke, 4-stroke, Otto, Diesel and rotary (Wankel); — Piston displacement and compression ratio; — Engine configuration and firing order. 	1	2
16.2 Engine Performance <ul style="list-style-type: none"> — Power calculation and measurement; — Factors affecting engine power; — Mixtures/leaning, pre-ignition. 	1	2
16.3 Engine Construction <ul style="list-style-type: none"> — Crank case, crank shaft, cam shafts, sumps; — Accessory gearbox; — Cylinder and piston assemblies; — Connecting rods, inlet and exhaust manifolds; — Valve mechanisms; — Propeller reduction gearboxes. 	1	2
16.4 Engine Fuel Systems		
16.4.1 Carburettors <ul style="list-style-type: none"> — Types, construction and principles of operation; — Icing and heating. 	1	2
16.4.2 Fuel injection systems <p>Types, construction and principles of operation.</p>	1	2
16.4.3 Electronic engine control <ul style="list-style-type: none"> — Operation of engine control and fuel-metering systems including electronic engine control (full authority digital engine control (FADEC)); 	1	2

— System layout and components.		
16.5 Starting and Ignition Systems	1	2
<ul style="list-style-type: none"> — Starting systems, preheat systems; — Magneto types, construction and principles of operation; — Ignition harnesses, spark plugs; — Low- and high-tension systems. 		
16.6 Induction, Exhaust and Cooling Systems	1	2
<ul style="list-style-type: none"> — Construction and operation of induction systems including alternate air systems; — Exhaust systems, engine cooling systems — air and liquid. 		
16.7 Supercharging/Turbocharging	1	2
<ul style="list-style-type: none"> — Principles and purpose of supercharging and its effects on engine parameters; — Construction and operation of supercharging/turbocharging systems; — System terminology; — Control systems; — System protection 		
16.8 Lubricants and Fuels	1	2
<ul style="list-style-type: none"> — Properties and specifications of standard, alternate, and drop-in fuel; — Properties and specifications of lubricants — Fuel additives; — Safety precautions. 		
16.9 Lubrication Systems	1	2
System operation/layout and components.		
16.10 Engine Indication Systems	1	2
<ul style="list-style-type: none"> — Engine speed; — Cylinder head temperature; — Coolant temperature; — Oil pressure and temperature; — Exhaust Gas Temperature; — Fuel pressure and flow; — Manifold pressure. 		
16.11 Powerplant Installation	1	2

Configuration of firewalls, cowlings, acoustic panels, engine mounts, antivibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		
16.12 Engine Monitoring and Ground Operation	1	3
<ul style="list-style-type: none"> — Procedures for starting and ground run-up; — Interpretation of engine power output and parameters; — Inspection of engine and components: criteria, tolerances, and data specified by the engine manufacturer. 		
16.13 Engine Storage and Preservation	—	2
Preservation and depreservation for the engine and accessories / systems.		
16.14 Alternate piston-engine constructions	1	1
Hybrid piston–electric concepts and electric power augmentation.		

MODULE 17. PROPELLER

MODULE 17. PROPELLER	Level	
	A1 A2	B1.1 B1.2 B3
17.1 Fundamentals <ul style="list-style-type: none"> — Blade element theory; — High/low blade angle, reverse angle, angle of attack, rotational speed; — Propeller slip; — Aerodynamic, centrifugal, and thrust forces; — Torque; — Relative airflow on blade angle of attack; — Vibration and resonance. 	1	2
17.2 Propeller Construction <ul style="list-style-type: none"> — Construction methods and materials used in wooden, composite and metal propellers; — Blade station, blade face, blade shank, blade back / thrust face and hub assembly; — Fixed pitch, controllable pitch, constant speeding propeller; — Propeller/spinner installation. 	1	2
17.3 Propeller Pitch Control <ul style="list-style-type: none"> — Speed control and pitch change methods - mechanical and electrical/electronic; — Feathering and reverse pitch; — Overspeed protection. 	1	2
17.4 Propeller Synchronising Synchronising and synchrophasing equipment.	—	2
17.5 Propeller Ice Protection Fluid and electrical de-icing equipment.	1	2
17.6 Propeller Maintenance <ul style="list-style-type: none"> — Static and dynamic balancing; — Blade tracking; 	1	3

<ul style="list-style-type: none"> — Assessment of blade damage, erosion, corrosion, impact damage, delamination; — Propeller treatment/repair schemes; — Propeller engine running. 		
<p>17.7 Propeller Storage and Preservation</p> <p>Propeller preservation and depreservation</p>	1	2

AMC1 Appendix I — Basic Knowledge Requirements (except for category L licence)

Section 3

Basic training methods

Training methods are categorised as follows: ‘instructor-centred training’, ‘student-centred training’, and ‘blended training’.

The actual training method and training tools should be adapted to suit the training subject and be chosen considering their intrinsic characteristics, such as but not limited to their efficiency and the pedagogical benefits of the training method/tool.

Basic training modules 7, 9, 11, 12, 13, 14, 15, 16 and 17 should not normally be taught solely through a student-centred method unless provisions are in place to verify the actual and progressive acquisition of knowledge, skills and attitude by the student.

Appendix II Basic Examination Standard (except for category L licence)

1. General

- 1.1. All basic examinations must be carried out using the multi-choice question format and essay questions as specified below. The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.
- 1.2. Each multi-choice question must have three alternative answers of which only one must be the correct answer and the candidate shall be allowed a time per module which is based upon a nominal average of 75 seconds per question.
- 1.3. Each essay question requires the preparation of a written answer and the candidate shall be allowed 20 minutes to answer each such question.
- 1.4. Suitable essay questions shall be drafted and evaluated using the knowledge syllabus in Appendix I Module 7.
- 1.5. Each question will have a model answer drafted for it, which will also include any known alternative answers that may be relevant for other subdivisions.
- 1.6. The model answer will also be broken down into a list of the important points known as Key Points.
- 1.7. The pass mark for each module and sub-module multi-choice part of the examination is 75%.
- 1.8. The pass mark for each essay question is 75% in that the candidates answer shall contain 75% of the required key points addressed by the question and no significant error related to any required key point.
- 1.9. If either the multi-choice part only or the essay part only is failed, then it is only necessary to retake the multi-choice or essay part, as appropriate.
- 1.10. Penalty marking systems must not be used to determine whether a candidate has passed.
- 1.11. An examination in a module may not be retaken earlier than 90 days following the date of a failed examination in that module, except in the case of a maintenance training organisation approved in accordance with MCAR-147 which delivers a course of retraining tailored to the failed subjects in the particular module; the failed module may be retaken after 30 days.

- 1.12. Basic knowledge examinations with a maximum allowed time of more than 90 or more than 180 minutes may be split in two or three partial exams respectively.

Each partial exam shall:

- (a) be complementary to the other partial exam or exams taken by the candidate, ensuring that the combination of partial exams meets the examination requirements for the subject module;
- (b) be of similar allowed time;
- (c) be passed with 75 % or more of the questions answered correctly;
- (d) contain a number of questions that is multiple of four;
- (e) be listed on the same certificate of recognition issued after the last partial exam has been successfully passed. That certificate of recognition shall list the dates and the results of the partial exams – without averaging the results;
- (f) be taken within the same organisation, following the normal examination provisions for retaking failed exams.

- 1.13. The maximum number of attempts for each examination is three in a 12-month period.

The applicant shall provide in a written statement to the approved maintenance training organisation or the CAA to which they apply for an examination, the number, and dates of attempts during the 12 months preceding the examination, and the organisation or the CAA where those attempts took place. The approved maintenance training organisation or the CAA is responsible for checking the number of attempts within the applicable time frames.

- 1.14. While it is accepted that the subject matter of the questions may be the same, the questions used as part of the MBT learning programme shall not be used in examinations.

2. Number of questions per module

2.1. MODULE 1 – MATHEMATICS:

Category A: 16 multi-choice, no essay questions.

Time allowed: 20 minutes.

Category B1, B2, B2L and B3: 32 multi-choice, no essay questions.

Time allowed: 40 minutes.

2.2. MODULE 2 – PHYSICS:

Category A and B3: 32 multi-choice, no essay questions.

Time allowed: 40 minutes.

Category B1, B2 and B2L: 52 multi-choice, no essay questions.

Time allowed: 65 minutes.

2.3. MODULE 3 – ELECTRICAL FUNDAMENTALS:

Category A: 20 multi-choice, no essay questions.

Time allowed: 25 minutes.

Category B3: 24 multi-choice, no essay questions.

Time allowed 30 minutes.

Category B1, B2 and B2L: 52 multi-choice, no essay questions.

Time allowed: 65 minutes.

2.4. MODULE 4 – ELECTRONIC FUNDAMENTALS:

Category B1 and B3: 20 multi-choice, no essay questions.

Time allowed: 25 minutes.

Category B2 and B2L: 40 multi-choice, no essay questions.

Time allowed: 50 minutes.

2.5. MODULE 5 – DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS:

Category A and B3: 20 multi-choice, no essay questions.

Time allowed: 25 minutes.

Category B1: 40 multi-choice, no essay questions.

Time allowed: 50 minutes.

Category B2 and B2L: 72 multi-choice, no essay questions.

Time allowed 90 minutes.

2.6. MODULE 6 – MATERIALS AND HARDWARE:

Category A: 52 multi-choice, no essay questions.

Time allowed: 65 minutes.

Category B1 and B3: 80 multi-choice, no essay questions.

Time allowed: 100 minutes.

Category B2 and B2L: 60 multi-choice, no essay questions.

Time allowed: 75 minutes.

2.7. MODULE 7 – MAINTENANCE PRACTICES:

Category A: 76 multi-choice and 2 essay questions.
Time allowed: 95 minutes plus 40 minutes.
Category B1 and B3: 80 multi-choice and 2 essay questions.
Time allowed 100 minutes plus 40 minutes.
Category B2 and B2L: 60 multi-choice and 2 essay questions.
Time allowed: 75 minutes plus 40 minutes.

2.8. MODULE 8 – BASIC AERODYNAMICS:

Category A, B3, B1, B2 and B2L: 24 multi-choice, no essay questions.
Time allowed: 30 minutes.

2.9. MODULE 9 – HUMAN FACTORS:

Category A, B1, B3, B2 and B2L: 28 multi-choice, no essay questions.
Time allowed: 35 minutes.

2.10. MODULE 10 – AVIATION LEGISLATION:

Category A: 32 multi-choice, no essay questions.
Time allowed: 40 minutes.
Category B1, B3, B2 and B2L: 44 multi-choice, no essay questions.
Time allowed: 55 minutes.

2.11. MODULE 11 – TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS:

Category A: 108 multi-choice, no essay questions.
Time allowed: 135 minutes.
Category A2: 72 multi-choice, no essay questions.
Time allowed: 90 minutes.
Category B1.1: 140 multi-choice, no essay questions.
Time allowed: 175 minutes.
Category B1.2: 100 multi-choice, no essay questions.
Time allowed: 125 minutes.
Category B3: 60 multi-choice, no essay questions.
Time allowed: 75 minutes.

2.12. MODULE 12 – HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS:

Category A: 100 multi-choice, no essay questions.
Time allowed: 125 minutes.
Category B1.3 and B1.4: 128 multi-choice, no essay questions.
Time allowed: 160 minutes.

2.13. MODULE 13 – AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS:

Category B2: 188 multi-choice, no essay questions.
Time allowed: 235 minutes.

Category B2L:

System rating	Number of multiple-choice questions	Time allowed (minutes)
Basic requirements (Submodules 13.1, 13.2, 13.5 and 13.9)	32	40
COM/NAV (Submodule 13.4(a))	24	30
INSTRUMENTS (Submodule 13.8)	20	25
AUTOFLIGHT (Submodules 13.3 and 13.7)	28	35
SURVEILLANCE (Submodule 13.4(b))	20	25
AIRFRAME SYSTEMS (Submodules 13.11 to 13.19)	52	65

2.14. MODULE 14 – PROPULSION:

Category B2 and B2L: 32 multi-choice, no essay questions.

Time allowed: 40 minutes.

NOTE: The B2L examination for module 14 is only applicable to the 'Instruments' and Airframe Systems' ratings.

2.15. MODULE 15 – GAS TURBINE ENGINE:

Category A1 and A3: 60 multi-choice, no essay questions.

Time allowed: 75 minutes.

Category B1 and B1.3: 92 multi-choice, no essay questions.

Time allowed: 115 minutes.

2.16. MODULE 16 – PISTON ENGINE:

Category A1 and A2: 52 multi-choice, no essay questions.

Time allowed: 65 minutes.

Category B3, B1.2 and B1.4: 76 multi-choice, no essay questions.

Time allowed: 95 minutes.

2.17. MODULE 17 – PROPELLER:

Category A1 and A2: 20 multi-choice, no essay questions.

Time allowed: 25 minutes.

Category B3, B1.1 and B1.2: 32 multi-choice, no essay questions.

Time allowed: 40 minutes.

AMC1 Appendix II — Basic examination standard (except for category L licence)

The tables below show the acceptable number of questions for the submodules. Justified deviations from these values are also acceptable, provided the sum of the questions complies with the total number of questions for a given module.

[This AMC is new and should be green but not coloured for ease]

MODULE 1. MATHEMATICS

MODULE 1. MATHEMATICS	Nr of questions	
	A	B1 B2 B2L B3
Total number for the module:	16	32
1.1 Arithmetic	6	6
1.2 Algebra		
(a) Simple algebraic expressions;	5	4
(b) Equations;	—	12
1.3 Geometry		
(a) Simple geometrical constructions;	—	3
(b) Graphical representation;	5	4
(c) Trigonometry.	—	3

MODULE 2. PHYSICS

MODULE 2. PHYSICS	Nr of questions	
	A B3	B1 B2 B2L
Total number for the module:	32	52
2.1 Matter	4	5
2.2 Mechanics		
2.2.1 Statics	6	7
2.2.2 Kinetics	6	7
2.2.3 Dynamics		
(a) Mass, force and energy;	4	5
(b) Momentum and conservation of momentum;	4	5
2.2.4 Fluid dynamics		
(a) Gravity and density;	2	2
(b) Viscosity; compressibility on fluids; static, dynamic and total pressure	2	3
2.3 Thermodynamics		
(a) Temperature.	2	2
(b) Heat.	2	8
2.4 Optics (Light)	—	5
2.5 Wave Motion and Sound	—	4

MODULE 3. ELECTRICAL FUNDAMENTALS

MODULE 3. ELECTRICAL FUNDAMENTALS		Nr of questions		
		A	B1 B2 B2L	B3
Total number for the module:		20	52	24
3.1	Electron Theory	2	2	2
3.2	Static Electricity and Conduction	3	3	2
3.3	Electrical Terminology	3	2	2
3.4	Generation of Electricity	3	2	2
3.5	Sources of DC Electricity	3	3	3
3.6	DC Circuits	1	2	1
3.7	Resistance/Resistor			
(a)	Resistance;	—	3	1
(b)	Resistors.	—	2	—
3.8	Power	—	3	1
3.9	Capacitance/Capacitor	—	4	1
3.10	Magnetism			
(a)	Theory of magnetism;	—	3	1
(b)	Magnetomotive force.	—	1	1
3.11	Inductance/Inductor	—	4	1
3.12	DC Motor/Generator Theory	—	3	1
3.13	AC Theory	5	3	1
3.14	Resistive (R), Capacitive (C) and Inductive (L) Circuits	—	3	1
3.15	Transformers	—	3	1
3.16	Filters	—	1	—

3.17 AC Generators	—	3	1
3.18 AC Motors	—	2	1

MODULE 4. ELECTRONIC FUNDAMENTALS

MODULE 4. ELECTRONIC FUNDAMENTALS	Nr of questions		
	A	B1 B3	B2 B2L
Total number for the module:	—	20	40
4.1 Semiconductors			
4.1.1 <i>Diodes</i>			
(a) Description and characteristics;	—	8	8
(b) Operation and function.	—	—	7
4.1.2 <i>Transistors</i>			
(a) Description and characteristics;	—	4	4
(b) Construction and operation.	—	—	7
4.1.3 <i>Integrated Circuits</i>			
(a) Basic Description and operation;	—	3	2
(b) Description and operation.	—	—	4
4.2 Printed Circuit Boards	—	2	3
4.3 Servomechanisms			
(a) Principles	—	3	2
(b) Construction, operation and use;	—	—	3

MODULE 5. DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

MODULE 5. DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS		Nr of questions			
		A	B3	B1	B2 B2L
Total number for the module:		20	20	40	72
5.1	Electronic Instrument Systems	4	4	4	4
5.2	Numbering Systems	—	—	3	5
5.3	Data Conversion	—	—	3	4
5.4	Data Buses	—	—	3	5
5.5	Logic Circuits				
(a)	Identification and applications;	—	—	3	4
(b)	Interpretation of logic diagrams.	—	—	—	4
5.6	Basic Computer Structure				
(a)	Computer terminology and technology;	6	2	4	2
(b)	Computer operation;	—	—	—	6
5.7	Microprocessors	—	—	—	4
5.8	Integrated Circuits	—	—	—	5
5.9	Multiplexing	—	—	—	4
5.10	Fibre Optics	—	—	3	3
5.11	Electronic Displays	2	2	2	4
5.12	Electrostatic sensitive devices	6	6	4	5
5.13	Software Management Control	—	1	3	3
5.14	Electromagnetic Environment	—	1	3	4
5.15	Typical Electronic/Digital Aircraft Systems	2	4	5	6

MODULE 6. MATERIALS AND HARDWARE

MODULE 6. MATERIALS AND HARDWARE		Nr of questions		
		A	B1 B3	B2 B2L
Total number for the module:		52	80	60
6.1 Aircraft Materials — Ferrous				
(a) Alloy steel used in aircraft;		3	3	3
(b) Testing of ferrous materials;		—	2	1
(c) Repair and inspection procedures.		—	2	1
6.2 Aircraft Materials — Non-Ferrous				
(a) Characteristics;		3	4	3
(b) Testing of non-ferrous material;		—	3	2
(c) Repair and inspection procedures.		—	2	1
6.3 Aircraft Materials — Composite and Non-Metallic				
<i>6.3.1 Composite and non-metallic other than wood and fabric</i>				
(a) Characteristics;		2	4	3
(b) Detection of defects;		2	4	—
(c) Repair of and inspection procedures.		—	2	2
<i>6.3.2 Wooden structures</i>		3	4	—
<i>6.3.3 Fabric covering</i>		—	4	—
<i>6.4 Corrosion</i>				
(a) Chemical fundamentals;		3	3	3
(b) Types of corrosion;		4	5	3
6.5 Fasteners				
<i>6.5.1 Screw threads</i>		4	4	3
<i>6.5.2 Bolts, studs and screws</i>		6	6	5

6.5.3	<i>Locking devices</i>	2	2	2
6.5.4	<i>Aircraft rivets</i>	2	3	2
6.6	Pipes and Unions			
(a)	Identification;	1	1	1
(b)	Standard unions.	2	2	2
6.7	Springs	—	1	1
6.8	Bearings	2	4	3
6.9	Transmissions	3	4	4
6.10	Control Cables	5	5	4
6.11	Electrical Cables and Connectors	5	6	11

MODULE 7. MAINTENANCE PRACTICES

MODULE 7. MAINTENANCE PRACTICES	Nr of questions		
	A	B1 B3	B2 B2L
Total number for the module:	76	80	60
7.1 Safety Precautions — Aircraft and Workshop	4	4	4
7.2 Workshop Practices	4	4	4
7.3 Tools	6	6	6
7.4 (Reserved)	—	—	—
7.5 Engineering drawings, diagrams and standards	6	6	6
7.6 Fits and Clearances	5	5	5
7.7 Electrical Wiring Interconnection System (EWIS)	4	4	8
7.8 Riveting	4	3	—
7.9 Pipes and Hoses	4	3	—
7.10 Springs	1	1	—
7.11 Bearings	4	3	—
7.12 Transmissions	3	3	—
7.13 Control Cables	4	3	—
7.14 Material handling			
7.14.1 <i>Sheet Metal</i>	—	2	—
7.14.2 <i>Composite and non-metallic</i>	—	2	—
7.14.3 <i>Additive manufacturing</i>	2	4	2
7.15 (Reserved)	—	—	—
7.16 Aircraft Weight and Balance			

(a)	Centre-of-gravity calculation;	—	2	2
(b)	Aircraft weighing;	—	1	—
7.17	Aircraft Handling and Storage	7	5	6
7.18	Disassembly, Inspection, Repair and Assembly Techniques			
(a)	Types of defects and visual inspection techniques;	2	2	2
(b)	General repair methods, Structural Repair Manual;	—	2	—
(c)	Non-destructive inspection techniques;	—	1	1
(d)	Disassembly and reassembly techniques;	2	1	1
(e)	Troubleshooting techniques.	—	1	1
7.19	Abnormal Events			
(a)	Inspections following lightning strikes and HIRF penetration;	2	1	2
(b)	Inspections following abnormal events such as heavy landings and flight through turbulence.	2	1	—
7.20	Maintenance Procedures	6	6	6
7.21	Documentation and communication	4	4	4

MODULE 8. BASIC AERODYNAMICS

MODULE 8. BASIC AERODYNAMICS	Nr of questions	
	A B3	B1 B2 B2L
Total number for the module:	24	24
8.1 Physics of the Atmosphere	2	2
International Standard Atmosphere (ISA), application to aerodynamics.		
8.2 Aerodynamics	9	9
8.3 Theory of Flight	7	7
8.4 High-speed airflow	4	4
8.5 Flight Stability and Dynamics	2	2

MODULE 9. HUMAN FACTORS

MODULE 9. HUMAN FACTORS	Nr of questions
	ALL
Total number for the module:	28
9.1 General	3
9.2 Human Performance and Limitations	3
9.3 Social Psychology	2
9.4 Factors that affect performance	3
9.5 Physical Environment	2
9.6 Tasks	2
9.7 Communication	3
9.8 Human Error	4
9.9 Safety Management	2
9.10 The 'Dirty dozen' and risk-mitigation	4

MODULE 10. AVIATION LEGISLATION

MODULE 10. AVIATION LEGISLATION	Nr of questions	
	A	B1 B2 B2L B3
Total number for the module:	32	44
10.1 Regulatory Framework	5	5
10.2 Certifying Staff - Maintenance	7	7
10.3 Approved Maintenance Organisations	6	6
10.4 Independent certifying staff	—	4
10.5 Air Operations	4	4
10.6 Certification of aircraft, parts and appliances	1	4
10.7 Continuing Airworthiness	6	7
10.8 Oversight principles in continuing airworthiness	2	3
10.9 Requirements for component maintenance, welding, painting, NDT, etc	—	3
10.10 Cybersecurity in aviation maintenance	1	1

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	Nr of questions				
	A1	A2	B1.1	B1.2	B3
Total number for the module:	108	72	140	100	60
11.1 Theory of Flight					
(a) Aeroplane Aerodynamics and Flight Controls	2	2	2	2	1
(b) Aeroplane: other aerodynamics devices	2	2	2	2	2
11.2 Airframe Structures (ATA 51)					
(a) General concepts:	3	3	4	3	2
(b) Airworthiness requirements for structural strength;	3	3	3	3	1
(c) Construction methods.	1	1	3	2	1
11.3 Airframe Structures — Aeroplanes					
<i>11.3.1 Fuselage, doors, windows (ATA 52/53/56)</i>					
(a) Construction principles;	1	1	2	2	2
(b) Airborne towing devices;	1	1	1	1	1
(c) Doors.	1	1	1	1	—
<i>11.3.2 Wings (ATA 57)</i>	2	2	3	3	2
<i>11.3.3 Stabilisers (ATA 55)</i>	1	1	2	1	1
<i>11.3.4 Flight Control Surfaces (ATA 55/57)</i>	1	1	2	2	1
<i>11.3.5 Nacelles/Pylons (ATA 54)</i>	1	1	2	1	1
11.4 Air Conditioning and Cabin Pressurisation (ATA21)					
(a) Pressurisation;	2	2	3	1	—
(b) Air supply;	3	—	3	—	—
(c) Air conditioning;	3	—	3	—	—

(d) Safety and warning devices;	2	1	2	2	—
(e) Heating and ventilation systems.	—	1	—	2	1
11.5 Instruments/Avionics Systems					
<i>11.5.1 Instrument Systems (ATA 31)</i>	2	2	4	4	3
<i>11.5.2 Avionic Systems</i>	3	2	5	4	4
Fundamentals of system lay-outs and operation of;					
— Auto Flight (ATA 22);					
— Communications (ATA 23)					
— Navigation Systems (ATA 34).					
11.6 Electrical Power (ATA 24)	4	3	5	5	4
11.7 Equipment and Furnishings (ATA 25)					
(a) Emergency equipment;	4	2	4	3	2
(b) Cabin and cargo layout.	3	3	3	3	—
11.8 Fire Protection (ATA 26)					
(a) Fire and smoke detection, and fire-extinguishing systems;	3	2	4	3	—
(b) Portable fire extinguisher	1	1	1	1	1
11.9 Flight Controls (ATA 27)					
(a) Primary and secondary flight controls;	3	2	4	4	3
(b) Actuation and protection;	3	—	3	—	—
(c) System operation;	3	—	3	—	—
(d) Balancing and rigging.	1	1	3	3	2
11.10 Fuel Systems (ATA 28, ATA 47)					
(a) Systems layout;	2	2	3	3	2
(b) Fuel handling;	2	2	2	2	1

(c)	Indications and warnings;	1	1	2	2	1
(d)	Special systems;	1	—	1	—	—
(e)	Balancing.	2	—	2	—	—
11.11 Hydraulic Power (ATA 29)						
(a)	System description;	1	1	3	3	2
(b)	System operation (1);	1	1	3	2	1
(c)	System operation (2);	2	—	2	—	—
11.12 Ice and Rain Protection (ATA 30)						
(a)	Principles;	1	1	2	2	1
(b)	De-icing;	1	1	2	2	1
(c)	Anti-icing;	1	—	2	—	—
(d)	Wipers;	1	1	2	2	1
(e)	Rain-repellent systems.	2	—	2	—	—
11.13 Landing Gear (ATA 32)						
(a)	Description;	3	3	4	3	1
(b)	System operation;	3	3	4	2	1
(c)	Air-ground sensing;	1	—	1	—	—
(d)	Tail protection.	1	1	1	1	1
11.14 Lights (ATA 33)		2	2	3	3	2
11.15 Oxygen (ATA 35)		3	3	4	4	3
11.16 Pneumatic/Vacuum (ATA 36)						
(a)	Systems;	3	3	3	3	2
(b)	Pumps.	3	3	3	3	2

11.17 Water/Waste (ATA 38)					
(a) Systems;	2	2	2	2	1
(b) Corrosion.	1	1	1	1	1
11.18 Onboard Maintenance Systems (ATA 45)	3	—	3	—	—
11.19 Integrated Modular Avionics (IMA) (ATA 42)					
(a) Overall system description and theory;	1	—	1	—	—
(b) Typical system layouts.	1	—	1	—	—
11.20 Cabin Systems (ATA 44)	2	—	2	—	—
11.21 Information Systems (ATA 46)	2	—	2	—	—

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	Nr of questions	
	A3 A4	B1.3 B1.4
Total number for the module:	100	128
12.1 Theory of Flight — Rotary Wing Aerodynamics	6	9
12.2 Flight Control Systems (ATA 67)	9	9
12.3 Blade Tracking and Vibration Analysis (ATA 18)	6	9
12.4 Transmission	3	6
12.5 Airframe Structures		
(a) General concept;	5	6
(b) Construction methods for the principal elements.	5	7
12.6 Air Conditioning (ATA 21)		
12.6.1 Air supply;	1	2
12.6.2 Air Conditioning.	3	5
12.7 Instruments/Avionic Systems		
12.7.1 Instrument Systems (ATA 31)	6	9
12.7.2 Avionic Systems	5	7
Fundamentals of system layouts and operation of:		
— Autoflight (ATA 22)		
— Communication systems (ATA 23);		
— Navigation Systems (ATA 34).		
12.8 Electrical Power (ATA 24)	8	10
12.9 Equipment and Furnishings (ATA 25)		
(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.	2	3

(b) Emergency flotation systems; Cabin layout, cargo retention; Equipment lay-out; Cabin Furnishing Installation.	3	3
12.10 Fire Protection (ATA 26)		
(a) Fire and smoke detection systems and Fire-extinguishing systems;	3	4
(b) Portable fire extinguishers.	1	1
12.11 Fuel Systems (ATA 28)	7	8
12.12 Hydraulic Power (ATA 29)	8	8
12.13 Ice and Rain Protection (ATA 30)	4	4
12.14 Landing Gear (ATA 32)		
(a) System description and operation;	3	4
(b) Sensors.	3	3
12.15 Lights (ATA 33)	3	4
12.16 (Reserved)		
12.17 Integrated Modular Avionics (IMA) (ATA 42)		
(a) Overall system description and theory;	1	1
(b) Typical system layouts.	1	1
12.18 Onboard Maintenance Systems (ATA 45)	2	3
Central maintenance computers; Data-loading system; Electronic library system;		
12.19 Information Systems (ATA 46)	2	2

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

C/N: Communication and Navigation; Ins.: Instruments; A/F: Autoflight; Sur.: Surveillance; A/S: Airframe and Systems

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	Nr of questions						
	B2	B2L Basic	B2L C/N	B2L Ins.	B2L A/F	B2L Sur.	B2L A/S
Total number for the module:	188	32	24	20	28	20	50
13.1 Theory of Flight							
(a) Aeroplane Aerodynamics and Flight Controls;	3	3	—	—	—	—	—
(b) Rotary wing aerodynamics.	1	1	—	—	—	—	—
13.2 Structures – general concepts (ATA 51)							
(a) General concepts;	4	4	—	—	—	—	—
(b) Fundamentals of structural systems.	4	4	—	—	—	—	—
13.3 Autoflight (ATA 22)							
(a) Fundamentals of automatic flight control;	12	—	—	—	8	—	—
(b) Autothrottle systems and automatic landing systems.	8	—	—	—	8	—	—
13.4 Communication navigation (ATA 23/34)							
(a) Fundamentals of communication and navigation systems;	24	—	24	—	—	—	—
(b) Fundamentals of aircraft surveillance systems.	3	—	—	—	—	20	—
13.5 Electrical Power (ATA 24)	13	13	—	—	—	—	—
13.6 Equipment and furnishings (ATA 25)	5	—	—	—	—	—	—
13.7 Flight Controls							
(a) Primary and secondary flight controls (ATA 27);	4	—	—	—	3	—	—
(b) Actuation and protection;	4	—	—	—	3	—	—

(c) System operation;	2	—	—	—	3	—	—
(d) Rotorcraft flight controls (ATA 67).	2	—	—	—	3	—	—
13.8 Instruments (ATA 31)	20	—	—	20	—	—	—
13.9 Lights (ATA 33)	7	7	—	—	—	—	—
13.10 Onboard maintenance systems (ATA 45)	5	—	—	—	—	—	—
13.11 Airconditioning and cabin pressurisation (ATA 21)							
(a) Pressurisation;	2	—	—	—	—	—	2
(b) Air Supply;	2	—	—	—	—	—	2
(c) Air conditioning;	2	—	—	—	—	—	2
(d) Safety and warning devices.	2	—	—	—	—	—	2
13.12 Fire protection (ATA 26)							
(a) Fire and smoke detection system and fire-extinguishing systems;	2	—	—	—	—	—	2
(b) Portable fire extinguisher.	1	—	—	—	—	—	1
13.13 Fuel Systems (ATA 28, ATA 47)							
(a) System layout:	2	—	—	—	—	—	2
(b) Fuel handling:	2	—	—	—	—	—	2
(c) Indications and warnings;	2	—	—	—	—	—	2
(d) Special systems:	2	—	—	—	—	—	2
(e) Balancing:	1	—	—	—	—	—	1
13.14 Hydraulic Power (ATA 29)							
(a) System layout;	1	—	—	—	—	—	1
(b) System operation (1)	5	—	—	—	—	—	4
(c) System operation (2)	5	—	—	—	—	—	4

13.15 Ice and Rain Protection (ATA 30)							
(a) Principles:	1	—	—	—	—	—	1
(b) De-icing:	2	—	—	—	—	—	2
(c) Anti-icing:	1	—	—	—	—	—	1
(d) Wiper systems.	1	—	—	—	—	—	1
(e) Rain repellent.	1	—	—	—	—	—	1
13.16 Landing Gear (ATA 32)							
(a) Description;	1	—	—	—	—	—	1
(b) Systems;	3	—	—	—	—	—	3
(c) Air-ground sensing.	3	—	—	—	—	—	3
13.17 Oxygen (ATA 35)	2	—	—	—	—	—	—
13.18 Pneumatic/Vacuum (ATA 36)	6	—	—	—	—	—	6
13.19 Water/Waste (ATA 38)	2	—	—	—	—	—	2
13.20 Integrated Modular Avionics (IMA) (ATA 42)							
(a) Overall system description and theory:	2	—	—	—	—	—	—
(b) Typical system layout.	1	—	—	—	—	—	—
13.21 Cabin Systems (ATA 44)	3	—	—	—	—	—	—
13.22 Information Systems (ATA 46)	3	—	—	—	—	—	—

MODULE 14 PROPULSION

MODULE 14 PROPULSION	Nr of questions
	B2 B2L Instruments B2L Airframe and Systems
Total number for the module:	32
14.1 Engines	
(a) Turbine engines;	3
(b) Auxiliary power units (APUs);	4
(c) Piston engines;	2
(d) Electric and hybrid engines;	4
(e) Engine control.	3
14.2 Electric/electronic engine Indication systems	10
14.3 Propeller systems	2
14.4 Starting and Ignition Systems	4

MODULE 15. GAS TURBINE ENGINE

MODULE 15. GAS TURBINE ENGINE	Nr of questions	
	A1 A3	B1.1 B1.3
Total number for the module:	60	92
15.1 Fundamentals	4	4
15.2 Engine Performance	—	6
15.3 Inlet	3	4
15.4 Compressors	5	7
15.5 Combustion Section	3	3
15.6 Turbine Section	5	5
15.7 Exhaust	4	4
15.8 Bearings and Seals	—	3
15.9 Lubricants and Fuels	3	4
15.10 Lubrication Systems	3	4
15.11 Fuel Systems	4	5
15.12 Air Systems	3	3
15.13 Starting and Ignition Systems	3	4
15.14 Engine Indication Systems	5	7
15.15 Alternate turbine constructions	—	2
15.16 Turbo-prop Engines	3	5
15.17 Turboshift engines	2	3
15.18 Auxiliary Power Units (APUs)	2	3
15.19 Powerplant Installation	2	3
15.20 Fire Protection Systems	2	3

15.21 Engine Monitoring and Ground Operation	4	7
15.22 Engine Storage and Preservation	—	3

MODULE 16. PISTON ENGINE

MODULE 16. PISTON ENGINE	Nr of questions	
	A2 A4	B1.2 B1.4 B3
Total number for the module:	52	76
16.1 Fundamentals	5	5
16.2 Engine Performance	3	5
16.3 Engine Construction	7	8
16.4 Engine Fuel Systems		
16.4.1 Carburettors	3	4
16.4.2 Fuel injection systems	2	4
16.4.3 Electronic engine control	2	4
16.5 Starting and Ignition Systems	5	5
16.6 Induction, Exhaust and Cooling Systems	3	4
16.7 Supercharging/Turbocharging	4	6
16.8 Lubricants and Fuels	2	5
16.9 Lubrication Systems	3	4
16.10 Engine Indication Systems	6	7
16.11 Powerplant Installation	3	3
16.12 Engine Monitoring and Ground Operation	3	5
16.13 Engine Storage and Preservation	—	3
16.14 Alternate piston-engine constructions	1	4

MODULE 17. PROPELLER

MODULE 17. PROPELLER	Nr of questions	
	A1 A2	B1.1 B1.2 B3
Total number for the module:	20	32
17.1 Fundamentals of propellers	5	8
17.2 Propeller Construction	4	5
17.3 Propeller Pitch Control	4	6
17.4 Propeller Synchronising	—	2
17.5 Propeller Ice Protection	2	3
17.6 Propeller Maintenance	3	6
17.7 Propeller Storage and Preservation	2	2

Appendix III Aircraft Type Training and type evaluation Standard - On-the-Job Training

1. General

Aircraft type training shall consist of theoretical training and examination, and, except for the category C ratings, practical training and assessment.

- (a) Theoretical training and examination shall comply with the following requirements:
 - (i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with MCAR-147 or, when conducted by other organisations, as directly approved by the CAA.
 - (ii) Shall comply with the standard set out in point 3.1 of this Appendix and, if existing, the elements defined in the operational suitability data (OSD) established in accordance with MCAR-21.
 - (iii) In the case of a category C person qualified by holding an academic degree as specified in point 66.A.30(a)(5), the first relevant aircraft type theoretical training shall be at the category B1 or B2 level.
 - (iv) Shall have been started and completed within the three years preceding the application for a type rating endorsement.
- (b) Practical training and assessment shall comply with the following requirements:
 - (i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with MCAR-147 or, when conducted by other organisations, as directly approved by the CAA.
 - (ii) Shall comply with the standard set out in point 3.2 of this Appendix and, if existing, the elements defined in the OSD established in accordance with MCAR-21.
 - (iii) Shall include a representative cross section of maintenance activities relevant to the aircraft type.
 - (iv) Shall include demonstrations using equipment, components, maintenance simulation training devices (MSTDs), maintenance training devices (MTDs), or real aircraft.
 - (v) Shall have been started and completed within the three years preceding the application for a type rating endorsement.
- (c) Differences training
 - (i) Differences training is the training required to cover the training differences between:

- (a) two different aircraft type ratings of the same manufacturer as determined by the CAA; or
- (b) two different licence categories in respect of the same aircraft type rating.
- (ii) Differences training has to be defined on a case to case basis taking into account the requirements contained in this Appendix III in respect of both theoretical and practical elements of type rating training.
- (iii) A type rating shall only be endorsed on a licence after differences training when the applicant also complies with one of the following conditions:
 - having already endorsed on the licence the aircraft type rating from which the differences are being identified, or
 - having completed the type training requirements for the aircraft from which the differences are being identified.
- (iv) The differences training shall have been started and completed within 3 years preceding the application for the new type rating in the same category (case (a)) or in another category (case (b)).

2. Aircraft type training levels

The three levels listed below define the objectives, the depth of training and the level of knowledge that the training is intended to achieve.

- *Level 1: A brief overview of the airframe, systems and powerplant as outlined in the Systems Description Section of the Aircraft Maintenance Manual/Instructions for Continued Airworthiness.*

Course objectives: Upon completion of Level 1 training, the student will be able to:

- (a) provide a simple description of the whole subject, using common words and examples, using typical terms and identify safety precautions related to the airframe, its systems and powerplant;
- (b) identify aircraft manuals, maintenance practices important to the airframe, its systems and powerplant;
- (c) define the general layout of the aircraft's major systems;
- (d) define the general layout and characteristics of the powerplant;
- (e) identify special tooling and test equipment used with the aircraft.

- *Level 2: Basic system overview of controls, indicators, principal components including their location and purpose, servicing and minor troubleshooting. General knowledge of the theoretical and practical aspects of the subject.*

Course objectives: In addition to the information contained in the Level 1 training, at the completion of Level 2 training, the student will be able to:

- (a) understand the theoretical fundamentals; apply knowledge in a practical manner using detailed procedures;
 - (b) recall the safety precautions to be observed when working on or near the aircraft, powerplant and systems;
 - (c) describe systems and aircraft handling particularly access, power availability and sources;
 - (d) identify the locations of the principal components;
 - (e) explain the normal functioning of each major system, including terminology and nomenclature;
 - (f) perform the procedures for ramp and transit servicing associated with the aircraft for the following systems: Fuel, Power Plants, Hydraulics, Landing Gear, Water/Waste and Oxygen;
 - (g) demonstrate proficiency in use of crew reports and on-board reporting systems (minor troubleshooting) and determine aircraft airworthiness per the MEL/CDL;
 - (h) demonstrate the use, interpretation and application of appropriate documentation including instructions for continued airworthiness, maintenance manual, illustrated parts catalogue, etc.
- *Level 3: Detailed description, operation, component location, removal/installation and bite and troubleshooting procedures to maintenance manual level.*

Course objectives: In addition to the information contained in Level 1 and Level 2 training, at the completion of Level 3 training, the student will be able to:

- (a) demonstrate a theoretical knowledge of aircraft systems and structures and inter-relationships with other systems, provide a detailed description of the subject using theoretical fundamentals and specific examples and to interpret results from various sources and measurements and apply corrective action where appropriate;
- (b) perform system, engine, component and functional checks as specified in the maintenance manual;

- (c) demonstrate the use, interpret and apply appropriate documentation including structural repair manual, troubleshooting manual, etc.;
- (d) correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level;
- (e) describe procedures for replacement of components unique to aircraft type.

3. Aircraft type training standard

Although aircraft type training includes both theoretical and practical elements, courses can be approved for the theoretical element, the practical element or for a combination of both.

An appropriate training method, or combination of training methods, shall be determined for the entire course or for each of its parts with regard to the scope and objectives of each training phase and taking into consideration the benefits and limitations of the available training methods.

Multimedia-based training (MBT) methods may be used in order to achieve the training objectives either in a physically or in a virtually controlled environment.

3.1 Theoretical element

(a) Objective

On completion of a theoretical training course the student shall be able to demonstrate, to the levels identified in the Appendix III syllabus, the detailed theoretical knowledge of the aircraft's applicable systems, structure, operations, maintenance, repair, and troubleshooting in accordance with maintenance data. The student shall be able to demonstrate the use of manuals and approved procedures, including the knowledge of relevant inspections and limitations.

(b) Level of training

Training levels are those levels defined in point 2 above.

After the first type course for category C certifying staff all subsequent courses need only be to level 1.

During a level 3 theoretical training, level 1 and 2 training material may be used to teach the full scope of the chapter if required. However, during the training the majority of the course material and training time shall be at the higher level.

(c) Duration

The theoretical training minimum tuition hours are contained in the following table:

Category	Hours
Aeroplanes with a maximum take-off mass above 30000kg:	
B1.1	150
B1.2	120
B2	100
C	30
Aeroplanes with a maximum take-off mass equal or less than 30000kg and above 5700kg:	

B1.1	120
B1.2	100
B2	100
C	25
Aeroplanes with a maximum take-off mass of 5700kg and below*	
B1.1	80
B1.2	60
B2	60
C	15
Helicopters**	
B1.3	120
B1.4	100
B2	100
C	25

* For non-pressurised piston engine aeroplanes below 2000kg MTOM the minimum duration can be reduced by 50%.

** For helicopters in group 2 (as defined in point 66.A.5) the minimum duration can be reduced by 30%.

For the purpose of the table above, a tuition hour means 60 minutes of teaching and exclude any breaks, examination, revision, preparation and aircraft visit.

These hours apply only to theoretical courses for complete aircraft/engine combinations according to the type rating as defined by the CAA.

(d) Justification of course duration:

Training courses carried out in a maintenance training organisation approved in accordance with MCAR-147 and courses directly approved by the CAA shall justify their hour duration and the coverage of the full syllabus by a training needs analysis based on:

- the design of the aircraft type, its maintenance needs and the types of operation,
- detailed analysis of applicable chapters – see contents table in point 3.1(e) below,
- detailed competency analysis showing that the objectives as stated in point 3.1(a) above are fully met.

Where the training needs analysis shows that more hours are needed, course lengths shall be longer than the minimum specified in the table.

Similarly, tuition hours of differences courses or other training course combinations (such as combined B1/B2 courses), and in cases of theoretical type

training courses below the figures given in point 3.1(c) above, these shall be justified to the CAA by the training needs analysis as described above.

In addition, the course must describe and justify the following:

- The minimum physical and/or virtual classroom attendance required of the trainee, in order to meet the objectives of the course.
- The maximum number of hours of physical and/or virtual classroom training per day, taking into account pedagogical and human factors principles.

If the minimum attendance required is not met, the certificate of recognition shall not be issued. Additional training may be provided by the training organisation in order to meet the minimum attendance time.

(e) Content:

As a minimum, the elements in the Syllabus below that are specific to the aircraft type shall be covered. Additional elements introduced due to type variations, technological changes, etc shall also be included.

The training syllabus shall be focused on mechanical and electrical aspects for B1 personnel, and electrical and avionics aspects for B2.

If it exists, the minimum syllabus of the operational suitability data (OSD), established in accordance with MCAR-21, shall be included.

Chapters \ Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
		B1	C	B1	C	B1	C	B1	C	
License Category		B1	C	B1	C	B1	C	B1	C	B2
Introduction Module:										
05	Time limits/maintenance checks	1	1	1	1	1	1	1	1	1
06	Dimensions/Areas (MTOM, etc)	1	1	1	1	1	1	1	1	1
07	Lifting and Shoring	1	1	1	1	1	1	1	1	1
08	Levelling and weighing	1	1	1	1	1	1	1	1	1
09	Towing and taxiing	1	1	1	1	1	1	1	1	1
10	Parking/mooring, Storing & Return to Service	1	1	1	1	1	1	1	1	1
11	Placards and Markings	1	1	1	1	1	1	1	1	1
12	Servicing	1	1	1	1	1	1	1	1	1
20	Standard practices – only type	1	1	1	1	1	1	1	1	1

Chapters \ Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
particular										
Helicopters										
18	Vibration and Noise Analysis (Blade tracking)	-	-	-	-	3	1	3	1	-
60	Standard Practices Rotor	-	-	-	-	3	1	3	1	-
62	Rotors	-	-	-	-	3	1	3	1	1
62A	Rotors – Monitoring and indicating	-	-	-	-	3	1	3	1	3
63	Rotor Drives	-	-	-	-	3	1	3	1	1
63A	Rotor Drives – Monitoring and indicating	-	-	-	-	3	1	3	1	3
64	Tail Rotor	-	-	-	-	3	1	3	1	1
64A	Tail rotor - Monitoring and indicating	-	-	-	-	3	1	3	1	3
65	Tail Rotor Drive	-	-	-	-	3	1	3	1	1
65A	Tail Rotor Drive - Monitoring and indicating	-	-	-	-	3	1	3	1	3
66	Folding Blades/Pylon	-	-	-	-	3	1	3	1	-
67	Rotors Flight Control	-	-	-	-	3	1	3	1	-
53	Airframe Structure (Helicopter)	-	-	-	-	3	1	3	1	-
25	Emergency Flotation Equipment	-	-	-	-	3	1	3	1	1
Airframe Structures										
51	Standard practices and structures (damage classification, assessment and repair)	3	1	3	1	-	-	-	-	1
53	Fuselage	3	1	3	1	-	-	-	-	1
54	Nacelles/Pylons	3	1	3	1	-	-	-	-	1
55	Stabilisers	3	1	3	1	-	-	-	-	1
56	Windows	3	1	3	1	-	-	-	-	1
57	Wings	3	1	3	1	-	-	-	-	1
52	Doors	3	1	3	1	-	-	-	-	1
	Zonal & Station Identification Systems	1	1	1	1	1	1	1	1	1
Airframe systems:										
21	Air Conditioning	3	1	3	1	3	1	3	1	3
21A	Air Supply	3	1	3	1	3	1	3	1	2
21B	Pressurisation	3	1	3	1	3	1	3	1	3

Chapters	Level	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
21C	Safety and Warning Devices	3	1	3	1	3	1	3	1	3
22	Autoflight	2	1	2	1	2	1	2	1	3
23	Communications	2	1	2	1	2	1	2	1	3
24	Electrical Power	3	1	3	1	3	1	3	1	3
25	Equipment & Furnishings	3	1	3	1	3	1	3	1	1
25A	Electronic Equipment including emergency equipment	1	1	1	1	1	1	1	1	3
26	Fire Protection	3	1	3	1	3	1	3	1	3
27	Flight Controls	3	1	3	1	3	1	3	1	2
27A	Sys. Operation: Electrical/Fly-by-Wire	3	1	-	-	-	-	-	-	3
28	Fuel Systems	3	1	3	1	3	1	3	1	2
28A	Fuel Systems - Monitoring and indicating	3	1	3	1	3	1	3	1	3
29	Hydraulic Power	3	1	3	1	3	1	3	1	2
29A	Hydraulic Power - Monitoring and indicating	3	1	3	1	3	1	3	1	3
30	Ice & Rain Protection	3	1	3	1	3	1	3	1	3
31	Indicating/Recording Systems	3	1	3	1	3	1	3	1	3
31A	Instrument Systems	3	1	3	1	3	1	3	1	3
32	Landing Gear	3	1	3	1	3	1	3	1	2
32A	Landing Gear - Monitoring and indicating	3	1	3	1	3	1	3	1	3
33	Lights	3	1	3	1	3	1	3	1	3
34	Navigation	2	1	2	1	2	1	2	1	3
35	Oxygen	3	1	3	1	-	-	-	-	2
36	Pneumatic	3	1	3	1	3	1	3	1	2
36A	Pneumatic - Monitoring and indicating	3	1	3	1	3	1	3	1	3
37	Vacuum	3	1	3	1	3	1	3	1	2
38	Water/Waste	3	1	3	1	-	-	-	-	2
41	Water Ballast	3	1	3	1	-	-	-	-	1
42	Integrated modular avionics	2	1	2	1	2	1	2	1	3
44	Cabin Systems	2	1	2	1	2	1	2	1	3
45	On-Board Maintenance System (or covered in 31)	3	1	3	1	3	1	-	-	3

Chapters \ Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
46	Information Systems	2	1	2	1	2	1	2	1	3
47	Nitrogen generation system	3	1	3	1	-	-	-	-	2
50	Cargo and Accessory Compartments	3	1	3	1	3	1	3	1	1
55/ 57	Flight control surfaces (All)	3	1	3	1	-	-	-	-	1
Turbine Engines										
70	Standard Practices – Engines,	3	1	-	-	3	1	-	-	1
70A	Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems).	3	1	-	-	3	1	-	-	1
70B	Engine Performance	3	1	-	-	3	1	-	-	1
71	Powerplant	3	1	-	-	3	1	-	-	1
72	Engine Turbine/Turbo Prop/Ducted Fan/Unducted fan	3	1	-	-	3	1	-	-	1
73	Engine Fuel and Control	3	1	-	-	3	1	-	-	1
75	Air	3	1	-	-	3	1	-	-	1
76	Engine controls	3	1	-	-	3	1	-	-	1
78	Exhaust	3	1	-	-	3	1	-	-	1
79	Oil	3	1	-	-	3	1	-	-	1
80	Starting	3	1	-	-	3	1	-	-	1
82	Water Injections	3	1	-	-	3	1	-	-	1
83	Accessory Gear Boxes	3	1	-	-	3	1	-	-	1
84	Propulsion Augmentation	3	1	-	-	3	1	-	-	1
73A	FADEC	3	1	-	-	3	1	-	-	3
74	Ignition	3	1	-	-	3	1	-	-	3
77	Engine Indicating Systems	3	1	-	-	3	1	-	-	3
49	Auxiliary Power Units (APUs)	3	1	-	-	-	-	-	-	2
Piston Engine										
70	Standard Practices – Engines	-	-	3	1	-	-	3	1	1
70A	Constructional arrangement and operation (Installation, Carburettors, Fuel injection systems, Induction, Exhaust and Cooling Systems,	-	-	3	1	-	-	3	1	1

<div>Chapters</div> <div>Level</div>		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Supercharging/Turbocharging, Lubrication Systems).										
70B	Engine Performance	-	-	3	1	-	-	3	1	1
71	Powerplant	-	-	3	1	-	-	3	1	1
73	Engine Fuel and Control	-	-	3	1	-	-	3	1	1
76	Engine Control	-	-	3	1	-	-	3	1	1
79	Oil	-	-	3	1	-	-	3	1	1
80	Starting	-	-	3	1	-	-	3	1	1
81	Turbines	-	-	3	1	-	-	3	1	1
82	Water Injections	-	-	3	1	-	-	3	1	1
83	Accessory Gear Boxes	-	-	3	1	-	-	3	1	1
84	Propulsion Augmentation	-	-	3	1	-	-	3	1	1
73A	FADEC	-	-	3	1	-	-	3	1	3
74	Ignition	-	-	3	1	-	-	3	1	3
77	Engine Indication Systems	-	-	3	1	-	-	3	1	3
Propellers										
60A	Standard Practices - Propeller	3	1	3	1	-	-	-	-	1
61	Propellers/Propulsion	3	1	3	1	-	-	-	-	1
61A	Propeller Construction	3	1	3	1	-	-	-	-	-
61B	Propeller Pitch Control	3	1	3	1	-	-	-	-	-
61C	Propeller Synchronising	3	1	3	1	-	-	-	-	1
61D	Propeller Electronic control	2	1	2	1	-	-	-	-	3
61E	Propeller Ice Protection	3	1	3	1	-	-	-	-	-
61F	Propeller Maintenance	3	1	3	1	-	-	-	-	1

3.2 Practical element

(a) Objective:

The objective of practical training is to gain the required competence in performing safe maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks. It includes the awareness of the use of all technical literature and documentation for the aircraft, the use of specialist/special tooling and test equipment for performing removal and replacement of components and modules unique to type, including any on-wing maintenance activity.

(b) Content:

At least 50% of the crossed items in the table below, which are relevant to the particular aircraft type, shall be completed as part of the practical training.

Tasks crossed represent subjects that are important for practical training purposes to ensure that the operation, function, installation and safety significance of key maintenance tasks is adequately addressed; particularly where these cannot be fully explained by theoretical training alone. Although the list details the minimum practical training subjects, other items may be added where applicable to the particular aircraft type.

Tasks to be completed shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

If it exists, the minimum list of practical tasks of the operational suitability data (OSD), established in accordance with MCAR-21, shall be part of the practical elements to be selected.

Glossary of the table: LOC: Location; FOT: Functional / Operational Test; SGH: Service and Ground Handling; R/I: Removal / Installation; MEL: Minimum Equipment List; TS: Troubleshooting.

Chapters		B1/B2	B1					B2				
		LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
Introduction Module:												
05	Time limits/maintenance checks	X/X	-	-	-	-	-	-	-	-	-	-
06	Dimensions/Areas (MTOM, etc)	X/X	-	-	-	-	-	-	-	-	-	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
07 Lifting and Shoring	X/X	-	-	-	-	-	-	-	-	-	-
08 Levelling and weighing	X/X	-	X	-	-	-	-	X	-	-	-
09 Towing and taxiing	X/X	-	X	-	-	-	-	X	-	-	-
10 Parking/mooring, Storing & Return to Service	X/X	-	X	-	-	-	-	X	-	-	-
11 Placards and Markings	X/X	-	-	-	-	-	-	-	-	-	-
12 Servicing	X/X	-	X	-	-	-	-	X	-	-	-
20 Standard practices – only type particular	X/X	-	X	-	-	-	-	X	-	-	-
Helicopters											
18 Vibration and Noise Analysis (Blade tracking)	X/-	-	-	-	-	X	-	-	-	-	-
60 Standard Practices Rotor – only type particular	X/X	-	X	-	-	-	-	X	-	-	-
62 Rotors	X/-	-	X	X	-	X	-	-	-	-	-
62A Rotors – Monitoring and indicating	X/X	X	X	X	X	X	-	-	X	-	X
63 Rotor Drives	X/-	X	-	-	-	X	-	-	-	-	-
63A Rotor Drives – Monitoring and indicating	X/X	X	-	X	X	X	-	-	X	-	X
64 Tail Rotor	X/-	-	X	-	-	X	-	-	-	-	-
64A Tail rotor - Monitoring and indicating	X/X	X	-	X	X	X	-	-	X	-	X
65 Tail Rotor Drive	X/-	X	-	-	-	X	-	-	-	-	-
65A Tail Rotor Drive - Monitoring and indicating	X/X	X	-	X	X	X	-	-	X	-	X
66 Folding Blades/Pylon	X/-	X	X	-	-	X	-	-	-	-	-
67 Rotors Flight Control	X/-	X	X	-	X	X	-	-	-	-	-
53 Airframe Structure (Helicopter)	Note: Covered under Airframe structures										
25 Emergency Flotation Equipment	X/X	X	X	X	X	X	X	X	-	-	-
Airframe Structures											
51 Standard practices and structures (damage classification, assessment and repair)											

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
53 Fuselage	X/-	-	-	-	-	X	-	-	-	-	-
54 Nacelles/Pylons	X/-	-	-	-	-	-	-	-	-	-	-
55 Stabilisers	X/-	-	-	-	-	-	-	-	-	-	-
56 Windows	X/-	-	-	-	-	X	-	-	-	-	-
57 Wings	X/-	-	-	-	-	-	-	-	-	-	-
52 Doors	X/X	X	X	-	-	-	-	X	-	-	-
Airframe systems:											
21 Air Conditioning	X/X	X	X	-	X	X	X	X	-	X	X
21A Air Supply	X/X	X	-	-	-	-	X	-	-	-	-
21B Pressurisation	X/X	X	-	-	X	X	X	-	-	X	X
21C Safety and Warning Devices	X/X	-	X	-	-	-	-	X	-	-	-
22 Autoflight	X/X	-	-	-	X	-	X	X	X	X	X
23 Communications	X/X	-	X	-	X	-	X	X	X	X	X
24 Electrical Power	X/X	X	X	X	X	X	X	X	X	X	X
25 Equipment & Furnishings	X/X	X	X	X	-	-	X	X	X	-	-
25A Electronic Equipment including emergency equipment	X/X	X	X	X	-	-	X	X	X	-	-
26 Fire Protection	X/X	X	X	X	X	X	X	X	X	X	X
27 Flight Controls	X/X	X	X	X	X	X	X	-	-	-	-
27A Sys. Operation: Electrical/Fly-by-Wire	X/X	X	X	X	X	-	X	-	X	-	X
28 Fuel Systems	X/X	X	X	X	X	X	X	X	-	X	-
28A Fuel Systems - Monitoring and indicating	X/X	X	-	-	-	-	X	-	X	-	X
29 Hydraulic Power	X/X	X	X	X	X	X	X	X	-	X	-
29A Hydraulic Power - Monitoring and indicating	X/X	X	-	X	X	X	X	-	X	X	X
30 Ice & Rain Protection	X/X	X	X	-	X	X	X	X	-	X	X
31 Indicating/Recording Systems	X/X	X	X	X	X	X	X	X	X	X	X
31A Instrument Systems	X/X	X	X	X	X	X	X	X	X	X	X
32 Landing Gear	X/X	X	X	X	X	X	X	X	X	X	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
32A Landing Gear - Monitoring and indicating	X/X	X	-	X	X	X	X	-	X	X	X
33 Lights	X/X	X	X	-	X	-	X	X	X	X	-
34 Navigation	X/X	-	X	-	X	-	X	X	X	X	X
35 Oxygen	X/-	X	X	X	-	-	X	X	-	-	-
36 Pneumatic	X/-	X	-	X	X	X	X	-	X	X	X
36A Pneumatic - Monitoring and indicating	X/X	X	X	X	X	X	X	X	X	X	X
37 Vacuum	X/-	X	-	X	X	X	-	-	-	-	-
38 Water/Waste	X/-	X	X	-	-	-	X	X	-	-	-
41 Water Ballast	X/-	-	-	-	-	-	-	-	-	-	-
42 Integrated modular avionics	X/X	-	-	-	-	-	X	X	X	X	X
44 Cabin Systems	X/X	-	-	-	-	-	X	X	X	X	X
45 On-Board Maintenance System (or covered in 31)	X/X	X	X	X	X	X	X	X	X	X	X
46 Information Systems	X/X	-	-	-	-	-	X	-	X	X	X
47 Nitrogen generation system	X/X	X	X	X	X	X	X	-	-	-	X
50 Cargo and Accessory Compartments	X/X	-	X	-	-	-	-	-	-	-	-
55/ 57 Flight control surfaces (All)	X/-	-	-	-	-	X	-	-	-	-	-
Turbine / Piston Engine Modules											
70 Standard Practices – Engines – only type particular	-	-	X	-	-	-	-	X	-	-	-
70A Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems).	X/X	-	-	-	-	-	-	-	-	-	-
Turbine Engines											
70B Engine Performance	-	-	-	-	-	X	-	-	-	-	-
71 Powerplant	X/-	X	X	-	-	-	-	X	-	-	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
72 Engine Turbine/Turbo Prop/Ducted Fan/Unducted fan	X/-	-	-	-	-	-	-	-	-	-	-
73 Engine Fuel and Control	X/X	X	-	-	-	-	-	-	-	-	-
73A FADEC Systems	X/X	X	-	X	X	X	X	-	X	X	X
74 Ignition	X/X	X	-	-	-	-	X	-	-	-	-
75 Air	X/-	-	-	X	-	X	-	-	-	-	-
76 Engine controls	X/-	X	-	-	-	X	-	-	-	-	-
77 Engine Indicating	X/X	X	-	-	X	X	X	-	-	X	X
78 Exhaust	X/-	X	-	-	X	-	-	-	-	-	-
79 Oil	X/-	-	X	X	-	-	-	-	-	-	-
80 Starting	X/-	X	-	-	X	X	-	-	-	-	-
82 Water Injections	X/-	X	-	-	-	-	-	-	-	-	-
83 Accessory Gear Boxes	X/-	-	X	-	-	-	-	-	-	-	-
84 Propulsion Augmentation	X/-	X	-	-	-	-	-	-	-	-	-
Auxiliary Power Units (APUs)											
49 Auxiliary Power Units (APUs)	X/-	X	X	-	-	X	-	-	-	-	-
Piston Engine											
70 Standard Practices – Engines – only type particular	-	-	X	-	-	-	-	X	-	-	-
70A Constructional arrangement and operation (Installation, Carburettors, Fuel injection systems, Induction, Exhaust and Cooling Systems, Supercharging/Turbocharging, Lubrication Systems).	X/X	-	-	-	-	-	-	-	-	-	-
70B Engine Performance	-	-	-	-	-	X	-	-	-	-	-
71 Powerplant	X/-	X	X	-	-	-	-	X	-	-	-
73 Engine Fuel and Control	X/X	X	-	-	-	-	-	-	-	-	-
73A FADEC Systems	X/X	X	-	X	X	X	X	X	X	X	X
74 Ignition	X/X	X	-	-	-	-	X	-	-	-	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
76 Engine Control	X/-	X	-	-	-	X	-	-	-	-	-
77 Engine Indicating	X/X	X	-	-	X	X	X	-	-	X	X
78 Exhaust	X/-	X	-	-	X	X	-	-	-	-	-
79 Oil	X/-	-	X	X	-	-	-	-	-	-	-
80 Starting	X/-	X	-	-	X	X	-	-	-	-	-
81 Turbines	X/-	X	X	X	-	X	-	-	-	-	-
82 Water Injections	X/-	X	-	-	-	-	-	-	-	-	-
83 Accessory Gear Boxes	X/-	-	X	X	-	-	-	-	-	-	-
84 Propulsion Augmentation	X/-	X	-	-	-	-	-	-	-	-	-
Propellers											
60A Standard Practices - Propeller	-	-	-	X	-	-	-	-	-	-	-
61 Propellers/Propulsion	X/X	X	X	-	X	X	-	-	-	-	-
61A Propeller Construction	X/X	-	X	-	-	-	-	-	-	-	-
61B Propeller Pitch Control	X/-	X	-	X	X	X	-	-	-	-	-
61C Propeller Synchronising	X/-	X	-	-	-	X	-	-	-	X	-
61D Propeller Electronic control	X/X	X	X	X	X	X	X	X	X	X	X
61E Propeller Ice Protection	X/-	X	-	X	X	X	-	-	-	-	-
61F Propeller Maintenance	X/X	X	X	X	X	X	X	X	X	X	X

4. Type training examination and assessment standard

4.1 Theoretical element examination standard

After the theoretical portion of the aircraft type training has been completed, a written examination shall be performed, which shall comply with the following:

- (a) Format of the examination is of the multiple-choice type. Each multiple-choice question must have 3 alternative answers of which only one must be the correct answer. The total time is based on the total number of questions and the time for answering is based upon a nominal average of 90 seconds per question.
- (b) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.
- (c) In numerical questions, the incorrect answers shall correspond to procedural errors such as the use of incorrect sense (+ versus -) or incorrect measurement units. They shall not be mere random numbers.
- (d) The level of examination for each chapter (*) shall be the one defined in point 2 "Aircraft type training levels". However, the use of a limited number of questions at a lower level is acceptable.

(*) For the purpose of this point (d), a "chapter" means each one of the rows preceded by a number in the table contained in point 3.1(e).

- (e) The examination must be of the closed book type. No reference material is permitted. An exception will be made for the case of examining a B1 or B2 candidate's ability to interpret technical documents.
- (f) The number of questions shall be at least 1 question per hour of training. The number of questions for each chapter and level shall be proportionate to:
 - the effective training hours spent on teaching at that chapter and level; or
 - in case of student-centred methods, the anticipated average time to complete the training; and
 - the learning objectives as given by the training needs analysis.

The CAA will assess the number and the level of the questions when approving the course.

- (g) The minimum examination pass mark is 75%. When the type training examination is split in several examinations, each examination shall be passed with at least a 75% mark. In order to be possible to achieve exactly a 75% pass mark, the number of questions in the examination shall be a multiple of 4.

- (h) Penalty marking (negative points for failed questions) is not to be used.
- (i) End of module phase examinations cannot be used as part of the final examination unless they contain the correct number and level of questions required.
- (j) Whilst it is accepted that the subject matter of the questions may be the same, the questions used as part of the MBT learning programme shall not be used in course or phase examinations.

4.2 Practical element assessment standard

After the practical element of the aircraft type training has been completed, an assessment must be performed, which must comply with the following:

- (a) The assessment shall be performed by designated assessors appropriately qualified.
- (b) The assessment shall evaluate the knowledge and skills of the trainee.

5. Type evaluation standard for Group 2 and Group 3 aircraft

Type evaluation relative to aircraft of Group 2 or Group 3 shall be conducted by training organisations appropriately approved in accordance with MCAR-147 or by the CAA.

The evaluation shall consist of practical assessment and oral examination and comply with the following requirements:

- (a) The practical assessment shall determine the candidate's competence to perform maintenance tasks applicable to the particular aircraft type.
- (b) The oral examination shall be on a sample of chapters drawn from point 3. 'Aircraft type training standard', at the indicated level in point 3.1.(e).
- (c) Both oral examinations and practical assessments shall ensure that the following objectives are met:
 - 1. properly discuss with confidence the aircraft type and its systems;
 - 2. ensure safe performance of maintenance, inspections, and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example, troubleshooting, repairs, adjustments, replacements, rigging and functional checks such as engine run, etc., if required;
 - 3. correctly use all technical literature and documentation for the aircraft;
 - 4. correctly use specialist/special tooling and test equipment, perform removal and replacement of components and modules unique to type, including any on-wing maintenance activity.
- (d) The following conditions apply to the type evaluation:

- 1. The maximum number of attempts for each examination is three in a 12-month period. A waiting period of 30 days is required after the first failed attempt within one set, and a waiting period of 60 days is required after the second failed attempt.

The applicant shall confirm in writing to the maintenance training organisation or the CAA the number, and dates of attempts during the last 12-month period and the maintenance training organisation or the CAA where these attempts took place. The maintenance training organisation or the CAA is responsible for checking the number of attempts within the applicable time frames.

- 2. The type evaluation shall be passed, and the required practical experience shall be completed within the 3 years preceding the application for the rating endorsement on the aircraft maintenance licence.

3. Type evaluation shall be performed with at least one examiner present. The examiner(s) shall not have been involved in the applicant's training.
- (e) A written and signed report shall be prepared and made available to the candidate by the examiner(s) to explain why the candidate has passed or failed.

6. On-the-job training (OJT)

6.1 General

The OJT is the training that the applicant is given on a particular aircraft type in a real workplace, having the possibility to learn maintenance best practices and correct release-to-service procedures. The OJT shall comply with the following requirements:

- (a) The list of the OJT tasks and programme shall be accepted by the CAA before starting the OJT training.
- (b) The OJT shall be conducted at one or more maintenance organisations appropriately approved according to MCAR-145 or MCAR-CAO for the maintenance of that aircraft type. One of those organisations shall control the OJT.
- (c) The applicant shall have a category A, B or L5 licence before undergoing the OJT or have finished the theoretical type training and cumulated at least 50 % of the basic experience requirement (point 66.A.30) as regards the category of aircraft he or she is trained for.
- (d) The applicant shall start and complete the OJT within 3 years preceding the application for the first type rating endorsement. At least 50 % of the OJT tasks shall take place after the related aircraft theoretical type training has been completed.
- (e) The applicant shall undergo the OJT under the mentorship of a qualified mentor or mentors, on a one-to-one supervision basis, during which the mentors verify the technical knowledge, the skills, and responsibilities of a typical certifying staff. During the OJT, the mentors transmit also knowledge and experience to the applicant, providing the necessary advice, support, and guidance.
- (f) Each task shall be signed off by the applicant and refer to an actual job card/work sheet, etc. The mentors shall verify and countersign off the tasks performed during the OJT, because they shall assume the responsibility for the tasks at support staff or certifying staff level, as applicable, depending on the release-to-service procedure.
- (g) At the satisfactory completion of the OJT programme, the mentors shall issue a recommendation for the final assessment of the applicant to be conducted by designated assessors.

6.2 OJT content and OJT logbook

The OJT shall include a series of activities and tasks representative of the aircraft type rating, systems, and licence category applied for and may cover more than one licence category.

The OJT shall be documented in an OJT logbook reporting the following:

- (a) name of the applicant;
- (b) date of birth of the applicant;
- (c) the approved maintenance organisation(s) where the OJT was carried out;
- (d) aircraft rating and licence categories applied for;
- (e) list of tasks, including:
 - (i) task description;
 - (ii) reference to job card/work order/aircraft tech log, etc.;
 - (iii) location of task completion;
 - (iv) date of task completion;
 - (v) aircraft registration(s).
- (f) names of the mentors (including licence number, if applicable);
- (g) a signed recommendation of the mentors for the successive final assessment of the applicant.

6.3 Final assessment of the applicant

The final assessment of the applicant may only be performed once the OJT logbook has been completed and the mentors have signed the related recommendation.

The designated assessor(s) conducting the final assessment shall notify the date of the assessment to the CAA well in advance to allow a possible participation of the CAA.

The objective of the final assessment is to verify that the applicant has sufficient technical knowledge as well as the appropriate skills and attitude and that he or she is competent to work independently as type-rated certifying staff on a particular aircraft type.

The final assessment shall have a minimum duration of one working day.

- (a) The assessment shall sample:
 - (1) the general technical knowledge required for the particular licence category;

- (2) the aircraft-type-specific knowledge and skills for the particular licence category;
 - (3) the understanding of the licence privileges relevant to the aircraft and to the licence category;
 - (4) the appropriate behaviour and safety attitude of the applicant in relation to the maintenance environment.
- (b) The assessment shall be recorded in a report containing the following information:
- (1) identification data of the applicant;
 - (2) identification data of the assessor(s);
 - (3) date and time frame of the assessment;
 - (4) content of the assessment;
 - (5) result of the assessment: Passed or Failed.
 - (6) signature of the assessor(s), the candidate and, if applicable, the independent observer(s).
- (c) A failed assessment may be retaken after 3 months or, if additional training has been received and a new recommendation by the mentors has been made, earlier than 3 months if agreed by the assessor(s). After three failed attempts, the complete OJT shall be repeated.

6.4 Requirements for mentors and assessors

Mentors and assessors are maintenance staff with the following qualifications:

- (i) Mentors:
- hold a valid aircraft maintenance licence (AML) issued in accordance with this Regulation or a valid and fully compliant with ICAO Annex 1 AML in accordance with Appendix IV to MCAR-145, which is acceptable to the CAA;
 - have been holding, for at least 1 year, an AML in the same category, when compared to the one for which the OJT is being mentored, that is endorsed with a type rating appropriate to exercise the privileges on the related aircraft;
 - have the necessary release or sign-off privileges in the maintenance organisation where the OJT is performed;

- have experience in training other people (such as being apprenticeship instructors, instructors in accordance with MCAR-147, having received train-the-trainer courses or having any other comparable national qualification, or having a training to do so that is acceptable to the CAA).

(ii) Assessors of the final assessment:

- hold a valid AML issued in accordance with this Regulation or a valid and fully compliant with ICAO Annex 1 AML in accordance with Appendix IV to MCAR-145, which is acceptable to the CAA;
- have been holding, for at least 3 years, an AML in the same category, when compared to the one for which the OJT is being assessed, endorsed with the same or similar aircraft type rating;
- have experience and/or have received training in assessing others (such as being apprenticeship instructors, examiners in accordance with MCAR-147, having received train-the-trainer courses, or having any other comparable national qualification, or having a training to do so that is acceptable to the CAA);
- shall not have been involved as a mentor of the applicant in the OJT; when the assessor has taken part in the OJT performance, then an independent observer shall be present during the OJT assessment.

6.5 OJT documentation and records

The satisfactory accomplishment of the OJT shall be attested to the applicant with the final assessment report and the OJT logbook.

The OJT documentation shall be provided to the CAA to support the application for the issue or change of the licence as laid down in Section B, Subpart B, of this Regulation.

Records of the OJT documentation shall be kept by the maintenance organisation where the OJT is conducted, in accordance with the procedures agreed with the CAA.

AMC to Appendix III to MCAR-66 ‘Aircraft Type Training and Examination Standard. On-the-Job Training’

Aircraft Type Training and On-the-Job Training

The theoretical and practical training providers, as well as the OJT provider, may contract the services of a language translator in the case where training is imparted to students not conversant in the language of the training material. Nevertheless, it remains essential that the students understand all the relevant maintenance documentation.

During the performance of examinations and assessments, the assistance of the translator should be limited to the translation of the questions, but should not provide clarifications or help in relation to those questions.

AMC1 Appendix III “Aircraft type training and type evaluation standard- on-the-Job Training (OJT) Section 1

Aircraft Type Training

1. Aircraft type training may be sub-divided in airframe and/or powerplant and/or avionics/electrical systems type training courses.
 - Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding the powerplant.
 - Powerplant type training course means a type training course on the bare engine, including the build-up to a quick engine change unit.
 - The interface of the engine/airframe systems should be addressed by either airframe or powerplant type training course. In some cases, such as for general aviation, it may be more appropriate to cover the interface during the airframe course due to the large variety of aircraft that can have the same engine type installed.
 - Avionics/electrical systems type training course means type training on avionics and electrical systems covered by but not necessarily limited to ATA (Air Transport Association) Chapters 22, 23, 24, 25, 27, 31, 33, 34, 42, 44, 45, 46, 73 and 77 or equivalent.
2. Practical training may be performed either following or integrated with the theoretical elements. However, it should not be performed before theoretical training.
3. The content of the theoretical and practical training should:
 - address the different parts of the aircraft which are representative of the structure, the systems/components installed and the cabin; and
 - include training on the use of technical manuals, maintenance procedures and the interface with the operation of the aircraft.

Therefore it should be based on the following elements:

- Type design including relevant type design variants, new technology and techniques;
- Feedback from in-service difficulties, occurrence reporting, etc;
- Significant applicable airworthiness directives and service bulletins;
- Known human factor issues associated with the particular aircraft type;
- Use of common and specific documentation, (when applicable, such as MMEL, AMM, MPD, TSM, SRM, WD, AFM, tool handbook), philosophy of the troubleshooting, etc.;
- Knowledge of the maintenance on-board reporting systems and ETOPS maintenance conditions where applicable;
- Use of special tooling and test equipment and specific maintenance practises including critical safety items and safety precautions;
- Significant and critical tasks/aspects from the MMEL, CDL, Fuel Tank Safety (FTS), airworthiness limitation items (ALI) including Critical Design Configuration Control Limitations (CDCCL), CMR and all ICA documentation such as MRB, MPD, SRM, AMM, etc., when applicable.
- Maintenance actions and procedures to be followed as a consequence of specific certification requirements, such as, but not limited to, RVSM (Reduced Vertical Separation Minimum) and NVIS (Night Vision Imaging Systems);
- Knowledge of relevant inspections and limitations as applicable to the effects of environmental factors or operational procedures such as cold and hot climates, wind, moisture, sand, de-icing / anti-icing, etc.

The type training does not necessarily need to include all possible customer options corresponding to the type rating described in the Appendix I to AMC to MCAR-66.

4. Limited avionic system training should be included in the category B1 type training as the B1 privileges include work on avionics systems requiring simple tests to prove their serviceability.
5. Electrical systems should be included in both categories of B1 and B2 type training.
6. The theoretical and practical training should be complementary and may be:
 - Integrated or split;

- Supported by the use of training aids, such as trainers, virtual aircraft, aircraft components, maintenance simulation training devices (MSTDs) and maintenance training devices (MTDs).
7. The integration and usage of MSTDs and MTDs, as defined in AMC 147.A.30(a), in maintenance type training (theoretical and/or practical) should consider the following:
- The use of actual aircraft components should be allowed for any MSTD or MTD, even if the components are in a non-airworthy condition.
 - The complexity and degree of simulation for an MSTD may vary and should support type training elements that address a component, a system or the entire aircraft. Based on its characteristics and capabilities, the MSTD may be:
 - a training device capable of providing, for the respective component or system, the representation of aircraft location, access and layout, and for servicing with an acceptable level of accuracy and limited simulation; or
 - a training device capable of providing, for the respective component or system, the representation of aircraft location, access and layout with sufficient accuracy and with interactive simulation for servicing, and the applicable maintenance data for operational (O) and functional (F) test elements including built-in test (BIT) initiation and monitoring from outside the cockpit; such representation should have the capability to accommodate some troubleshooting scenarios; or
 - a training device capable of providing, for the respective component or system, the representation of onboard (flight deck/cockpit or cabin) indication and controls with an acceptable level of accuracy and limited interactive simulation; or
 - a training device capable of providing, for the respective component or system, the representation of onboard (flight deck/cockpit or cabin) indication and controls with sufficient accuracy and with interactive simulation for servicing, and the applicable maintenance data for operational (O) and functional (F) test elements including built-in test (BIT) initiation and monitoring; such representation should have the capability to accommodate some troubleshooting scenarios; or
 - any combination of the above.
 - Flight simulation training devices (FSTDs) may be used as MSTDs whenever their characteristics and capabilities are considered appropriate for, and supportive of, the delivery of the respective maintenance training element(s).
 - An MTD is any training device other than an MSTD used for maintenance training and/or examination and/or assessment.

AMC to Paragraphs 1(b), 3.2 and 4.2 of Appendix III to MCAR-66 'Aircraft Type Training and Examination Standard. On-the-Job Training'

Practical Element of the Aircraft Type Training

1. The practical training may include instruction in a classroom or in simulators but part of the practical training should be conducted in a real maintenance or manufacturer environment.
2. The tasks should be selected because of their frequency, complexity, variety, safety, criticality, novelty, etc. The selected tasks should cover all the chapters described in the table contained in paragraph 3.2 of Appendix III to MCAR-66.
3. The duration of the practical training should ensure that the content of training required by paragraph 3.2 of Appendix III to MCAR-66 is completed.

Nevertheless, for aeroplanes with a MTOM equal or above 30000kg, the duration for the practical element of a type rating training course should not be less than two weeks unless a shorter duration meeting the objectives of the training and taking into account pedagogical aspects (maximum duration per day) is justified to the competent authority.

4. The organisation providing the practical element of the type training should provide trainees a schedule or plan indicating the list of tasks to be performed under instruction or supervision. A record of the tasks completed should be entered into a logbook which should be designed such that each task or group of tasks may be countersigned by the designated assessor. The logbook format and its use should be clearly defined.
5. In paragraph 4.2 of Appendix III to MCAR-66, the term 'designated assessors appropriately qualified' means that the assessors should demonstrate training and experience on the assessment process being undertaken and be authorised to do so by the organisation.

Further guidance about the assessment and the designated assessors is provided in Appendix III to AMC to MCAR-66.

6. The practical element (for powerplant and avionic systems) of the Type Rating Training may be subcontracted by the approved MCAR-147 organisation under its quality system according to the provisions of 147.A.145(d)3 and the corresponding Guidance Material.

AMC to Paragraph 1(c) of Appendix III to MCAR-66 'Aircraft Type Training and Examination Standard. On-the-Job Training'

Differences Training

Approved difference training is not required for different variants within the same aircraft type rating (as specified in Appendix I to AMC to MCAR-66) for the purpose of type rating endorsement on the aircraft maintenance licence.

However, this does not necessarily mean that no training is required before a certifying staff authorisation can be issued by the maintenance organisation (refer to AMC 66.A.20(b)3).

GM1 Appendix III Aircraft type training and type evaluation standard — on-the-job training (OJT) Section 1(c)

DIFFERENCES TRAINING

If the holder of a B1 and B2 licence, without any type rating, successfully completes a combined type training course (B1 + B2) followed by an OJT tailored only to B1 tasks, they can obtain only the type-rating endorsement that is applicable to the B1 subcategory.

Within the next 3 years from the completion of the combined training course, endorsement of the aircraft type for the B2 category is possible after carrying out an OJT programme limited to the tasks relevant to the B2 category only.

When instead, the aircraft type endorsement would be requested after more than 3 years, the applicant would be required to also pass a differences type training course (from B1 to B2) plus the OJT programme limited to the tasks relevant to the B2 category only. All common theoretical and practical elements, and OJT tasks, already demonstrated as B1, shall be considered fulfilled.

AMC1 Appendix III Aircraft type training and type evaluation standard — on-the-job training (OJT) Section 3

AIRCRAFT TYPE TRAINING STANDARD

Training methods are categorised as ‘instructor-centred’, ‘student-centred’ and ‘blended training’.

The actual training method and the training tools should be adapted to suit the training subject and be chosen considering their intrinsic characteristics, such as but not limited to their efficiency and the pedagogical benefits of the method/tool.

A complex or critical subject should not normally be taught solely through a student-centred method unless provisions are in place to verify the actual and progressive acquisition of knowledge of the student.

Complex and critical areas should be identified by the training needs analysis (TNA). The complexity and criticality of the areas could differ on a case-by-case basis (that is, areas proven to be critical by organisations’ ‘in-service events’, occurrence reporting, human factors, safety, etc.), but should in any case cover the maintenance areas with special emphasis (MASE) identified by the type-certificate holder (TCH) in its operational suitability data (OSD).

AMC1 Appendix III Aircraft type training and type evaluation standard- on-the-job Training (OJT) Section 3.1 (d)

Training Needs Analysis (TNA) for the theoretical element of the aircraft type training

1. The minimum duration for the theoretical element of the type rating training course, as described in Appendix III to MCAR-66, has been determined based on:
 - generic categories of aircraft and minimum standard equipment fit
 - the estimated average duration of standard courses imparted in the world
2. The purpose of the Training Needs Analysis (TNA) is to adapt and justify the duration of the course for a specific aircraft type. This means that the TNA is the main driver for determining the duration of the course, regardless of whether it is above or below the minimum duration described in Appendix III to MCAR-66.

In the particular case of type training courses approved on the basis of the requirements valid before Issue 2 of MCAR-66 was applicable (31 December 2015) and having a duration for the theoretical element equal to or above the minimum duration contained in paragraph 3.1(c) of Appendix III to MCAR-66, it is acceptable that the TNA only covers the differences introduced by Issue 2 of MCAR-66 in paragraph 3.1(e) "Content" and the criteria introduced in paragraph 3.1(d) "Justification of course duration" related to the minimum attendance and the maximum number of training hours per day. This TNA may result in a change in the duration of the theoretical element.

3. The content and the duration deriving from this TNA may be supported by an analysis from the Type Certificate holder.
4. In order to approve a reduction of such minimum duration, the CAA will perform an assessment on a case-by-case basis, and the assessment will be appropriate to the aircraft type and to the training methods and tools proposed.

For example:

- (a) While it would be exceptional for a theoretical course for a large transport category aircraft, such as an A330 or a B777, to be below the minimum duration shown, it would not necessarily be exceptional in the case of a business aircraft, such as a Learjet 45 or similar. The TNA for a business aircraft course could demonstrate that a course of a shorter duration satisfies the applicable requirements.
- (b) The use of an MSTD (i.e. flat panel trainer) comprising aircraft-type-specific software may result in the duration of the training being reduced due to a more effective transfer of knowledge.
- (c) The use of multimedia-based training (MBT), or blending the training methods, may improve the efficiency of the training and, consequently, contribute to the reduction of the overall time needed to achieve the learning objectives.

5. When developing the TNA, the following should be considered:

- (a) The TNA should include an analysis identifying all the areas and elements where there is a need for training as well as the associated learning objectives, considering the design philosophy of the aircraft type, the operational environment, the type of operations and the operational experience. This analysis should be written in a manner which provides a reasonable understanding of which areas and elements constitute the course in order to meet the learning objectives.
- (b) As a minimum, the Training Need Analysis (TNA) should take into account all the applicable elements contained in paragraph 3.1 of MCAR-66 Appendix III and associated AMCs.
- (c) The TNA should set-up the course content considering the Appendix III objectives for each level of training and the prescribed topics in the theoretical element table contained in paragraph 3.1 of MCAR-66 Appendix III.
- (d) For each chapter described in the theoretical element table contained in paragraph 3.1 of MCAR-66 Appendix III, the corresponding training time should be recorded.
- (e) Typical documents to be used in order to identify the areas and elements where there is a need for training typically include, among others, the Aircraft Maintenance Manual, MRB report, CMRs, airworthiness limitations, Troubleshooting Manual, Structural Repair Manual, Illustrated Parts Catalogue, Airworthiness Directives and Service Bulletins.
- (f) During the analysis of these documents:
 - Consideration should be given to the following typical activities:
 - Activation/reactivation;
 - Removal/Installation;
 - Testing;
 - Servicing;
 - Inspection, check and repairs;
 - Troubleshooting / diagnosis.
 - For the purpose of identifying the specific elements constituting the training course, it is acceptable to use a filtering method based on criteria such as:
 - Frequency of the task;
 - Human factor issues associated to the task;
 - Difficulty of the task;
 - Criticality and safety impact of the task;
 - In-service experience;
 - Novel or unusual design features (not covered by MCAR-66 Appendix I);
 - Similarities with other aircraft types;

- Special tests and tools/equipment.
- It is acceptable to follow an approach based on:
 - Tasks or groups of tasks, or
 - Systems or subsystems or components

(g) The TNA should:

- Identify the learning objectives for each task, group of tasks, system, subsystem or component;
- Associate the identified tasks to be trained to the regulatory requirements (table in Paragraph 3.1 of Appendix III to MCAR-66);
- Organise the training into modules in a logical sequence (adequate combination of chapters as defined in Appendix III of MCAR-66);
- Determine the sequence of learning (within a lesson and for the whole syllabus);
- Identify the scope of information and level of detail with regard the minimum standard to which the topics of the TNA should be taught according to the set-up objectives.
- Address the following:
 - Description of each system/component including the structure (where applicable);
 - System/component operation taking into account:
 - a. Complexity of the system (e.g. the need of further break down into subsystems, etc.);
 - b. Design specifics which may require more detailed presentation or may contribute to maintenance errors;
 - c. Normal and emergency functioning;
 - d. Troubleshooting;
 - e. Interpretation of indications and malfunctions;
 - f. Use of maintenance publications;
 - g. Identification of special tools and equipment required for servicing and maintaining the aircraft;
 - h. Maintenance Practices;
 - i. Routine inspections, functional or operational tests, rigging/adjustment, etc.
- Describe the following:
 - The instructional methods and training tools and their blended application, in order to ensure the effectiveness of the training.

- The maintenance training documentation/material to be delivered to the student.
 - Facilitated discussions, questioning session, additional practiced-oriented training, etc.
 - The homework, if developed, i.e. to support the achievement of the learning objectives while using asynchronous distance-learning or self-learning methods.
 - The training provider's resources available to the learner.
- (h) It is acceptable to differentiate between subjects which have to be led by an instructor and subjects which may be delivered through interactive simulation training devices and/or covered by self-paced elements. The overall time of the course will be allocated accordingly.
- (i) The maximum number of training hours per day for the theoretical element of type training should not be more than 6 hours. A training hour means 60 minutes of tuition excluding any breaks, examination, revision, preparation and aircraft visit. In exceptional cases, the CAA may allow deviation from this standard when it is properly justified that the proposed number of hours follows pedagogical and human factors principles. These principles are especially important in those cases where:
- Theoretical and practical training are performed at the same time;
 - Training and normal maintenance duty / apprenticeship are performed at the same time.
- (j) The minimum participation time in order for the trainee to meet the objectives of the course should not be less than 90% of the tuition hours, or 95% completion of the content in case of student-centred methods in a theoretical training course. Additional training may be provided by the training organisation in order to meet the minimum participation time. If the minimum participation defined for the course is not met, a certificate of recognition should not be issued.
- (k) The TNA is a living process and should be reviewed/updated based on operation feedback, maintenance occurrences, airworthiness directives, major service bulletins impacting maintenance activities or requiring new competencies for mechanics, alert service bulletins, feedback from trainees or customer satisfaction, evolution of the maintenance documentation such as MRBs, MPDs, MMs, etc. The frequency at which the TNA should be reviewed/updated is left to the discretion of the organisation conducting the course.

NOTE: The examination is not part of the TNA. However, it should be prepared in accordance with the learning objectives described in the TNA.

AMC1 Appendix III Aircraft type training and type evaluation standard — on-the-job training (OJT) Section 4.1

Type training examination and assessment standard

4.1 Theoretical element examination standard

Examinations may be computer or paper based, or a combination of both. Refer to point MCAR-147.A.135.

AMC to Section 5 of Appendix III to MCAR-66 “Aircraft Type Training and Examination Standard. On-the-Job Training”

Type Examination Standard

This Section 5 “Type Examination Standard” does not apply to the examination performed as part of type training. This Section only applies to those cases where type examination is performed as a substitute for type training.

AMC1 Appendix III Aircraft type training and type evaluation standard - on-the-job Training (OJT) Section 6

On-the-job training (OJT)

General

'Maintenance organisations appropriately approved according to MCAR-145 or MCAR-CAO for the maintenance of that aircraft type' means MCAR-145 or MCAR-CAO approved maintenance organisations (AMO) that hold an 'A' rating for such aircraft.

The OJT may be split in several parts and carried out at different AMOs, also combining line and base facilities from the same or different organisations. The organisation at which the final assessment is carried out, should control and coordinate the OJT activities and have the responsibility for the entire OJT programme.

The procedures for the OJT should be included in the Exposition Manual of the approved maintenance organisation.

'Skills and responsibilities of a typical certifying staff' include but are not limited to:

- understanding the importance of professional integrity, behaviour and having an appropriate attitude towards safety;
- understanding the conditions for ensuring the continuing airworthiness of aircraft and components;
- the ability to identify and rectify existing and potential unsafe conditions;
- the ability to prioritise tasks, coordinate with a team, and report discrepancies;
- the ability to determine the required qualifications for the performance of maintenance tasks;
- the ability to confirm the proper accomplishment of maintenance tasks;
- the ability to compile and control completed work cards;
- knowledge of safety risks linked to a particular working environment;
- understanding of human performance and limitations;
- understanding of the AMO's (where the OJT is performed) privileges and limitations;
- understanding of the AMO's personnel authorisations and limitations;
- being familiar with the AMO's documents/forms (work packages, work orders, work cards, etc.);

- being familiar with AMO's release-to-service procedures: use of the aircraft technical logbook (ATLB), deferral of items and dispatch under MEL/CDL;
- access, use and control of the required tools and equipment;
- access, use and control of the required ICAs (AMM, TSM, SRM, etc.).

OJT content and OJT logbook

If the aircraft manufacturer has defined the OJT tasks during the type certification of a particular aircraft type (e.g. the operational suitability data (OSD) has been approved for a particular aircraft type), those tasks should be selected. In particular, the analysis performed for the maintenance areas of specific emphasis (MASE), as defined in point 430 of EASA CS-MCSD, helps the organisation identify the more appropriate tasks.

Where no such data exists, the task list in Appendix II to the AMC to MCAR-66 serves as the basis to develop an OJT programme including the applicable tasks for a particular aircraft type, based typically on the AMM. The tasks may be selected from the table in Appendix II in order to cover a broader representative sample of both simple and complex tasks on the particular aircraft type in order to reach a balanced distribution of the tasks between line and base maintenance. The tasks should be selected among those that are applicable to the aircraft type and the licence (sub)category applied for; for example, the selection could exclude location tasks (LOC) and tasks that can be considered under the category A licence privileges (seat covers, boilers, wheels, etc.).

A minimum number of tasks, as described in point 2 'List of tasks for OJT' of Appendix II, of each of the following categories should be performed: INS/inspections, FOT/functional or operational, SGH/servicing, R/I removal and installation, MEL, and T/S troubleshooting. The licensing authority may accept that a limited number of tasks is not performed as long as the relevant cross section of the tasks as regards quality, quantity and complexity is still assured.

A task may be performed on the analogous system installed on a different aircraft type when the systems are similar in terms of design architecture, technology, and functionality. This can be the case, for example, for tasks performed on engines or landing gear of aircraft of the same manufacturer. Such task should be clearly identified and recorded.

Certain maintenance tasks could be performed on non-airworthy aircraft that still maintain functionality of systems to the extent that the maintenance tasks can be completely performed without any deviation from the maintenance instructions. Tasks circumscribed to system components may be performed at the workshop. This can be the case, for example, for avionics functional tests. Such scenarios should be limited to specific tasks that may not occur often in the maintenance of operational aircraft.

The use of MSTDs and MTDs for OJT should be restricted to a minimum.

When an existing licence is changed to include an additional category with a type rating, a different OJT from the category held to the new one may be permissible. In those cases, only tasks corresponding to the differences between the two categories should be performed.

The organisation that has control over the OJT should provide candidates with a schedule or plan which indicates the list of tasks to be performed under supervision. A record of the completed tasks is to be entered into a logbook whose design and format should be such that each task or group of tasks is countersigned by the corresponding mentor(s).

Regarding day-to-day supervision of the OJT programme in the approved maintenance organisation and the role of the mentor(s), the following should be considered:

- It is sufficient for the completion of the individual OJT tasks to be confirmed by the direct mentor(s), without the direct evaluation of the assessor being necessary.
- During the day-to-day OJT performance, the aim of the supervision is for mentors to oversee the whole process, including task completion, use of manuals, adherence to procedures, observance of safety measures, warnings, cautions and recommendations, and demonstration of appropriate behaviour in the maintenance environment.
- The mentor(s) should personally observe the work being performed to ensure its safe completion, and should be readily available for consultation if needed during the OJT.
- The mentor(s) should sign the tasks and release the maintenance tasks as the candidate is still not qualified to do so.
- The mentor(s) should be designated by the approved maintenance organisation to supervise.

For training in release-to-service procedures, following the completion of the performance of a specific task chosen by the mentor, the candidate should prepare a document with simulated release to service which has to be marked as 'for training purposes only' (e.g. ATL page, maintenance task card, CRS). If both the task and the simulated release to service have been performed to the satisfaction of the mentor, the task may be countersigned in the OJT task list by the mentor. A physical or electronic copy of the document with simulated release should be added to the syllabus.

Tasks which are usually performed with more than one person may be performed by more than one candidate under the supervision of one mentor. During the performance of the tasks, the mentor is limited to overseeing three candidates at the same time, given that the candidates can be properly seen 'at a glance' from the mentor's position. Those tasks should be marked as 'group tasks' when applying for the approval. All other tasks should be a one-to-one mentorship. In such cases, all the candidates involved should be noted on the work order.

At the end of the performance of the OJT, a compliance report shall be made which verifies and documents the correct and complete performance and the recommendation of the mentor(s)

for the following assessment. The mentor(s) may deny a recommendation if the candidate has not demonstrated the knowledge, skills, behaviour and/or ethics required from certifying staff.

Final assessment of the applicant

The OJT assessment should consist of a theoretical part and a practical part.

The theoretical part comprises the regulatory framework, safety procedures, knowledge of aircraft and its systems, maintenance procedures, and other typical certifying staff activities such as:

- the review and acceptance of work orders;
- shift-handover procedures and team coordination;
- communication and interaction with the flight crew;
- dispatch with unserviceable items;
- clear aircraft logbook entries and reporting notes;
- checks before release to service.

The practical part should include maintenance tasks on the aircraft (e.g. rem./inst., TS, R/I, FOT, MEL dispatch). The assessor may decide to simulate some aspects of the maintenance tasks. The aircraft type on which the OJT is performed needs to be available for the assessment together with access to the required maintenance data, equipment, and tools. A training aircraft may be acceptable. It is good practice to assess the practical skills on the aircraft in question while the assessment of knowledge may be performed either on the aircraft or in theory.

Further guidance about the designated assessors is provided in the AMC to Appendix III to MCAR-66.

If an independent observer is required for the OJT, they shall be selected by the maintenance organisation among the maintenance personnel that have not taken part in the OJT performance but do have an adequate understanding of the OJT procedures.

Appendix IV Experience and basic knowledge modules or partial modules required for extending an Aircraft Maintenance Licence under MCAR-66

A. Experience requirements

Table A below shows the experience requirements, in months, for adding a new category or subcategory to an existing MCAR-66 licence.

The experience requirements can be reduced by 50 % if the applicant has completed an approved MCAR-147 course relevant to a particular subcategory.

[[Table should be green]]

Table A																
To: From:	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3	L1	L2	L3	L4	L5
A1	-	6	6	6	24	6	24	12	24	12	6	12	12	12	12	24
A2	6	-	6	6	24	6	24	12	24	12	6	12	12	12	12	24
A3	6	6	-	6	24	12	24	6	24	12	12	12	12	12	12	24
A4	6	6	6	-	24	12	24	6	24	12	12	12	12	12	12	24
B1.1	-	6	6	6	-	6	6	6	12	12	6	6	6	12	12	12
B1.2	6	-	6	6	24	-	24	6	24	12	-	-	-	12	12	12
B1.3	6	6	-	6	6	6	-	6	12	12	6	6	6	12	12	12
B1.4	6	6	6	-	24	6	24	-	24	12	6	6	6	12	12	12
B2	6	6	6	6	12	12	12	12	-	-	12	6	6	12	12	24
B2L	6	6	6	6	12	12	12	12	12	-	12	6	6	12	12	24
B3	6	-	6	6	24	6	24	12	24	12	-	-	-	12	12	12
L1	24	24	24	24	36	24	36	24	36	24	24	-	6*	12*	12*	24*
L2	24	12	24	24	36	12	36	24	36	24	12	-	-	12*	12*	24*
L3	30	30	30	30	48	30	48	30	48	30	30	12*	12*	-	6*	24*
L4	30	30	30	30	48	30	48	30	48	30	30	12*	12*	-	-	24*
L5	24	24	24	24	36	24	36	24	36	24	24	12*	12*	12*	-	-

* Experience may be reduced by 50 % but allowing a licence with limitations, i.e. a licence endorsed with the exclusion of 'complex maintenance tasks provided for in Appendix VII to Annex I (Part-M), standard changes provided for in point 21.A.90B of Annex I (Part 21) to Regulation (EU) No 748/2012, and standard repairs provided for in point 21.A.431B of Annex I (Part 21) to Regulation (EU) No 748/2012'.

B. Basic knowledge modules or partial modules required.

The purpose of this table is to outline the examinations required to add a new basic category/subcategory to an AML granted in accordance with this Annex.

The syllabi prepared in accordance with Appendix I and Appendix VII require different levels of knowledge for different licence categories within a module; therefore, there are additional examinations applicable to certain modules for licence holders wishing to extend an AML granted in accordance with this Annex to include another category/subcategory and an analysis of the module shall be conducted to determine the subjects missing or passed at a lower level.

[Table should be green]

Table B

To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3	L1C	L1	L2C	L2	L3H	L3G	L4H	L4G	L5
A1	None	16.	12.	12, 16.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 2, 8, 9.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 9.
A2	11, 15.	None	12, 15.	12.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 2, 8, 9.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 9.
A3	11, 17.	11, 16, 17.	None	16.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 2, 8, 9.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 9.
A4	11, 15, 17.	11, 17.	15.	None	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 9.	All except 2, 8, 9.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 2L.	All except 9.
B1.1	None	16.	12.	12, 16.	None	16.	12.	12, 16.	4, 5, 13,14	4, 5, 13SQ, 14SQ	16.	12L.	12L.	8L**, 12L.	8L**, 12L.	9L.	10L.	9L,11L.	10L, 11L.	8L**, 10L,11,12L.
B1.2	11,15	None	12, 15.	12.	11, 15.	None	12, 15.	12.	4, 5,13,14	4, 5, 13SQ, 14SQ	None	12L.	12L.	8L*, 12L.	8L*, 12L.	9L.	10L.	9L,11L.	10L, 11L.	8L*, 10L,11,12L.
B1.3	11, 17.	11, 16, 17.	None	16.	11, 17.	11, 16, 17.	None	16.	4, 5,13,14	4, 5, 13SQ, 14SQ	11, 16, 17.	7L,12L.	7L,12L.	7L,8-L**,12L.	7L,8-L**,12L.	9L.	10L.	9L,11L.	10L, 11L.	8L**, 10L,11,12L.

To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3	L1C	L1	L2C	L2	L3H	L3G	L4H	L4G	L5
B1.4	11, 15, 17.	11, 17.	15.	None	11, 15, 17.	11, 17.	15.	None	4, 5, 13, 14	4, 5, 13SQ, 14SQ	11, 17.	7L, 12L.	7L, 12L.	7L, 8-L*, 12L.	7L, 8-L*, 12L.	9L.	10L.	9L, 11L.	10L, 11L.	8L*, 10L, 11, 12L.
B2	6, 7, 11, 15, 17.	6, 7, 11, 16, 17.	6, 7, 12, 15.	6, 7, 12, 16.	6, 7, 11, 15, 17.	6, 7, 11, 16, 17.	6, 7, 12, 15.	6, 7, 12, 16.	None	None	6, 7, 11, 16, 17.	5L, 7L.	4L, 5L, 6L, 7L.	5L, 7L, 8L.	4L, 5L, 6L, 7L, 8L.	9L.	10L.	9L, 11L.	10L, 11L.	6, 7, 11 or 12, 15 or 16, 17, 8L, 10L
B2L	6, 7, 11, 15, 17.	6, 7, 11, 16, 17.	6, 7, 12, 15.	6, 7, 12, 16.	6, 7, 11, 15, 17.	6, 7, 11, 16, 17.	6, 7, 12, 15.	6, 7, 12, 16.	13SQ, 14SQ.	None	6, 7, 11, 16, 17.	5L, 7L, 12LSQ.	4L, 5L, 6L, 7L, 12LSQ.	5L, 7L, 8L, 12LSQ.	4L, 5L, 6L, 7L, 8L, 12LSQ.	9L.	10L.	9L, 11L.	10L, 11L.	6, 7, 11 or 12, 15 or 16, 17, 8L, 10L
B3	11, 15.	11	12, 15.	12.	2, 3, 5, 8, 11, 15	2, 3, 5, 8, 11.	2, 3, 5, 8, 12, 15	2, 3, 5, 8, 12.	2, 3, 4, 5, 8, 13, 14.	2, 3, 4, 5, 8, 13SQ	None	12L.	12L.	8L*, 12L.	8L*, 12L.	9L.	10L.	9L, 11L.	10L, 11L.	2, 3, 5, 8, 11 or 12, 8L*, 10L, 11L, 12L.

To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3	L1C	L1	L2C	L2	L3H	L3G	L4H	L4G
L1C	All	All	All	All	All	All	All	All	All	All	All	None	4L, 6L.	8L.	4L, 6L, 8L.	9L.	10L.	8L, 9L, 11L.	8L, 10L, 11L.
L1	All	All	All	All	All	All	All	All	All	All	All	None	None	8L.	8L.	9L.	10L.	8L, 9L, 11L.	8L, 10L, 11L.
L2C	All	All	All	All	All	All	All	All	All	All	All	None	4L, 6L.	None	4L, 6L.	9L.	10L.	9L, 11L.	10L, 11L.
L2	All	All	All	All	All	All	All	All	All	All	All	None	None	None	None	9L.	10L.	9L, 11L.	10L, 11L.
L3H	All	All	All	All	All	All	All	All	All	All	All	5L, 7L.	4L, 5L, 6L, 7L.	5L, 7L, 8L.	4L, 5L, 6L, 7L, 8L.	None	10L.	8L, 11L.	8L, 10L, 11L.
L3G	All	All	All	All	All	All	All	All	All	All	All	5L, 7L.	4L, 5L, 6L, 7L.	5L, 7L, 8L.	4L, 5L, 6L, 7L, 8L.	9L.	None	8L, 9L, 11L.	8L, 11L.
L4H	All	All	All	All	All	All	All	All	All	All	All	5L, 7L.	4L, 5L, 6L, 7L.	5L, 7L.	4L, 5L, 6L, 7L.	None	10L.	None	10L.
L4G	All	All	All	All	All	All	All	All	All	All	All	5L, 7L.	4L, 5L, 6L, 7L.	5L, 7L.	4L, 5L, 6L, 7L.	9L.	None	9L.	None

SQ = it depends on system qualification

*:excluding the subjects related to piston engines

**:excluding the subjects related to turbine engines;’.

Appendix V Application Form – CAA Form 19

[Reserved]

Appendix VI Aircraft Maintenance Licence referred to in this Regulation

[Reserved]

Appendix VII Basic knowledge requirements for category L aircraft maintenance licence

The definitions of the different levels of knowledge required in this Appendix are the same as those contained in point 1 of Appendix I to MCAR-66.

1. Modularisation

The modules required for each aircraft licence subcategory/category shall be in accordance with the following matrix. Where applicable, the subject modules are indicated by an 'X', while 'n/a' means that the subject module is not applicable nor required.

The basic knowledge requirement for L5 shall be the same as for any B1 subcategory (as indicated in Appendix I) plus other modules as shown in the matrix.

	Licence subcategories								
	Composite sailplanes	Sailplanes	Composite powered sailplanes and composite ELA1 aeroplanes	Powered sailplanes and ELA1	Hot-air balloons	Gas balloons	Hot-air airships	ELA2 gas airships	Gas airships above ELA2
Subject modules	L1C	L1	L2C	L2	L3H	L3G	L4H	L4G	L5
1L 'Basic knowledge'	X	X	X	X	X	X	X	X	n/a
2L 'Human factors'	X	X	X	X	X	X	X	X	n/a
3L 'Aviation legislation'	X	X	X	X	X	X	X	X	n/a
4L 'Wooden and/or metal-tube structure covered with fabric'	n/a	X	n/a	X	n/a	n/a	n/a	n/a	n/a
5L 'Composite structure'	X	X	X	X	n/a	n/a	n/a	n/a	n/a
6L 'Metallic structure'	n/a	X	n/a	X	n/a	n/a	n/a	n/a	n/a
7L 'Airframe – general, mechanical and electrical systems'	X	X	X	X	n/a	n/a	n/a	n/a	n/a
8L 'Power plant'	n/a	n/a	X	X	n/a	n/a	X	X	X (*)
9L 'Balloons – hot-air balloons'	n/a	n/a	n/a	n/a	X	n/a	X	n/a	n/a
10L 'Balloon - gas (free/tethered) balloons'	n/a	n/a	n/a	n/a	n/a	X	n/a	X	X
11L 'Airships – hot-air/gas AIRSHIPS'	n/a	n/a	n/a	n/a	n/a	n/a	X	X	X
12L 'Radio Com/ELT/Transponder/Instruments'	X	X	X	X	n/a	n/a	X	X	X
(*) Only applicable propulsion subjects of Module 8L are required; these depend on the B1 subcategory the applicant comes from									

[[Tables should be green]]

MODULE 1L — BASIC KNOWLEDGE

MODULE 1L — BASIC KNOWLEDGE	Level
1L.1 Mathematics <ul style="list-style-type: none"> – Arithmetic – Algebra – Geometry 	1
1L.2 Physics <ul style="list-style-type: none"> – Matter – Mechanics – Temperature 	1
1L.3 Electrics <ul style="list-style-type: none"> – AC and DC Circuits 	1
1L.4 Aerodynamics/aerostatics	1
1L.5 Workplace safety and environmental protection	2

MODULE 2L — HUMAN FACTORS

MODULE 2L — HUMAN FACTORS	Level
2L.1 General	1
2L.2 Human performance and limitations	1
2L.3 Social psychology	1
2L.4 Factors affecting performance	1
2L.5 Physical environment	1
2L.6 The 'Dirty Dozen' and risk-mitigation	2

MODULE 3L — AVIATION LEGISLATION

MODULE 3L — AVIATION LEGISLATION	Level
3L.1 Regulatory framework	1
3L.2 Continuing airworthiness regulations	1
3L.3 Repairs and modifications (MCAR-ML)	2
3L.4 Maintenance data (MCAR-ML)	2
3L.5 Licence privileges and how to exercise them properly (MCAR-66, MCAR-ML)	2

MODULE 4L — WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC

MODULE 4L — WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC	Level
4L.1 Airframe wooden/combination of metal tube and fabric	2
4L.2 Material	2
4L.3 Identifying damages and defects	3
4L.4 Standard repairs and maintenance procedures	3

MODULE 5L — COMPOSITE STRUCTURE

MODULE 5L — COMPOSITE STRUCTURE	Level
5L.1 Airframe fibre-reinforced plastic (FRP)	2
5L.2 Material	2
5L.3 Identifying damages and defects	3
5L.4 Standard repair and maintenance procedures	3

MODULE 6L — METALLIC STRUCTURE

MODULE 6L — METALLIC STRUCTURE	Level
6L.1 Metallic Airframe	2
6L.2 Materials	2
6L.3 Identifying damages and defects	3
6L.4 Standard repair and maintenance procedures	3

MODULE 7L — AIRFRAME: GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS

MODULE 7L — AIRFRAME: GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS	Level
7L.1 Flight control system	1
7L.2 Airframe structure – gliders and aeroplanes	1
7L.3 Air conditioning (ATA 21)	1
7L.4 Electrical power, cables and connectors (ATA 24)	2
7L.5 Equipment and furnishing (ATA 25)	2
7L.6 Fire protection and other safety systems (ATA 26)	2
7L.7 Flight controls (ATA 27)	3
7L.8 Fuel system (ATA 28)	2
7L.9 Hydraulic power (ATA 29)	2
7L.10 Ice and rain protection (ATA 30)	1
7L.11 Landing gear (ATA 32)	2
7L.12 Lights (ATA 33)	2
7L.13 Oxygen (ATA 35)	2
7L.14 Pneumatic/vacuum (ATA 36)	2
7L.15 Water ballast (ATA 41)	2
7L.16 Fasteners	2
7L.17 Pipes, hoses and connectors	2
7L.18 Springs	2
7L.19 Bearings	2
7L.20 Transmission	2
7L.21 Control cables	2
7L.22 Fits and clearances	2
7L.23 Aircraft weight and balance	2
7L.24 Workshop practices and tools	2
7L.25 Disassembly, inspection, repair, and assembly techniques	2
7L.26 Abnormal events	2
7L.27 Maintenance procedures	2

MODULE 8L — POWER PLANT

MODULE 8L — POWER PLANT	Piston	Turbine	Electrical	Level
8L.1 Engine fundamentals - general	X	X	X	2
8L.2 Piston-engine fundamentals and performance	X			2
8L.3 Piston-engine construction	X			2
8L.4 Piston-engine fuel system (non-electronic)	X			2
8L.5 Starting and ignition systems	X			2
8L.6 Air-intake, exhaust and cooling systems	X			2
8L.7 Supercharging/turbocharging	X			2
8L.8 Lubrication systems of piston engines	X			2
8L.9 Engine indication systems	X	X	X	2
8L.10 Electric aircraft engines			X	2
8L.11 Turbine-engine fundamentals and performance		X		2
8L.12 Inlet and compressor		X		2
8L.13 Combustion chamber, starting and ignitions system		X		2
8L.14 Turbine section and exhaust		X		2
8L.15 Other turbine-engine components and systems		X		2
8L.16 Turbine-engine inspection and ground operation		X		2
8L.17 Propeller	X	X	X	2
8L.18 Full authority digital engine control (FADEC)	X	X	X	2
8L.19 Lubricants and fuel	X	X	X	2
8L.20 Engine and propeller installation	X	X	X	2
8L.21 Engine monitoring and ground operation	X	X	X	2
8L.22 Engine/propeller storage and preservation	X	X	X	2

MODULE 9L — BALLOON: HOT-AIR BALLOONS

MODULE 9L — BALLOONS: HOT-AIR BALLOONS	Level
9L.1 Theory of flight – hot-air balloons	1
9L.2 General airframe of hot-air balloons	2
9L.3 Envelope	3
9L.4 Heater system / burner	3
9L.5 Basket and basket suspension (including alternative devices)	3
9L.6 Instruments	2
9L.7 Equipment	2
9L.8 Hot-air balloon handling and storage	2
9L.9 Disassembly, inspection, repair and assembly techniques	3

MODULES 10L — BALLOONS: GAS (FREE/TETHERED) BALLOONS

MODULES 10L — BALLOONS: GAS (FREE/TETHERED) BALLOONS	Level
10L.1 Theory of flight – gas balloons	1
10L.2 General airframe of gas balloons	2
10L.3 Envelope	3
10L.4 Netting	3
10L.5 Valves, parachutes and other related systems	3
10L.6 Load ring	3
10L.7 Basket (including alternative devices)	3
10L.8 Ropes and lines	3
10L.9 Instruments	2
10L.10 Tethered gas balloon (TGB) systems	3
10L.11 Equipment	2
10L.12 Gas-balloon handling and storage	2
10L.13 Disassembly, inspection, repair and assembly techniques	3

MODULES 11L — AIRSHIPS: HOT-AIR/GAS AIRSHIPS

MODULES 11L — AIRSHIPS: HOT-AIR/GAS AIRSHIPS	Level
11L.1 Theory of flight and control of airships	2
11L.2 Airships airframe structure – general concepts	2
11L.3 Airship Envelope	2
11L.4 Gondola	3
11L.5 Airship flight controls (ATA 27)	3
11L.6 Electrical power (ATA 24)	3
11L.7 Lights (ATA 33)	2
11L.8 Ice and rain protection	3
11L.9 Fuel system (ATA 28)	2
11L.10 Engine and propellers in airships	2
11L.11 Airship handling and storage	2
11L.12 Disassembly, inspection, repair and assembly techniques	2

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS	Level
12L.1 Radio Com/ELT	2
12L.2 Transponder and FLARM	2
12L.3 Instruments	2
12L.4 Avionics general test equipment	1

AMC1 Appendix VII Basic knowledge requirements for category L aircraft maintenance licence

MODULE 1L — BASIC KNOWLEDGE

MODULE 1L — BASIC KNOWLEDGE	Level
<p>1L.1 Mathematics</p> <p>Arithmetic</p> <ul style="list-style-type: none"> – Arithmetical terms and signs; – Methods of multiplication and division; – Fractions and decimals; – Factors and multiples; – Weights, measures and conversion factors; – Ratio and proportion; – Averages and percentages; – Areas and volumes, squares, cubes. <p>Algebra</p> <ul style="list-style-type: none"> – Evaluating simple algebraic expressions: addition, subtraction, multiplication and division; – Use of brackets; – Simple algebraic fractions. <p>Geometry</p> <ul style="list-style-type: none"> – Simple geometrical constructions; – Graphical representation: nature and uses of graphs. 	1
<p>1L.2 Physics</p> <p>Matter</p> <ul style="list-style-type: none"> – Nature of matter: the chemical elements; – Chemical compounds; – States: solid, liquid and gaseous; – Changes between states. <p>Mechanics</p> <ul style="list-style-type: none"> – Forces, moments and couples, representation as vectors; – Centre of gravity; – Tension, compression, shear and torsion; – Nature and properties of solids, fluids and gases. <p>Temperature</p> <ul style="list-style-type: none"> – Thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; – Heat definition. 	1
<p>1L.3 Electrics</p> <p>AC and DC Circuits</p> <ul style="list-style-type: none"> – Ohm's law, Kirchoff's voltage and current laws; – Significance of the internal resistance of a supply; – Resistance/resistor; 	1

<ul style="list-style-type: none">– Resistor colour code, values and tolerances, preferred values, wattage ratings;– Resistors in series and parallel.	
1L.4 Aerodynamics/aerostatics International Standard Atmosphere (ISA), application to aerodynamics and aerostatics.	1
1L.5 Workplace safety and environmental protection <ul style="list-style-type: none">– Safe working practices and precautions when working with electricity, gases (especially oxygen), oils and chemicals;– Labelling, storage and disposal of hazardous (to workplace safety and environment) materials;– Remedial action in the event of a fire or another accident with one or more hazards, including knowledge of fire-extinguishing agents.	2

MODULE 2L — HUMAN FACTORS

MODULE 2L — HUMAN FACTORS	Level
2L.1 General <ul style="list-style-type: none"> – The need to take human factors into account in the maintenance domain; – Incidents attributable to human factors/human error; – Murphy's Law. 	1
2L.2 Human performance and limitations <ul style="list-style-type: none"> – Vision, hearing, information processing, attention and perception, memory. 	1
2L.3 Social psychology <ul style="list-style-type: none"> – Responsibility, motivation, peer pressure, teamwork. 	1
2L.4 Factors affecting performance <ul style="list-style-type: none"> – Fitness, physical and mental health, stress, sleep, fatigue, alcohol, medication, drug abuse. 	1
2L.5 Physical environment <ul style="list-style-type: none"> – Working environment (climate, noise, illumination). 	1
2L.6 The 'Dirty Dozen' and risk-mitigation <p>The 'Dirty Dozen':</p> <ul style="list-style-type: none"> — lack of communication — lack of teamwork — lack of assertiveness — complacency — fatigue — stress — lack of knowledge — lack of resources — lack of awareness — distraction — pressure — norms. <p>Risk-mitigation methods</p>	2

MODULE 3L — AVIATION LEGISLATION

MODULE 3L — AVIATION LEGISLATION	Level
3L.1 Regulatory framework <ul style="list-style-type: none"> – Role of the CAA; – Scope and limitations of the regulatory framework. 	1
3L.2 Continuing airworthiness regulations <ul style="list-style-type: none"> – General understanding of the applicable parts of MCAR-66; – General understanding of the applicable parts of MCAR-ML; – General understanding of the applicable parts of MCAR-CAO; – General understanding of MCAR-M, MCAR-CAMO and MCAR-145. 	1
3L.3 Repairs and modifications (MCAR-ML) <ul style="list-style-type: none"> – Approval of changes (repairs and modifications); – Standard changes and standard repairs. 	2
3L.4 Maintenance data (MCAR-ML) <ul style="list-style-type: none"> – Airworthiness Directives (ADs), safety information bulletins (SIBs) – Service bulletins (SBs), instructions for continuing airworthiness (ICAs) (AMM, IPC, etc.), aircraft flight manual (AFM), maintenance records, maintenance programmes; 	2
3L.5 Licence privileges and how to exercise them properly (MCAR-66, MCAR-ML) <p>Conditions for release to service:</p> <ul style="list-style-type: none"> – in a maintenance organisation; – is independent certifying staff; – release-to-service procedures. 	2

MODULE 4L — WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC

MODULE 4L — WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC	Level
4L.1 Airframe wooden/combination of metal tube and fabric <ul style="list-style-type: none"> – General construction principles for wooden structures covered with fabric, metal-tube structures covered with fabric, and combination of wooden and metal-tube structures; – Wood as a technical material (heartwood, sapwood, grain, etc.); – Wood defects (types, acceptable/ not acceptable); – Different woodcuts (tangential cuts, radial cuts, etc.) and their properties (tangential cuts, radial cuts, etc.); – Metal tubing (mechanical and stress properties of metal tubes); – Types of welding and welding joints; – General characteristics of aircraft coverings; – General characteristics of paint; – Transmission of loads in and between structures 	2
4L.2 Material <ul style="list-style-type: none"> – Types of wood (solid wood, laminated wood, plywood, wood composites), suitable wood materials and their properties (spruce, fir, etc.), wood defects (acceptable / not acceptable), stability, deterioration (temperature, humidity, ageing, etc.); – Types of covering and technologies (natural and synthetic polymers), deterioration; – Types of glues, adhesives, paints and other associated materials; – Types of metal-tubing material (steel, light alloy tubes, etc.); – Welding seams, fittings, screws and bolts (material and properties); – Proper storage of those materials; – Plastics (overview and understanding of their properties) 	2
4L.3 Identifying damages and defects <ul style="list-style-type: none"> – Inspection procedures; – Damage identification in wooden structures (heavy landing, rot, glue failure, fungi, shrinkage, stress damage, cracks, fatigue, etc.); – Damage identification in metal-tube structures (hard landing, stress, corrosion, fatigue, dents, cracks, fatigue, etc.); – Damage identification in welded seams; – Damage identification in fabric coverings (tears, strains, UV damage, hard landing, etc.) 	3
4L.4 Standard repairs and maintenance procedures <ul style="list-style-type: none"> – Repair and conservation of wooden aircraft structures: wing rib, wing spar, bolt and brushing holes, patches (fabric, splayed, surface, plug, scarf); – Repair and reapplication of fabric on aircraft (fabric, tape, lacing, threads, seams, fabric protection, stitching, knots, fasteners, finishing tape, rings and grommets, dope); – Repair and corrosion protection/prevention methods for metal-tube aircraft structures (welding, patch plates, reinforcement tubes, sleeves, etc.); – Repair, removal and application of paint and dope on airframes in wooden / combination of metal tube and fabric (surface preparation, application and finish) 	3

MODULE 5L — COMPOSITE STRUCTURE

MODULE 5L — COMPOSITE STRUCTURE	Level
5L.1 Airframe fibre-reinforced plastic (FRP) <ul style="list-style-type: none"> – General construction principles of airframes in FRP and its properties; – Characteristics of laminated structures (matrix and fibres); – Fibre (fibre orientation, strength characteristics, isotropic, anisotropic, filament, strands, tows, yarns, rovings, impreg and prepreg); – Fabric weave styles (plain weave, twill weave, atlas weave, unidirectional) and non-woven material (stitched and knotted) and their characteristics; – Matrix (thermosetting, thermoplastic, curing stages); – Characteristics of sandwich structures and their supporting cores (honeycombs, foams, wooden cores, pseudo-cores); – General characteristics of accelerators and additives/modifiers; – Transmission of loads in and between structures 	2
5L.2 Material <ul style="list-style-type: none"> – Types of fibres (fibreglass, E-glass, aramid, carbon/graphite, boron, ceramic, lightning protection fibre); – Types of matrices (different types, properties and application); – Types of resin filler materials (fumed silica, glass powder, hollow glass, phenolic and plastic microballoons, cotton, floc, colour pigments, fire retardants); – Types of sandwich structure core materials (honeycombs: aramid paper, kraft paper, thermoplastic, aluminium, fibreglass, carbon; foams: polystyrene, phenolic, polyurethane, polypropylene, PVC, polymethacrylimide; balsa wood); – Behaviour, interaction, and technological aspects of composites made of those materials; – Storage and handling of those materials 	2
5L.3 Identifying damages and defects <ul style="list-style-type: none"> – Inspection procedures (visual inspection, tapping, NDT testing, etc.); – Types of manufacturing defects and damages and their causes (fibre breakage, matrix imperfections, delamination, debonding, improper drilling, environmental degradation, impact damage, fatigue, erosion, corrosion, UV damage, hard landing, stress, etc.) 	3
5L.4 Standard repair and maintenance procedures <ul style="list-style-type: none"> – Repairs of aircraft structures: wing, rib, wing spar, aerofoil, bolt and brushing holes, patches, sandwich core and faceplate repairs, bolted and bonded repairs; – Proper construction and repair fittings, and load-bearing points for composites and composite sandwich structures; – Creation and use of repair moulds from the airframe or intact parts (types, procedures, coatings, etc.); – Proper procedure for the mixing of resins, fibre layering and curing of composites; – Bonding metals and other materials; – Composite painting and finish. 	3

MODULE 6L — METALLIC STRUCTURE

MODULE 6L — METALLIC STRUCTURE	Level
6L.1 Metallic Airframe <ul style="list-style-type: none"> – General construction principles for metal-structure airframes; – General knowledge of the properties of metal as a technical material (classification; physical, mechanical and electrical properties; manufacturing properties; chemical properties); – General knowledge of the properties of pure metals and alloys; – Metal grain structure of pure metals and alloys and its impact on behaviour (grain boundaries; corrosion; hardening; annealing; differences between forged, machined and cast metals); – Stresses in structural members (tension, compression, torsion, shearing, bearing, bending); – Types of corrosion and corrosion protection (electrochemical oxidation, galvanic corrosion, stress-corrosion cracking, corrosion in passivated materials, high-temperature corrosion); – Types of rivets and fasteners (solid shank rivet, blind rivets, self-plugging rivets (mechanical and friction lock), pull-thru rivets, pin rivets, head styles, taper-lok, rivet nut, lockbolt, high shear fastener, identification, measuring); – Types of welding and welding joints; – Transmission of loads in and between structures 	2
6L.2 Materials <ul style="list-style-type: none"> – Types of iron and steel, and their alloys in aviation (cast, forged, tempering, corrosion, strength properties); – Types of aluminium and aluminium alloys in aviation in airframes, rivets, and fasteners (strength properties, corrosion); – Common alloying elements for steel and aluminium (influence on the mechanical and physical properties of the alloy); – Common paint and surface protection materials; – Common adhesives for use with metals 	2
6L.3 Identifying damages and defects <ul style="list-style-type: none"> – Inspection procedures (sheet metal, structure, bonded joints, soldered joints, welded and brazed joints, riveted joints, corrosion); – Identification and classification of cracks, fatigue, and corrosion in metallic structures. 	3
6L.4 Standard repair and maintenance procedures <ul style="list-style-type: none"> – Metal and sheet metal (marking out and calculation of bend allowance, cutting, drilling, bending and forming, inspection of metal work); – Welding, brazing, soldering and bonding (soldering methods, welding and brazing methods, bonding methods); – Riveting (riveted joints, rivet spacing and pitch; tools used for riveting and dimpling; inspection of riveted joints); – Repairing by patching, insertion, and replacement of parts; – Corrosion treatment; – Problems in multiple-material systems. 	3

MODULE 7L — AIRFRAME: GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS

MODULE 7L — AIRFRAME: GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS	Level
<p>7L.1 Flight control system</p> <p>Aerodynamics and flight controls:</p> <ul style="list-style-type: none"> – Airflow around a body; – Boundary layer, laminar flow and turbulent flow; – Thrust, weight, aerodynamic resultant; – Generation of lift and drag angle of attack, polar curve, stall. <p>Operation and effect of roll control, pitch control, yaw control and rudder limiters:</p> <ul style="list-style-type: none"> – Control using dual-purpose controls; – High-lift devices, slots, slats, flaps, flaperons; – Drag-inducing devices, lift dumpers, speed brakes, dive brakes; – Effects of wing fences, saw tooth leading edges; – Boundary layer control using vortex generators, stall wedges or leading-edge devices; <p>Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels</p>	1
<p>7L.2 Airframe structure – gliders and aeroplanes</p> <ul style="list-style-type: none"> – Fuselage: construction (truss type, monocoque, semimonocoque), attach points (wing, tailplane, undercarriage); – Wings: construction (monospar, multispar, box beam), configurations (cantilever, semicantilever, strut/wire braced), fairing; – Stabilisers: construction, control surface attachments; – Flight control surfaces: construction and attachment, balancing (mass and aerodynamics); – Tow hooks (Schweizer and Tost hook); – Aircraft assembly, storage, jacking, chocking, securing and associated safety precautions; – Effects of environmental conditions on aircraft handling and operation 	1
<p>7L.3 Air conditioning (ATA 21)</p> <p>Heating and ventilation of small aircraft</p>	1
<p>7L.4 Electrical power, cables and connectors (ATA 24)</p> <ul style="list-style-type: none"> – Installation and operation of batteries; – Power generation / power sources (AC/DC) on small aircraft, voltage regulation, power distribution and circuit protection; – Cable types, construction and characteristics, high-tension and coaxial cables, testing and installation precautions; – Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes, pin insertion and removal; – Crimping (crimping, tools, testing of crimp joints); – Continuity, insulation and bonding techniques and testing; – Wiring protection techniques (cable looming and loom support, cable clamps, protective sleeving techniques (including heat shrink wrapping), shielding). 	2
<p>7L.5 Equipment and furnishing (ATA 25)</p>	2

<ul style="list-style-type: none"> – Emergency equipment requirements; – Seats, harness and belts. 	
7L.6 Fire protection and other safety systems (ATA 26) <ul style="list-style-type: none"> – Portable fire extinguisher – Rescue systems (safety parachute, recover parachute, launching systems, including safety measures for pyrotechnics) 	2
7L.7 Flight controls (ATA 27) <ul style="list-style-type: none"> – Primary controls: aileron, elevator/stabilator, rudder, dual-purpose controls (stabilator, ruddervator, flaperons); – Secondary controls: elevator trim systems, wing flaps, slats and spoilers / drive breaks; – System operation: manual; – Gust locks, balancing and rigging of flight controls; – Simple stall-warning systems. 	3
7L.8 Fuel system (ATA 28) <ul style="list-style-type: none"> – System layout; – Fuel tanks; – Supply systems; – Indications and warnings; – Refuelling and defuelling. 	2
7L.9 Hydraulic power (ATA 29) <ul style="list-style-type: none"> – System layout; – Hydraulic fluids; – Hydraulic reservoirs and accumulators, pressure generation (electric, mechanical), filters, pressure control, power distribution, indication and warning systems 	2
7L.10 Ice and rain protection (ATA 30) <ul style="list-style-type: none"> – Hydrophobic coatings; – Pitot probe heating 	1
7L.11 Landing gear (ATA 32) <ul style="list-style-type: none"> – Construction (tricycle, tailwheel, outrigger wheels, skids), shock absorbing; – Extension and retraction systems: normal and emergency operation; – Indications and warnings; – Wheels, brakes, tyres, and steering; – Standard repair and maintenance procedures for the landing gear. 	2
7L.12 Lights (ATA 33) <ul style="list-style-type: none"> – External lights: navigation, anticollision, landing, taxiing; – Internal lights: cockpit. 	2
7L.13 Oxygen (ATA 35) <ul style="list-style-type: none"> – System layout: storage system (containers), delivery system (continuous flow, diluter demand and pressure demand) and masks/nasal cannula; – System operation, including charging and discharging; – The 'PRICE' check 	2

<p>7L.14 Pneumatic/vacuum (ATA 36)</p> <ul style="list-style-type: none"> – System layout; – Sources, pumps, control and distribution; – Indication and warnings. 	2
<p>7L.15 Water ballast (ATA 41)</p> <p>Water tanks (main tank, fin tank), drain valves, vents.</p>	2
<p>7L.16 Fasteners</p> <ul style="list-style-type: none"> – Screw threads: nomenclature, forms, dimensions and tolerances, and measuring; – Bolts, studs and screws: types (specifications, identification, markings, international standards), nuts (self-locking, anchor, standard types), machine screws (aircraft specifications), studs (types and uses, insertion and removal), self-tapping screws, dowels; – Locking devices: tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quickrelease fasteners, keys, circlips, cotter pins; – Aircraft rivets: types of solid and blind rivets: specifications and identification, heat treatment. 	2
<p>7L.17 Pipes, hoses and connectors</p> <ul style="list-style-type: none"> – Types and connectors of pipes and hoses for hydraulic, fuel, oil, pneumatic and air; – Bending, belling/flaring, inspection, testing and installation of pipes and hoses. 	2
<p>7L.18 Springs</p> <p>Types of springs, materials, characteristics, applications, inspection, and testing.</p>	2
<p>7L.19 Bearings</p> <ul style="list-style-type: none"> – Purpose of bearings, loads, material, construction; – Types of bearings, their application, testing, cleaning, inspection, lubrication requirements, and common defects in bearings and their causes. 	2
<p>7L.20 Transmission</p> <ul style="list-style-type: none"> – Gear types, their application, gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns, inspection of gears, backlash/play; – Types, application and inspection of belts and pulleys, chains and sprockets; – Inspection of screw jacks, lever devices, push-pull rod systems. 	2
<p>7L.21 Control cables</p> <ul style="list-style-type: none"> – Types of cables, end fittings, turnbuckles, compensation devices, pulleys, cable system components, Bowden cables and aircraft flexible control systems; – Swaging of end fittings; 	2

<ul style="list-style-type: none"> – Inspection and testing of control cables, Bowden cables, and aircraft flexible control systems. 	
<p>7L.22 Fits and clearances</p> <p>Common system of fits, clearances and tolerances, drill sizes for bolt holes, classes of fits, schedule of fits and clearances for aircraft and engines, limits for bow, twist and wear, standard methods for checking shafts, bearings and other parts.</p>	2
<p>7L.23 Aircraft weight and balance</p> <p>Calculation of centre-of-gravity / balance limits: use of relevant documents, preparation of aircraft for weighing, aircraft weighing.</p>	2
<p>7L.24 Workshop practices and tools</p> <ul style="list-style-type: none"> – Common hand-tool types, power-tool types, precision tool types and equipment, their operation, care, control, calibration, and standards; – Operation, function and use of electrical general test equipment; – Proper handling of engineering drawings, diagrams and standards, and comprehension of the information presented thereupon (symbols, schematics and diagrams); – Use of workshop materials; – Dimensions, allowances and tolerances, standards of workmanship; – Lubrication equipment and methods. 	2
<p>7L.25 Disassembly, inspection, repair, and assembly techniques</p> <ul style="list-style-type: none"> – Types of defects and visual inspection techniques; corrosion removal, assessment and re-protection; – General repair methods, structural repair manual; ageing, fatigue and corrosion control programmes; – Non-destructive inspection techniques, including penetrant, radiographic, eddy current, ultrasonic and borescope methods; – Disassembly and reassembly techniques; – Troubleshooting techniques. 	2
<p>7L.26 Abnormal events</p> <p>Inspection following lightning strike, HIRF penetration, heavy landing, and flight through turbulence.</p>	2
<p>7L.27 Maintenance procedures</p> <p>Maintenance planning, modification procedures, stores procedures, maintenance inspection / quality control / quality assurance, additional maintenance procedures, control of life-limited components.</p>	2

MODULE 8L — POWER PLANT

MODULE 8L — POWER PLANT	Level
8L.1 Engine fundamentals - general <ul style="list-style-type: none"> – Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; – The relationship between force, work, power, energy, velocity, and acceleration; – Mechanical, thermal, and volumetric efficiencies 	2
8L.2 Piston-engine fundamentals and performance <ul style="list-style-type: none"> – Operating principles: 2-stroke, 4-stroke, Otto, Diesel, and Rotary (Wankel); – Piston displacement and compression ratio; – Engine configuration and firing order; – Power calculation and measurement; – Factors that affect engine power; – Mixtures/leaning, pre-ignition. 	2
8L.3 Piston-engine construction <ul style="list-style-type: none"> – Crank case, crank shaft, cam shafts, sumps; – Accessory gearbox; – Cylinder and piston assemblies; – Connecting rods, inlet and exhaust manifolds; – Valve mechanisms; – Propeller reduction gearboxes. 	2
8L.4 Piston-engine fuel system (non-electronic) <ul style="list-style-type: none"> – Carburetors (types, construction and principles of operation, icing and heating); – Fuel injection systems (types, construction, and principles of operation). 	2
8L.5 Starting and ignition systems <ul style="list-style-type: none"> – Starting systems, preheat systems; – Magneto types, construction, and principles of operation; – Ignition harnesses, spark plugs; – Low- and high-tension systems. 	2
8L.6 Air-intake, exhaust and cooling systems <ul style="list-style-type: none"> – Construction and operation of induction systems, including alternate air systems; – Exhaust systems, engine cooling systems — air and liquid. 	2
8L.7 Supercharging/turbocharging <ul style="list-style-type: none"> – Principles and purpose of supercharging and its effects on engine parameters; – Construction and operation of supercharging/turbocharging systems; – System-associated terminology; – Control systems; – System protection. 	2
8L.8 Lubrication systems of piston engines System operation/layout and components.	2
8L.9 Engine indication systems	2

<ul style="list-style-type: none"> – Indication systems specific to general combustion engines (coolant temperature, oil pressure and temperature, exhaust gas temperature, fuel pressure and flow); – Indication systems specific to piston engines (cylinder head temperature, manifold pressure, engine speed); – Indication systems specific to turbine engines (exhaust gas temperature, engine thrust indication, engine speed); – Indication systems specific to electric engines (voltage). 	
8L.10 Electric aircraft engines <ul style="list-style-type: none"> – Types and construction of electric motors (AC and DC motors, rotor, stator, bearings, windings, commutator, self-commutated, externally commutated, outrunner and inrunner, motor cooling, etc.); – Power electronics; – Transformer, transducer, and inverter; – Engine control systems; – Power storage systems (common high-density batteries, chemistry batteries, load cycles, degradation, effects of charging and overcharging, thermal runaway); – Battery management systems (general functions, battery balancing, monitoring); – Wiring of electric power storage, power electronics, and electric motor; – High-energy safety procedures. 	2
8L.11 Turbine-engine fundamentals and performance <ul style="list-style-type: none"> – Constructional arrangement and operation of turbojet and turboprop engines; – Thrust: thrust horsepower, shaft horsepower, specific fuel consumption; – Engine pressure ratio; – Pressure, temperature, and velocity of gas flow; – Engine ratings, static thrust, limitations. 	2
8L.12 Inlet and compressor <ul style="list-style-type: none"> – Compressor inlet; – Axial and centrifugal compressor types, constructional features, operating principles and applications; – Compressor (stator, rotor, blisk, disk, blades, compressor stall and surge); – Compressor ratio. 	2
8L.13 Combustion chamber, starting and ignitions system <ul style="list-style-type: none"> – Constructional features and principles of operation; – Operation of engine start systems and components; – Ignition systems and components (exciter, ignition plugs and glow plugs). 	2
8L.14 Turbine section and exhaust <ul style="list-style-type: none"> – Operation and characteristics of different turbine blade types, nozzle guide vanes; – Gas producer turbine and power turbine, blade-to-disk attachment; – Causes and effects of turbine blade stress and creep; – Engine exhaust nozzle and noise reduction. 	2
8L.15 Other turbine-engine components and systems <ul style="list-style-type: none"> – General knowledge of the type features and principles of bearings and seals in turbine engines; – System operation, layout and components of lubrication systems in small turbine engines (separate lubrication, as part of the fuel system); 	2

<ul style="list-style-type: none"> – System operation, layout and components of air and fuel systems in small turbine engines; – Turboprop reduction gears. 	
8L.16 Turbine-engine inspection and ground operation <ul style="list-style-type: none"> – Standard procedures for starting and ground run-up and interpretation of engine power output and parameters; – Inspection of engine and components to criteria, tolerances and data specified by the engine manufacturer; – Foreign object damage (FOD). 	2
8L.17 Propeller <ul style="list-style-type: none"> – Propeller fundamentals (blade element theory, blade angles, angle of attack, rotational speed, propeller slip, aerodynamic/centrifugal/thrust forces, torque, relative airflow, vibration and resonance); – Propeller construction (methods of construction and materials used in wooden/composite/metal propellers, blade station, blade face, blade shank, blade back/thrust face and hub assembly, fixed pitch, controllable pitch, constant speed propeller, propeller/spinner installation); – Propeller pitch control (speed control and mechanical/electrical pitch change methods, feathering, propeller accumulators, overspeed protection); – Environmental protection (de-icing and metal tipping); – Propeller balancing (static and dynamic) and blade tracking; – Damage assessment, erosion, corrosion, impact damage, delamination and decay; – Standard treatment and repair methods for propellers. 	2
8L.18 Full authority digital engine control (FADEC) <ul style="list-style-type: none"> – Operation of engine control and fuel-metering systems in piston and turbine engines, including electronic engine control (FADEC); – System layout and components. 	2
8L.19 Lubricants and fuel <ul style="list-style-type: none"> – Properties and specifications of standard, alternate and drop-in fuels, fuel additives and lubricants. 	2
8L.20 Engine and propeller installation <ul style="list-style-type: none"> – Construction of nacelles; – Configuration of firewalls, cowlings, acoustic panels, engine mounts, antivibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains; – Extension and retraction systems, including propeller position control; – Propeller installation. 	2
8L.21 Engine monitoring and ground operation <ul style="list-style-type: none"> – Procedures for starting and ground run-up; – Interpretation of engine power output and parameters; – Inspection of engine and components to criteria, tolerances and data specified by the engine manufacturer; – Foreign object damage. 	2
8L.22 Engine/propeller storage and preservation	2

<ul style="list-style-type: none">– Preservation and depreservation of the engine, the propeller and accessories/systems.	
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MODULE 9L — BALLOON: HOT-AIR BALLOONS

MODULE 9L — BALLOONS: HOT-AIR BALLOONS	Level
9L.1 Theory of flight – hot-air balloons Aerostatics and controls: <ul style="list-style-type: none"> – Principles; – Effect on envelopes, wind effect, altitude and temperature effects. 	1
9L.2 General airframe of hot-air balloons Components and assembly of a hot-air balloons: <ul style="list-style-type: none"> – Identification plate; – Envelope; – Heater system / burner; – Suspension cables; – Basket; – Lines and ropes (crown line, actuation line). 	2
9L.3 Envelope <ul style="list-style-type: none"> – Shape and assembly of envelope (poles, equator, panels, gores, special shapes); – Fabrics, seams, and materials; – Crown ring; – Deflation port/parachute and ripping panel; – Load tapes (horizontal and vertical) and rip stoppers; – Turning vent; – Mouth; – Skirt/scoop; – Diaphragms/catenaries (special shapes). 	3
9L.4 Heater system / burner <ul style="list-style-type: none"> – System layout (burner, fuel tanks, fuel lines); – Types of burners (whisper-/cow-burner, main/take-off burner); – Functionality, materials, use, inspection, and care of: <ul style="list-style-type: none"> o fuel tanks (propane cylinders, material, valves, fittings, fuel quantity gauge), o fuel lines / gas hoses, o burner (piezo igniter, pilot light and valve, blast valve, heat exchanger / burner coils, nozzle, etc.). 	3
9L.5 Basket and basket suspension (including alternative devices) <ul style="list-style-type: none"> – Common assembly of and materials for hot-air balloon baskets; – Rigging points, burner frame, burner support rods, metal frame, basket padding and leather trim; – Basket weave, grab handles, cylinder attachment, take-off aid and rope; – Basket wire and basket wire routing; – Basket floor, basket frame / load-bearing frame, sliders, rawhide protective covering. 	3
9L.6 Instruments Basic operation, maintenance and testing of: <ul style="list-style-type: none"> – altimeter (mechanical and electronic); – variometer (mechanical and electronic); 	2

<ul style="list-style-type: none"> – pyrometer / temperature sensors; – Mode S transponder; – VHF radio; – Emergency locator transmitter (ELT) and personal locator beacon (PLB). 	
9L.7 Equipment	2
<ul style="list-style-type: none"> – Required equipment for free-ballooning operation and its care. 	
9L.8 Hot-air balloon handling and storage	2
<ul style="list-style-type: none"> – Ground procedures for hot-air balloons, rigging and launch preparation; – Safe handling of propane; – Effects of environmental conditions on hot-air balloon. 	
9L.9 Disassembly, inspection, repair and assembly techniques	3
<ul style="list-style-type: none"> – Types of defects and visual inspection techniques; – Allowable damage to and tolerance of envelope, basket, lines, ropes, etc.; – Common test procedures (grab test); – General repair methods for envelopes, load ring, ropes and lines, basket; – Inspection methods for envelopes, ropes and lines, basket; – Ageing, fatigue; – Disassembly and reassembly techniques; – Troubleshooting techniques. 	

MODULES 10L — BALLOONS: GAS (FREE/TETHERED) BALLOONS

MODULES 10L — BALLOONS: GAS (FREE/TETHERED) BALLOONS	Level
10L.1 Theory of flight – gas balloons Aerostatics and controls: <ul style="list-style-type: none"> – Principles; – Effect on envelopes, wind effect, altitude and temperature effects. 	1
10L.2 General airframe of gas balloons Components and assembly of a gas balloon: <ul style="list-style-type: none"> – Identification plate; – Envelope; – Valve; – Netting; – Load ring (hoop); – Basket; – Lines and ropes (drag rope, mooring line, valve line, emergency opening rope, ripping line, neckline) 	2
10L.3 Envelope <ul style="list-style-type: none"> – Shape and assembly of envelope (poles, equator, panels); – Fabrics, seams, and materials; – Deflation opening and parachute; – Load belt; – Ripping panel; – Appendix; – Emergency opening; – Holding-down patches; – Ballonets; – Electrostatic properties. 	3
10L.4 Netting <ul style="list-style-type: none"> – Netting assembly (net ring, net, mesh); – Mesh dimensions (knots, sizes, angles); – Materials for netting and accessories; – Electrostatic properties 	3
10L.5 Valves, parachutes and other related systems <ul style="list-style-type: none"> – Construction, operation, maintenance and testing of manoeuvring/helium valves, pressure relief valves, gas-tight parachutes, and ballonet fans; – Construction, operation, maintenance and testing of parachute-centring belt and pull-down belts. 	3
10L.6 Load ring <ul style="list-style-type: none"> – Function, material and common problems (steel pipe, strops, toggles) 	3
10L.7 Basket (including alternative devices) Common assembly of and materials for hot-air / gas balloon baskets: <ul style="list-style-type: none"> – Metal frame, basket padding and leather trim; 	3

<ul style="list-style-type: none"> – Basket weave, grab handles, basket strops and toggles, ballast system (bags, support and sand dumpers); – Basket wire and basket wire routing; – Basket floor, basket frame / load-bearing frame, sliders, rawhide protective covering. 	
<p>10L.8 Ropes and lines</p> <p>Functionality, materials, use, inspection, and care of:</p> <ul style="list-style-type: none"> – Shroud lines / envelope ropes / bridles; – Trail rope /drag rope and trail-rope bag; – Holding ropes; – Valve line/ valve cord and parachute rope; – Emergency opening rope; – Appendix pull-close rope; – Appendix anchor line; – Inflation aid. 	3
<p>10L.9 Instruments</p> <p>Basis operation, maintenance and testing of:</p> <ul style="list-style-type: none"> – altimeter (mechanical and electronic); – variometer (mechanical and electronic); – pyrometer / temperature sensors; – Mode S transponder; – VHF radio; – Emergency locator transmitter (ELT) and personal locator beacon (PLB). 	2
<p>10L.10 Tethered gas balloon (TGB) systems</p> <p>Functionality, operation, materials, use, inspection and care of:</p> <ul style="list-style-type: none"> – Launch platform; – Winch system: winch (electric, hydraulic, emergency operation), tether cable (cable, sheaves, swivel, clamps), and control panel; – Gondola (metal-tubing construction); – Night lighting 	3
<p>10L.11 Equipment</p> <ul style="list-style-type: none"> – Required equipment for free-ballooning and for tethered operations and its care. 	2
<p>10L.12 Gas-balloon handling and storage</p> <ul style="list-style-type: none"> – Ground procedures and mooring for gas balloons and tethered gas balloons, ballasting, rigging and launch preparation; – Safe handling of hydrogen, helium, illuminating gas, and other lifting gases; – Lifting gas (charging, purifying and leak testing, pressure monitoring); – Effects of environmental conditions on gas-balloon handling. 	2
<p>10L.13 Disassembly, inspection, repair and assembly techniques</p> <ul style="list-style-type: none"> – Types of defects and visual inspection techniques; – Allowable damage to and tolerance of envelope, basket, lines, ropes, etc.; – Common test procedures (grab test, tensile strength, tear growth, porosity, electric resistivity, etc.); 	3

<ul style="list-style-type: none">– General repair methods for envelopes, load ring, ropes and lines, basket/gondola;– Inspection methods for envelopes, load ring, ropes and lines, basket/gondola (especially for steel frames and welds on TGB gondolas);– Ageing, fatigue and corrosion control programmes;– Disassembly and reassembly techniques;– Troubleshooting techniques.	
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MODULES 11L — AIRSHIPS: HOT-AIR/GAS AIRSHIPS

MODULES 11L — AIRSHIPS: HOT-AIR/GAS AIRSHIPS	Level
11L.1 Theory of flight and control of airships <ul style="list-style-type: none"> – Control using fins, rudders and elevators; – Aerodynamic lift and aerodynamic balance; – Stability and control; – Free ballooning; – Operation of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels; – Vectored thrust; – Fire and lightning protection. 	2
11L.2 Airships airframe structure – general concepts <ul style="list-style-type: none"> – Classification of airships (rigid airship, semi-rigid airship, non-rigid airship); – Construction of semi-rigid airships (envelope, ballonnet, membranes, nose cone, internal structures, keel, trusses, longerons, suspension lines); – Construction of non-rigid airships (envelope, ballonnet, catenary curtains, suspension lines, air scoops); – Attachment of stabilisers and control surfaces to the airframe. 	2
11L.3 Airship Envelope <ul style="list-style-type: none"> – Nose cone battens / bow strips; – Catenary systems (catenary curtain, support/suspension cables); – Ballonets and their positioning (forward, aft); – Air systems (air scoops, ballonnet fans, empennage air system, dampers and transfer fans). 	2
11L.4 Gondola <ul style="list-style-type: none"> – General knowledge of gondola construction (metal-tubing gondolas, metal-structure gondolas, composite gondolas); – Doors, windows, and hatches; – Attachment of the gondola to the airframe/envelope; – Gondola layout, equipment and furnishing (emergency equipment requirements, seats, harnesses and belts); – Simple water/waste systems in airships; – Gondola heating and ventilation (ventilations and heating systems, heat exchanger, blower); – Landing gear (construction, shock absorbing, tyres, weight-on-wheels). 	3
11L.5 Airship flight controls (ATA 27) <ul style="list-style-type: none"> – Primary controls (rudder, elevator, asymmetric thrust, thrust vectoring); – Trim control; – System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; – Balancing and rigging. 	3
11L.6 Electrical power (ATA 24) <ul style="list-style-type: none"> – Installation and operation of batteries; – DC power generation; – AC power generation; 	3

<ul style="list-style-type: none"> – Voltage regulation; – Power distribution; – Wiring, electrical connections; – Inverters, transformers, rectifiers; – Circuit protection; – External/ground power. 	
11L.7 Lights (ATA 33) <ul style="list-style-type: none"> – External: navigation, anticollision, landing, taxiing, ground approach light, aft landing light; – Internal: flight compartment (cockpit) and passenger compartment (cabin); – Emergency. 	2
11L.8 Ice and rain protection <ul style="list-style-type: none"> – Windscreen wipers and windscreen de-misting systems; – Surface de-icing systems 	3
11L.9 Fuel system (ATA 28) <ul style="list-style-type: none"> – System layout; – Fuel tanks: venting, draining – Supply systems; – Cross-feed and transfer; – Indications and warnings; – Refuelling and defuelling 	2
11L.10 Engine and propellers in airships <ul style="list-style-type: none"> – General understanding of engine layout, thrust vectoring, swivel systems, ducted propellers and control systems. 	2
11L.11 Airship handling and storage <ul style="list-style-type: none"> – Ground procedures and mooring with and without mooring mast, ballasting, hanging, rigging and launch preparation; – Lifting gas (charging, purifying and leak testing, pressure monitoring); – Effects of environmental conditions on airship handling. 	2
11L.12 Disassembly, inspection, repair and assembly techniques <ul style="list-style-type: none"> – Types of defects and visual inspection techniques; – Corrosion removal, assessment and re-protection; – General repair methods, structural repair manual; – Ageing, fatigue and corrosion control programmes; – Non-destructive inspection techniques; – Disassembly and reassembly techniques; – Troubleshooting techniques. 	2

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS	Level
<p>12L.1 Radio Com/ELT</p> <p>Fundamentals of radio-wave propagation, antennas, transmission lines, communication, receiver, and transmitter.</p> <p>Working principle of:</p> <ul style="list-style-type: none"> – Emergency locator transmitters (ELTs); – Very-high-frequency (VHF) communications; – installation and testing of ELTs and VHF radio and antennas. 	2
<p>12L.2 Transponder and FLARM</p> <ul style="list-style-type: none"> – Air traffic control transponder, secondary surveillance radar (basic operation, configuration, modes); – FLARM; – Installation and testing. 	2
<p>12L.3 Instruments</p> <ul style="list-style-type: none"> – Pitot-static: altimeter, airspeed indicator, vertical speed indicator, total energy probes; – Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; – Compasses: direct reading, remote reading; – Angle-of-attack indication, stall-warning systems; – Glass and analogue cockpit; – Indications of other aircraft systems; – Installation and testing of instruments. 	2
<p>12L.4 Avionics general test equipment</p> <ul style="list-style-type: none"> – Operation, function, and use of general test equipment for avionics. 	1

Appendix VIII Basic examination standard for category L aircraft maintenance licence

- (a) The standardisation basis for examinations related to the Appendix VII basic knowledge requirements shall be as follows:
- (i) all examinations must be carried out using the multiple-choice question format as specified in point (ii). The incorrect alternatives must seem equally plausible to anyone ignorant of the subject. All of the alternatives should be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers should correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions; they must not be mere random numbers;
 - (ii) each multiple-choice question must have three alternative answers of which only one must be the correct answer and the candidate must be allowed a time per module which is based upon a nominal average of 75 seconds per question;
 - (iii) the pass mark for each module is 75 %;
 - (iv) penalty marking (negative points for failed questions) is not to be used;
 - (v) the level of knowledge required in the questions must be proportionate to the level of technology of the aircraft category.
 - (vi) a failed module may not be retaken for at least 90 days from the date of the failed module examination;
 - (vii) the maximum number of attempts for each examination is three in a 12-month period.
- (b) The number of questions per module shall be as follows:
- (i) module 1L 'BASIC KNOWLEDGE': 20 questions.
Time allowed: 25 minutes;
 - (ii) module 2L 'HUMAN FACTORS': 20 questions.
Time allowed: 25 minutes;
 - (iii) module 3L 'AVIATION LEGISLATION': 28 questions.
Time allowed: 35 minutes;
 - (iv) module 4L 'WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC': 40 questions.
Time allowed: 50 minutes;
 - (v) module 5L 'COMPOSITE STRUCTURE': 32 questions.

Time allowed: 40 minutes;

(vi) module 6L 'METALLIC STRUCTURE': 32 questions.

Time allowed: 40 minutes;

(vii) module 7L 'AIRFRAME – GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS': 60 questions.

Time allowed: 75 minutes;

(viii) module 8L 'POWER PLANT': 64 questions.

Time allowed: 80 minutes;

(ix) module 9L 'BALLOONS – HOT-AIR BALLOONS': 36 questions.

Time allowed: 45 minutes;

(x) module 10L 'BALLOONS – GAS (FREE/TETHERED) BALLOONS': 44 questions.

Time allowed: 55 minutes;

(xi) module 11L 'AIRSHIPS – HOT-AIR/GAS AIRSHIPS': 40 questions.

Time allowed: 50 minutes;

(xii) Module 12L 'RADIO COM/ELT/TRANSPONDER/INSTRUMENTS': 20 questions.

Time allowed: 25 minutes.

AMC1 Appendix VIII — Basic examination standard for category L aircraft maintenance licence

NUMBER OF QUESTIONS PER SUBMODULE

The tables below show the number of questions recommended for each submodule. Justified deviations from these values are also acceptable, provided that the sum of the questions for the submodules equals the total number for a given module.

[[Tables should be green]]

MODULE 1L — BASIC KNOWLEDGE

MODULE 1L — BASIC KNOWLEDGE	Nr of questions
Total number for the module:	20
1L.1 Mathematics	4
1L.2 Physics	5
1L.3 Electrics	4
1L.4 Aerodynamics/aerostatics	2
1L.5 Workplace safety and environmental protection	5

MODULE 2L — HUMAN FACTORS

MODULE 2L — HUMAN FACTORS	Nr of questions
Total number for the module:	20
2L.1 General	3
2L.2 Human performance and limitations	2
2L.3 Social psychology	2
2L.4 Factors affecting performance	4
2L.5 Physical environment	4
2L.6 The 'Dirty Dozen' and risk-mitigation	5

MODULE 3L — AVIATION LEGISLATION

MODULE 3L — AVIATION LEGISLATION	Nr of questions
Total number for the module:	28
3L.1 Regulatory framework	4
3L.2 Continuing airworthiness regulations	6
3L.3 Repairs and modifications (MCAR-ML)	5
3L.4 Maintenance data (MCAR-ML)	5

3L.5 Licence privileges and how to exercise them properly (MCAR-66, MCAR-ML)	8
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MODULE 4L — WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC

MODULE 4L — WOODEN AND/OR METAL-TUBE STRUCTURE COVERED WITH FABRIC	Nr of questions
Total number for the module:	40
4L.1 Airframe wooden/combination of metal tube and fabric	8
4L.2 Material	8
4L.3 Identifying damages and defects	12
4L.4 Standard repairs and maintenance procedures	12

MODULE 5L — COMPOSITE STRUCTURE

MODULE 5L — COMPOSITE STRUCTURE	Nr of questions
Total number for the module:	32
5L.1 Airframe fibre-reinforced plastic (FRP)	6
5L.2 Material	6
5L.3 Identifying damages and defects	10
5L.4 Standard repair and maintenance procedures	10

MODULE 6L — METALLIC STRUCTURE

MODULE 6L — METALLIC STRUCTURE	Nr of questions
Total number for the module:	32
6L.1 Metallic Airframe	6
6L.2 Materials	6
6L.3 Identifying damages and defects	10
6L.4 Standard repair and maintenance procedures	10

MODULE 7L — AIRFRAME: GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS

MODULE 7L — AIRFRAME: GENERAL, MECHANICAL AND ELECTRICAL SYSTEMS	Nr of questions
Total number for the module:	60
7L.1 Flight control system	4
7L.2 Airframe structure – gliders and aeroplanes	4
7L.3 Air conditioning (ATA 21)	1
7L.4 Electrical power, cables and connectors (ATA 24)	3
7L.5 Equipment and furnishing (ATA 25)	2
7L.6 Fire protection and other safety systems (ATA 26)	2
7L.7 Flight controls (ATA 27)	3
7L.8 Fuel system (ATA 28)	2
7L.9 Hydraulic power (ATA 29)	2
7L.10 Ice and rain protection (ATA 30)	1
7L.11 Landing gear (ATA 32)	3
7L.12 Lights (ATA 33)	1
7L.13 Oxygen (ATA 35)	1
7L.14 Pneumatic/vacuum (ATA 36)	1
7L.15 Water ballast (ATA 41)	1
7L.16 Fasteners	2
7L.17 Pipes, hoses and connectors	2
7L.18 Springs	1
7L.19 Bearings	1
7L.20 Transmission	2
7L.21 Control cables	3
7L.22 Fits and clearances	1
7L.23 Aircraft weight and balance	2
7L.24 Workshop practices and tools	4
7L.25 Disassembly, inspection, repair, and assembly techniques	4
7L.26 Abnormal events	3
7L.27 Maintenance procedures	4

MODULE 8L — POWER PLANT

MODULE 8L — POWER PLANT	Nr of questions
Total number for the module:	64
8L.1 Engine fundamentals - general	2
8L.2 Piston-engine fundamentals and performance	2
8L.3 Piston-engine construction	3
8L.4 Piston-engine fuel system (non-electronic)	2
8L.5 Starting and ignition systems	3
8L.6 Air-intake, exhaust and cooling systems	2
8L.7 Supercharging/turbocharging	2
8L.8 Lubrication systems of piston engines	2
8L.9 Engine indication systems	3
8L.10 Electric aircraft engines	9
8L.11 Turbine-engine fundamentals and performance	2
8L.12 Inlet and compressor	2
8L.13 Combustion chamber, starting and ignitions system	2
8L.14 Turbine section and exhaust	2
8L.15 Other turbine-engine components and systems	2
8L.16 Turbine-engine inspection and ground operation	3
8L.17 Propeller	7
8L.18 Full authority digital engine control (FADEC)	2
8L.19 Lubricants and fuel	3
8L.20 Engine and propeller installation	4
8L.21 Engine monitoring and ground operation	3
8L.22 Engine/propeller storage and preservation	2

Note: In accordance with Appendix VII ‘1. Modularisation’ to Annex III, Module 8L training subjects for L5 category AML and, therefore, the number of questions, should be limited to the relevant propulsion system. As such, in the above table, certain submodules may not be applicable and should not be taken into account, and the total number of questions should also be adapted accordingly.

MODULE 9L — BALLOON: HOT-AIR BALLOONS

MODULE 9L — BALLOONS: HOT-AIR BALLOONS	Nr of questions
Total number for the module:	36
9L.1 Theory of flight – hot-air balloons	2
9L.2 General airframe of hot-air balloons	3
9L.3 Envelope	4
9L.4 Heater system / burner	4
9L.5 Basket and basket suspension (including alternative devices)	4
9L.6 Instruments	5
9L.7 Equipment	2
9L.8 Hot-air balloon handling and storage	4
9L.9 Disassembly, inspection, repair and assembly techniques	8

MODULES 10L — BALLOONS: GAS (FREE/TETHERED) BALLOONS

MODULES 10L — BALLOONS: GAS (FREE/TETHERED) BALLOONS	Nr of questions
Total number for the module:	44
10L.1 Theory of flight – gas balloons	2
10L.2 General airframe of gas balloons	3
10L.3 Envelope	3
10L.4 Netting	1
10L.5 Valves, parachutes and other related systems	1
10L.6 Load ring	1
10L.7 Basket (including alternative devices)	4
10L.8 Ropes and lines	2
10L.9 Instruments	5
10L.10 Tethered gas balloon (TGB) systems	8
10L.11 Equipment	2
10L.12 Gas-balloon handling and storage	4
10L.13 Disassembly, inspection, repair and assembly techniques	8

MODULES 11L — AIRSHIPS: HOT-AIR/GAS AIRSHIPS

MODULES 11L — AIRSHIPS: HOT-AIR/GAS AIRSHIPS	Nr of questions
Total number for the module:	40
11L.1 Theory of flight and control of airships	3
11L.2 Airships airframe structure – general concepts	3
11L.3 Airship Envelope	3
11L.4 Gondola	6
11L.5 Airship flight controls (ATA 27)	2
11L.6 Electrical power (ATA 24)	3
11L.7 Lights (ATA 33)	1
11L.8 Ice and rain protection	2
11L.9 Fuel system (ATA 28)	3
11L.10 Engine and propellers in airships	2
10L.11 Airship handling and storage	4
10L.12 Disassembly, inspection, repair and assembly techniques	8

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS	Nr of questions
Total number for the module:	20
12L.1 Radio Com/ELT	6
12L.2 Transponder and FLARM	5
12L.3 Instruments	8
12L.4 Avionics general test equipment	1

Appendix IX Assessment method for the multimedia-based training (MBT)

1. The purpose of this Appendix is to establish the requirements for the assessment and approval by the CAA of any course that includes MBT in accordance with point 66.B.135.

This Appendix may be used for the assessment of other training courses if the CAA decides that the assessment method laid down in this Appendix are appropriate for such other courses.

The assessment will be conducted by the CAA against all the criteria laid down in Table (A), grouped in four categories from (a) to (d). The CAA will clearly identify in the table the MBT product being assessed and its production and update versions.

2. The CAA will put itself in the position of the student or the end user and will rate each criterion listed in Table (A) individually on a rating scale from 1 to 5, as follows:
 - 1: Not acceptable. Does not meet the required criteria.
 - 2: Partially acceptable, but improvement is needed to meet the required criteria.
 - 3: Acceptable. Meets the required criteria.
 - 4: Good. Meets the required criteria with enhancements made.
 - 5: Excellent. Exceeds the required criteria.
3. If one or more of the criteria is rated below 3, an alternative learning process will be requested by the CAA in order to enhance the suitability of the product to an acceptable level.
4. Once the CAA has rated each of the individual criteria listed in Table (A) , the following combined rating scale will be used by the CAA to determine the overall suitability level for each MBT learning resource:
 - 100–80: Excellent learning resource. It offers different functionalities and meets the required suitability criteria.
 - 79–60: The learning resource meets the required suitability criteria.
 - 59–40: The learning resource does not allow for a sufficiently worthy educational use. It can be used for ‘informal’ training only.
 - 39–20: The learning resource is below the average. It does not meet several required suitability criteria.

Before approving the product, the CAA will check that the final score of the MBT is equal to or above 60, and that there is no single criterion that is rated below 3.

Table (A): Assessment for the multimedia-based training (MBT)

Assessment table for the multimedia-based training (MBT)		
Product identification:		
Name:	Version:	
		SCORE (1-5)
Category (a) 'academic quality'		
Information reliability	1. The information is reliable.	
Information relevance	2. The information is relevant.	
Category (b) 'pedagogical quality'		
Pedagogical formulation/ construction	3. The quality of the resource simplification is adequate.	
	4. The educational resource presents an appropriate number of overviews and summaries.	
	5. The resource is clearly structured (summaries, plans).	
	6. The structure promotes its use in the pedagogical context.	
Pedagogical strategies	7. The learning objectives are stated.	
	8. The resource includes stimuli to promote learning.	
	9. The resource creates interaction between student and instructor.	
	10. The active engagement of the student is fostered.	
	11. Student-centred learning is present.	
	12. Problem-solving tasks encourage learning.	
	13. The resource enables communication between students.	
	14. The student is able to see their learning progress.	
Student assessment methods	15. The resource provides a self-assessment procedure.	
Category (c) 'didactic quality'		
Learning activities	16. The content refers to real-life situations that the student could possibly face in an actual maintenance environment.	
Learning content	17. The content is adequate to meet the learning objectives.	
Category (d) 'technical quality'		
Design	18. The content and organisation of the learning resource includes the appropriate use of colours, interactivity, graphic quality, animations, and illustrations.	
Browsing	19. Navigation methods are clear, consistent, and intuitive.	
Technological aspects	20. Multimedia techniques promote the transfer of information.	
Final score:		

Notes:

The following will be taken into account by the CAA when assessing the MBT against the individual criteria listed in Table (A):

Categories:

(a) Academic quality

The information presented in the multimedia resource shall have two characteristics:

- (i) Reliability: the information is reliable, current, and relatively free of errors. The information complies with the current regulatory requirements.
- (ii) Relevance: the information is relevant to the learning objectives defined for the course. It supports the student in achieving the learning objectives.

(b) Pedagogical quality

The MBT emphasises the activities which promote the development of the required knowledge and skills.

The main criteria for each product are related to three aspects:

- (i) Pedagogical formulation/construction: it is characterised by the quality of simplification, the presence of summaries as well as the use of diagrams, figures, animations, and illustrations. It evaluates whether the structure of the learning resource promotes its use in a pedagogical context. This refers to the ease of orientation (summary, lesson plan), presence of appropriate interactions, usability (back, forward, scroll boxes, etc.), and communication resources (questions and answers, FAQs, forum, etc.)
- (ii) Pedagogical strategies: teaching and learning styles should be based on active teaching approaches to build meaningful situations related to learning objectives and to learner motivation.
- (iii) Student assessment methods: methods are implemented to measure the achievement of learning objectives.

(c) Didactic quality

- (i) Learning activities: the content refers to real-life situations the student could possibly face in an actual maintenance environment.
- (ii) Learning content: the content is adequate to meet the learning objectives.

(d) Technical quality

This section assesses the design, browsing and technological aspects of the learning resources:

- (i) Design: the content and organisation of the learning resource shall promote the appropriate use of colours, interactivity, graphic quality for selected images, animations, and illustrations.

- (ii) Browsing: while navigating, the student should be able to find a plan, an index, or a detailed table of contents. The suggested choices or guidelines shall be clear and the groupings within the menus shall be consistent.
- (iii) Technological aspects: multimedia techniques aim to combine and exploit the capacities of any new technology in education to enhance the transfer of knowledge. Therefore, the system shall favour the use of animations, simulations, or any other interactive elements.

APPENDICES TO THE AMCs

Appendix I to AMC to MCAR-66 - Aircraft Type Ratings for MCAR-66 Aircraft Maintenance Licence

The following aircraft type ratings will be used to ensure a common standard.

Notes on type rating (TR) endorsement covering several models/variants:

The endorsement of a type rating (TR) on the aircraft maintenance licence (AML), covering several models/variants, does not automatically imply that the AML holder has acquired the appropriate knowledge on each model/variant. In fact, the AML holder may only have received TR training and/or gained experience that was limited to one or several models or variants.

To demonstrate adequate competence on the relevant model(s)/variant(s), the AML holder and/or the maintenance organisation where the AML holder is contracted/employed is (are) responsible to verify that the model/variant has been adequately covered by the TR course or gained experience and is up to date.

Further explanation can be found in AMC 66.A.20(b)3 and AMC 145.A.35(a).

Notes on when and how the licences will be modified:

The CAA will implement the new type rating list once this Regulation becomes effective. New applications for type ratings that are no longer certified by CAA will not be accepted. Licences with the old type ratings will be endorsed with the amended type ratings, whenever the CAA deems necessary or the holder requests it; however, no later than the next renewal of the licence.

Notes on aircraft modified by a Supplemental Type Certificate (STC):

- It is not the intention of this document to include all aircraft modified by STCs.
- When an aircraft has been modified by an STC for installation of another engine, the MCAR-66 type rating of this aircraft may change i.e. from Group 2 to Group 1. This is not reflected in this document. In case the applicant to a licence faces such a case, he/she can inform the CAA and a new type rating will be defined by the CAA.

In the following tables:

- The column “TC Holder” includes the TC holder as defined in the TCDS (EASA, FAA or other) or the Specific Airworthiness Specifications (SAS).
- Some TC holders’ designations may include ‘Aircraft with an SAS’, this means that the aircraft listed under this TC holder designation is considered an ‘orphan aircraft’.
- In Group 3, the column ‘Type of structure’ intends to assist in identifying the experience required for this type with a view to removing existing limitations on the licence.
- In Group 4, the column ‘Type of structure’ intends to assist in identifying the required ‘L’ subcategories.

- Wooden structure covered with fabric is considered to fall under wooden structure. For Aeroplanes with a combination of structures; e.g. metal tubing fuselage and wooden wings, both experience ‘metal tube covered with fabric’ and ‘wooden structure’ are required.
- In Group 3, the column ‘MTOM’ intends to assist in identifying the aeroplane types where the maximum take-off mass (MTOM) is:
 - above 2t requires a B1.2 and B2 or B2L licence, or
 - 2t and below requires a B1.2 or B3 and B2 or B2L licence.
- The column ‘NOTE’ includes some useful information, when relevant, e.g. ELA1 or ELA2 aircraft.

GROUP 1 AEROPLANES

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
AIRBUS	A300 B1		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B2-1A		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B2-1C		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B2-202		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B2-203		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B2K-3C		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B4-102		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B4-103		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B4-203		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B4-2C		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 C4-203		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 F4-203		Airbus A300 basic model (GE CF6)	
AIRBUS	A300 B2-320		Airbus A300 basic model (PW JT9D)	
AIRBUS	A300 B4-120		Airbus A300 basic model (PW JT9D)	
AIRBUS	A300 B4-220		Airbus A300 basic model (PW JT9D)	
AIRBUS	A300 B4-601		Airbus A300-600 (GE CF6)	
AIRBUS	A300 B4-603		Airbus A300-600 (GE CF6)	
AIRBUS	A300 B4-605 R		Airbus A300-600 (GE CF6)	
AIRBUS	A300 C4-605 R Variant F		Airbus A300-600 (GE CF6)	
AIRBUS	A300 F4-605 R		Airbus A300-600 (GE CF6)	
AIRBUS	A300 B4-622		Airbus A300-600 (PW 4000)	
AIRBUS	A300 B4-622 R		Airbus A300-600 (PW 4000)	
AIRBUS	A300 F4-622 R		Airbus A300-600 (PW 4000)	
AIRBUS	A300 B4-620		Airbus A300-600 (PW JT9D)	
AIRBUS	A300 C4-620		Airbus A300-600 (PW JT9D)	
AIRBUS	A300F4-608ST	Beluga	Airbus A300-600ST (GE CF6)	
AIRBUS	A310-203		Airbus A310 (GE CF6)	
AIRBUS	A310-203 C		Airbus A310 (GE CF6)	
AIRBUS	A310-204		Airbus A310 (GE CF6)	
AIRBUS	A310-304		Airbus A310 (GE CF6)	
AIRBUS	A310-308		Airbus A310 (GE CF6)	
AIRBUS	A310-324		Airbus A310 (PW 4000)	
AIRBUS	A310-325		Airbus A310 (PW 4000)	
AIRBUS	A310-221		Airbus A310 (PW JT9D)	
AIRBUS	A310-222		Airbus A310 (PW JT9D)	
AIRBUS	A310-322		Airbus A310 (PW JT9D)	
AIRBUS	A318-121		Airbus A318 (PW 6000)	
AIRBUS	A318-122		Airbus A318 (PW 6000)	
AIRBUS	A318-111		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A318-112		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A319-111		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A319-112		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A319-113		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A319-114		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A319-115		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A320-211		Airbus A318/A319/A320/A321 (CFM56)	

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
AIRBUS	A320-212		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A320-214		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A320-215		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A320-216		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A321-111		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A321-112		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A321-211		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A321-212		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A321-213		Airbus A318/A319/A320/A321 (CFM56)	
AIRBUS	A319-151N	A319 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A319-152N	A319 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A319-153N	A319 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A320-251N	A320 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A320-252N	A320 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A320-253N	A320 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A321-251N	A321 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A321-251NX	A321 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A321-252N	A321 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A321-252NX	A321 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A321-253N	A321 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A321-253NX	A321 NEO	Airbus A319/A320/A321 (CFM LEAP-1A)	
AIRBUS	A319-171N	A319 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A319-172N	A319 NEO	Airbus A319/A320/A321 (IAE PW1100G)	TC not yet released
AIRBUS	A319-173N	A319 NEO	Airbus A319/A320/A321 (IAE PW1100G)	TC not yet released
AIRBUS	A320-271N	A320 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A320-272N	A320 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A320-273N	A320 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A321-271N	A321 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A321-271NX	A321 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A321-272N	A321 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A321-272NX	A321 NEO	Airbus A319/A320/A321 (IAE PW1100G)	
AIRBUS	A319-131		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A319-132		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A319-133		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A320-231		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A320-232		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A320-233		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A321-131		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A321-231		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A321-232		Airbus A319/A320/A321 (IAE V2500)	
AIRBUS	A330-201		Airbus A330 (GE CF6)	
AIRBUS	A330-202		Airbus A330 (GE CF6)	
AIRBUS	A330-203		Airbus A330 (GE CF6)	
AIRBUS	A330-301		Airbus A330 (GE CF6)	
AIRBUS	A330-302		Airbus A330 (GE CF6)	
AIRBUS	A330-303		Airbus A330 (GE CF6)	

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
AIRBUS	A330-223		Airbus A330 (PW 4000)	
AIRBUS	A330-223F		Airbus A330 (PW 4000)	
AIRBUS	A330-321		Airbus A330 (PW 4000)	
AIRBUS	A330-322		Airbus A330 (PW 4000)	
AIRBUS	A330-323		Airbus A330 (PW 4000)	
AIRBUS	A330-743L	Beluga XL	Airbus A330 (RR Trent 700)	
AIRBUS	A330-243		Airbus A330 (RR Trent 700)	
AIRBUS	A330-243F		Airbus A330 (RR Trent 700)	
AIRBUS	A330-341		Airbus A330 (RR Trent 700)	
AIRBUS	A330-342		Airbus A330 (RR Trent 700)	
AIRBUS	A330-343		Airbus A330 (RR Trent 700)	
AIRBUS	A330-841	A330 NEO	Airbus A330 (RR Trent 7000)	
AIRBUS	A330-941	A330 NEO	Airbus A330 (RR Trent 7000)	
AIRBUS	A350-1041		Airbus A350 (RR Trent XWB)	
AIRBUS	A350-941		Airbus A350 (RR Trent XWB)	
ATR-GIE Avions de Transport Régional	ATR 42-200		ATR 42-200/300 series (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 42-300		ATR 42-200/300 series (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 42-320		ATR 42-200/300 series (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 42-400		ATR 42-400/500/72-212A (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 42-500	42-500 42-600	ATR 42-400/500/72-212A (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 72-212 A	72-500 72-600	ATR 42-400/500/72-212A (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 72-101		ATR 72-100/200 series (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 72-102		ATR 72-100/200 series (PWC PW120)	
ATR-GIE Avions de	ATR 72-201		ATR 72-100/200 series (PWC PW120)	

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
Transport Régional				
ATR-GIE Avions de Transport Régional	ATR 72-202		ATR 72-100/200 series (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 72-211		ATR 72-100/200 series (PWC PW120)	
ATR-GIE Avions de Transport Régional	ATR 72-212		ATR 72-100/200 series (PWC PW120)	
BOEING COMPANY (THE)	757-200	B757	Boeing 757-200/300 (PW 2000)	
BOEING COMPANY (THE)	757-200PF	B757	Boeing 757-200/300 (PW 2000)	
BOEING COMPANY (THE)	757-300	B757	Boeing 757-200/300 (PW 2000)	
BOEING COMPANY (THE)	757-200	B757	Boeing 757-200/300 (RR RB211)	
BOEING COMPANY (THE)	757-200PF	B757	Boeing 757-200/300 (RR RB211)	
BOEING COMPANY (THE)	757-300	B757	Boeing 757-200/300 (RR RB211)	
BOEING COMPANY (THE)	767-200	B767	Boeing 767-200/300 (PW 4000)	
BOEING COMPANY (THE)	767-300	B767	Boeing 767-200/300 (PW 4000)	
BOEING COMPANY (THE)	767-300CF	B767	Boeing 767-200/300 (PW 4000)	
BOEING COMPANY (THE)	767-200	B767	Boeing 767-200/300 (PW JT9D)	
BOEING COMPANY (THE)	767-300	B767	Boeing 767-200/300 (PW JT9D)	

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
BOEING COMPANY (THE)	767-300CF	B767	Boeing 767-200/300 (PW JT9D)	
BOEING COMPANY (THE)	767-200	B767	Boeing 767-200/300/400 (GE CF6)	
BOEING COMPANY (THE)	767-300	B767	Boeing 767-200/300/400 (GE CF6)	
BOEING COMPANY (THE)	767-300CF	B767	Boeing 767-200/300/400 (GE CF6)	
BOEING COMPANY (THE)	767-300F	B767	Boeing 767-200/300/400 (GE CF6)	
BOEING COMPANY (THE)	767-400ER	B767	Boeing 767-200/300/400 (GE CF6)	
BOEING COMPANY (THE)	767-300	B767	Boeing 767-300 (RR RB211)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-102	DHC-8 Series 100	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-103	DHC-8 Series 100	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-106	DHC-8 Series 100	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-201	DHC-8 Series 200	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-202	DHC-8 Series 200	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF	DHC-8-301	DHC-8 Series 300	Bombardier DHC-8-100/200/300 (PWC PW 120)	

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
CANADA LIMITED				
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-311	DHC-8 Series 300	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-314	DHC-8 Series 300	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-315	DHC-8 Series 300	Bombardier DHC-8-100/200/300 (PWC PW 120)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-401	DHC-8 Series 400	Bombardier DHC-8-400 (PWC PW150)	
DE HAVILLAND AIRCRAFT OF CANADA LIMITED	DHC-8-402	DHC-8 Series 400	Bombardier DHC-8-400 (PWC PW150)	
RUAG Aerospace GmbH (DORNIER)	Dornier 228-100		Dornier 228 (Honeywell TPE331)	
RUAG Aerospace GmbH (DORNIER)	Dornier 228-101		Dornier 228 (Honeywell TPE331)	
RUAG Aerospace GmbH (DORNIER)	Dornier 228-200		Dornier 228 (Honeywell TPE331)	
RUAG Aerospace GmbH (DORNIER)	Dornier 228-201		Dornier 228 (Honeywell TPE331)	
RUAG Aerospace GmbH (DORNIER)	Dornier 228-202		Dornier 228 (Honeywell TPE331)	
RUAG Aerospace	Dornier 228-212		Dornier 228 (Honeywell TPE331)	

GROUP 1 AEROPLANES				
TC Holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
GmbH (DORNIER)				
TEXTRON AVIATION Inc.	1900	Airliner	Beech 1900 (PWC PT6)	
TEXTRON AVIATION Inc.	1900C	Airliner	Beech 1900 (PWC PT6)	
TEXTRON AVIATION Inc.	1900D	Airliner	Beech 1900 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 400	Twin Otter	De Havilland DHC-6 (PWC PT6)	OSD approved on 28.2.2017.
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 1	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 100	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 110	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 200	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 210	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 300	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 310	Twin Otter	De Havilland DHC-6 (PWC PT6)	
VIKING AIR (Bombardier) (De Havilland)	DHC-6 Series 320	Twin Otter	De Havilland DHC-6 (PWC PT6)	

**SUB-GROUP 2a: SINGLE TURBO-PROPELLER ENGINE AEROPLANES
(Other than those in Group 1)**

SUBGROUP 2a: SINGLE TURBO-PROPELLER ENGINE AEROPLANES (Other than those in Group 1)				
TC holder	Model	Com. des.	MCAR-66 type rating endorsement	Note
Quest Aircraft Design LLC	Kodiak 100		Quest Kodiak 100 (PWC PT6)	
TEXTRON AVIATION Inc.	208	<i>Caravan I</i>	Cessna 208 Series (PWC PT6)	
TEXTRON AVIATION Inc.	208B	<i>Caravan II</i>	Cessna 208 Series (PWC PT6)	

GROUP 3: PISTON-ENGINE AEROPLANES (Other than those in Group 1)

GROUP 3: PISTON-ENGINE AEROPLANES (other than those in Group 1)						
TC Holder	Model	Type of structure	Part-66 type rating endorsement	Note	MTOM	
					≤2T	>2T
CESSNA AIRCRAFT Company	F150F	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F150G	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F150H	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F150J	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F150K	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F150L	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F150M	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	FA150K	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	FA150L	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	FA150M	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	FRA150L	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	

CESSNA AIRCRAFT Company	FRA150M	<i>Metal</i>	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F152	<i>Metal</i>	Cessna/Reims-Cessna 152/F152 Series (Lycoming)	ELA1	X	
CESSNA AIRCRAFT Company	FA152	<i>Metal</i>	Cessna/Reims-Cessna 152/F152 Series (Lycoming)	ELA1	X	
CESSNA AIRCRAFT Company	F172D	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F172E	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F172F	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F172G	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F172H	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	F172K	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	FP172D	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
CESSNA AIRCRAFT Company	FR172E	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA2	X	
CESSNA AIRCRAFT Company	FR172F	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA2	X	
CESSNA AIRCRAFT Company	FR172G	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA2	X	
CESSNA AIRCRAFT Company	FR172H	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA2	X	
CESSNA AIRCRAFT Company	FR172J	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA2	X	
CESSNA AIRCRAFT Company	FR172K	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA2	X	
CESSNA AIRCRAFT Company	F172L	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	

CESSNA AIRCRAFT Company	F172M	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
CESSNA AIRCRAFT Company	F172N	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
CESSNA AIRCRAFT Company	F172P	<i>Metal</i>	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
PIPER AIRCRAFT	PA-34-200T (Seneca II)	Metal	Piper PA-34 Series (Continental)			X
PIPER AIRCRAFT	PA-34-220T (Seneca III)	Metal	Piper PA-34 Series (Continental)			X
PIPER AIRCRAFT	PA-34-220T (Seneca IV)	Metal	Piper PA-34 Series (Continental)			X
PIPER AIRCRAFT	PA-34-220T (Seneca V)	Metal	Piper PA-34 Series (Continental)			X
PIPER AIRCRAFT	PA-34-200 (Seneca)	Metal	Piper PA-34 Series (Lycoming)	ELA2	X	
Pipistrel Vertical Solutions d.o.o.	Virus SW 121	Composite	Pipistrel Virus (Rotax)	ELA1 ¹	X	
TECNAM Costruzioni Aeronautiche	P2006T	Metal	Tecnam P2006T (Rotax)	ELA1	X	
TEXTRON AVIATION Inc.	150	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150A	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150B	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150C	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150D	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150E	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150F	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150G	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150H	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150J	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150K	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	150L	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	

¹ Electrical Virus variants certified (within the L2 licence privilege)

TEXTRON AVIATION Inc.	150M	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	A150K	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	A150L	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	A150M	Metal	Cessna/Reims-Cessna 150/F150 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	152	Metal	Cessna/Reims-Cessna 152/F152 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	A152	Metal	Cessna/Reims-Cessna 152/F152 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172A	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172B	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172C	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172D	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172E	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172F	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172G	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172H	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	P172D	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	R172E	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	R172F	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	R172G	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	R172H	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	R172J	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	R172K	Metal	Cessna/Reims-Cessna 172/F172 Series (Continental)	ELA1	X	
TEXTRON AVIATION Inc.	172I	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172K	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172L	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	

TEXTRON AVIATION Inc.	172M	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172N	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172P	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172Q	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172R	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	
TEXTRON AVIATION Inc.	172RG	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA2	X	
TEXTRON AVIATION Inc.	172S	Metal	Cessna/Reims-Cessna 172/F172 Series (Lycoming)	ELA1	X	

Appendix II to AMC to MCAR-66 - Aircraft Type Practical Experience and On-the-Job Training - List of Tasks

1. Aircraft type practical experience

The tasks are divided in categories of aircraft:

- A) aeroplanes and helicopters
- B) sailplanes and powered sailplanes
- C) balloons and airships

A. SPECIFIC TASKS FOR AEROPLANES AND HELICOPTERS

Time limits/Maintenance checks

100 hour check (general aviation aircraft).
"B" or "C" check (transport category aircraft).
Assist carrying out a scheduled maintenance check i.a.w. AMM.
Review Aircraft maintenance log for correct completion.
Review records for compliance with airworthiness directives.
Review records for compliance with component life limits.
Procedure for Inspection following heavy landing.
Procedure for Inspection following lightning strike.

Dimensions/Areas

Locate component(s) by station number.
Perform symmetry check.

Lifting and Shoring

Assist in:
Jack aircraft nose or tail wheel.
Jack complete aircraft.
Sling or trestle major component.

Levelling/Weighing

Level aircraft.
Weigh aircraft.
Prepare weight and balance amendment.
Check aircraft against equipment list.

Towing and Taxiing

Prepare for aircraft towing.
Tow aircraft.
Be part of aircraft towing team

Parking and mooring

Tie down aircraft.
Park, secure and cover aircraft.
Position aircraft in dock.
Secure rotor blades.

Placards and Markings

Check aircraft for correct placards.
Check aircraft for correct markings.

Servicing

Refuel aircraft.
Defuel aircraft.
Carry out tank to tank fuel transfer.
Check/adjust tire pressures.
Check/replenish oil level.
Check/replenish hydraulic fluid level.
Check/replenish accumulator pressure.
Charge pneumatic system.
Grease aircraft.
Connect ground power.
Service toilet/portable water system.
Perform pre-flight/daily check.

Vibration and Noise Analysis

Analyse helicopter vibration problem.
Analyse noise spectrum.
Analyse engine vibration.

Air Conditioning

Replace combustion heater.
Replace flow control valve.
Replace outflow valve.
Replace safety valve.
Replace vapour cycle unit.
Replace air cycle unit.
Replace cabin blower.
Replace heat exchanger.
Replace pressurisation controller.
Clean outflow valves.
Deactivate/reactivate cargo isolation valve.
Deactivate/reactivate avionics ventilation components.
Check operation of air conditioning/heating system.
Check operation of pressurization system.
Troubleshoot faulty system.

Auto flight

Install servos.
Rig bridle cables
Replace controller.
Replace amplifier.
Replacement of the auto flight system LRUs in case of fly-by-wire aircraft.
Check operation of auto-pilot.
Check operation of auto-throttle/auto-thrust.
Check operation of yaw damper.
Check and adjust servo clutch.
Perform autopilot gain adjustments.
Perform mach trim functional check.
Troubleshoot faulty system.
Check autoland system
Check flight management systems
Check stability augmentation system

Communications

Replace VHF com unit.
Replace HF com unit.
Replace existing antenna.
Replace static discharge wicks.
Check operation of radios.
Perform antenna VSWR check.
Perform Selcal operational check.
Perform operational check of passenger address system.
Functionally check audio integrating system.
Repair co-axial cable.
Troubleshoot faulty system.
Check SATCOM.

Electrical Power

Charge lead/acid battery.
Charge Ni-Cad battery.
Check battery capacity.
Deep-cycle Ni-Cad battery.
Replace integrated drive/generator/alternator.
Replace switches.
Replace circuit breakers.
Adjust voltage regulator.
Change voltage regulator.
Amend electrical load analysis report.
Repair/replace electrical feeder cable.
Troubleshoot faulty system.
Perform functional check of integrated drive/generator/alternator.
Perform functional check of voltage regulator.

Perform functional check of emergency generation system.

Equipment/Furnishings

Replace carpets
Replace crew seats
Replace passenger seats
Check inertia reels
Check seats/belts for security.
Check emergency equipment.
Check ELT for compliance with regulations.
Repair toilet waste container.
Remove and install ceiling and sidewall panels.
Repair upholstery.
Change cabin configuration.
Replace cargo loading system actuator.
Test cargo loading system.
Replace escape slides/ropes.

Fire protection

Check fire bottle contents.
Check/test operation of fire/smoke detection and warning system.
Check cabin fire extinguisher contents.
Check lavatory smoke detector system.
Check cargo panel sealing.
Install new fire bottle.
Replace fire bottle squib.
Troubleshoot faulty system.
Inspect engine fire wire detection systems.

Flight Controls

Inspect primary flight controls and related components i.a.w. AMM.
Extending/retracting flaps & slats.
Replace horizontal stabiliser.
Replace spoiler/lift damper.
Replace elevator.
Deactivation/reactivation of aileron servo control.
Replace aileron.
Replace rudder.
Replace trim tabs.
Install control cable and fittings.
Replace slats.
Replace flaps.
Replace powered flying control unit
Replace flap actuator
Rig primary flight controls.
Adjust trim tab.

Adjust control cable tension.
Check control range and direction of movement.
Check for correct assembly and locking.
Troubleshoot faulty system.
Functional test of primary flight controls.
Functional test of flap system.
Operational test of the side stick assembly.
Operational test of the THS.
THS system wear check.

Fuel

Water drain system (operation).
Replace booster pump.
Replace fuel selector.
Replace fuel tank cells.
Replace/test fuel control valves.
Replace magnetic fuel level indicators.
Replace water drain valve.
Check/calculate fuel contents manually.
Check filters.
Flow check system.
Check calibration of fuel quantity gauges.
Check operation feed/selectors.
Check operation of fuel dump/jettison system.
Fuel transfer between tanks.
Pressure defuel.
Pressure refuel (manual control).
Deactivation/reactivation of the fuel valves (transfer defuel, X-feed, refuel).
Troubleshoot faulty system.

Hydraulics

Replace engine driven pump.
Check/replace case drain filter.
Replace standby pump.
Replace hydraulic motor pump/generator.
Replace accumulator.
Check operation of shut off valve.
Check filters/clog indicators.
Check indicating systems.
Perform functional checks.
Pressurisation/depressurisation of the hydraulic system.
Power Transfer Unit (PTU) operation.
Replacement of PTU.
Troubleshoot faulty system.

Ice and rain protection

Replace pump.
Replace timer.
Inspect repair propeller deice boot.
Test propeller de-icing system.
Inspect/test wing leading edge de-icer boot.
Replace anti-ice/deice valve.
Install wiper motor.
Check operation of systems.
Operational test of the pitot-probe ice protection.
Operational test of the TAT ice protection.
Operational test of the wing ice protection system.
Assistance to the operational test of the engine air-intake ice protection (with engines operating).
Troubleshoot faulty system.

Indicating/recording systems

Replace flight data recorder.
Replace cockpit voice recorder.
Replace clock.
Replace master caution unit.
Perform FDR data retrieval.
Troubleshoot faulty system.
Implement ESDS procedures.
Inspect for HIRF requirements.
Start/stop EIS procedure.
Bite test of the CFDIU.
Ground scanning of the central warning system.

Landing Gear

Build up wheel.
Replace main wheel.
Replace nose wheel.
Replace steering actuator.
Replace truck tilt actuator.
Replace gear retraction actuator.
Replace uplock/downlock assembly.
Replace shimmy damper.
Rig nose wheel steering.
Functional test of the nose wheel steering system.
Replace shock strut seals.
Servicing of shock strut.
Replace brake unit.
Replace brake control valve.
Bleed brakes.
Replace brake fan.
Test anti skid unit.

Test gear retraction.
Change bungees.
Adjust micro switches/sensors.
Charge struts with oil and air.
Troubleshoot faulty system.
Test auto-brake system.
Replace rotorcraft skids.
Replace rotorcraft skid shoes.
Pack and check floats.
Flotation equipment.
Check/test emergency blowdown (emergency landing gear extension).
Operational test of the landing gear doors.

Lights

Repair/replace rotating beacon.
Repair/replace landing lights.
Repair/replace navigation lights.
Repair/replace interior lights.
Replace ice inspection lights.
Repair/replace logo lights.
Repair/replace emergency lighting system.
Perform emergency lighting system checks.
Troubleshoot faulty system.

Instruments

Troubleshoot faulty system.
Calibrate magnetic direction indicator.
Replace airspeed indicator.
Replace altimeter.
Replace air-data computer.
Replace ADI.
Replace HSI.
Check pitot static system for leaks.
Check operation of directional gyro.
Check calibration of pitot static instruments.
Compass replacement direct/indirect.
Functional check flight director system.

Surveillance

Troubleshoot faulty system.
Functional check weather radar.
Functional check doppler.
Functional check TCAS.
Functional check ATC transponder.
Check calibration of pressure altitude reporting system.

Navigation

Functional check inertial navigation system.
Complete quadrantal error correction of ADF system.
Check GPS.
Test AVM.
Check marker systems.
Functional check DME.

Oxygen

Inspect on board oxygen equipment.
Purge and recharge oxygen system.
Replace regulator.
Replace oxygen generator.
Test crew oxygen system.
Perform auto oxygen system deployment check.
Troubleshoot faulty system.

Pneumatic systems

Replace filter.
Replace air shut off valve.
Replace pressure regulating valve.
Replace compressor.
Recharge dessicator.
Adjust regulator.
Check for leaks.
Troubleshoot faulty system.

Vacuum systems

Inspect the vacuum system i.a.w. AMM.
Replace vacuum pump.
Check/replace filters.
Adjust regulator.
Troubleshoot faulty system.

Water/Waste

Replace water pump.
Replace tap.
Replace toilet pump.
Perform water heater functional check.
Troubleshoot faulty system.
Inspect waste bin flap closure.

Central Maintenance System

Retrieve data from CMU.
Replace CMU.
Perform Bite check.

Troubleshoot faulty system.

Airborne Auxiliary power

Install APU.

Inspect hot section.

Troubleshoot faulty system.

Structures

Assessment of damage.

Sheet metal repair.

Fibre glass repair.

Wooden repair.

Fabric repair.

Recover fabric control surface.

Treat corrosion.

Apply protective treatment.

Doors

Inspect passenger door i.a.w. AMM.

Rig/adjust locking mechanism.

Adjust air stair system

Check operation of emergency exits.

Test door warning system.

Troubleshoot faulty system.

Remove and install passenger door i.a.w. AMM.

Remove and install emergency exit i.a.w. AMM.

Inspect cargo door i.a.w. AMM.

Windows

Replace windshield.

Replace direct vision window.

Replace cabin window.

Repair transparency.

Wings

Skin repair.

Recover fabric wing.

Replace tip.

Replace rib.

Replace integral fuel tank panel.

Check incidence/rig.

Propeller

Assemble prop after transportation.

Replace propeller.

Replace governor.

Adjust governor.
Perform static functional checks.
Check operation during ground run.
Check track.
Check setting of micro switches.
Assessment of blade damage i.a.w. AMM.
Dynamically balance prop.
Troubleshoot faulty system.

Main Rotors

Install rotor assembly.
Replace blades.
Replace damper assembly.
Check track.
Check static balance.
Check dynamic balance.
Troubleshoot.

Rotor Drive

Replace mast.
Replace drive coupling.
Replace clutch/freewheel unit
Replace drive belt.
Install main gearbox.
Overhaul main gearbox.
Check gearbox chip detectors.

Tail Rotors

Install rotor assembly.
Replace blades.
Troubleshoot.

Tail Rotor Drive

Replace bevel gearbox.
Replace universal joints.
Overhaul bevel gearbox.
Install drive assembly.
Check chip detectors.
Check/install bearings and hangers.
Check/service/assemble flexible couplings.
Check alignment of drive shafts.
Install and rig drive shafts.

Rotorcraft flight controls

Install swash plate.
Install mixing box.

Adjust pitch links.
Rig collective system.
Rig cyclic system.
Rig anti-torque system.
Check controls for assembly and locking
Check controls for operation and sense.
Troubleshoot faulty system.

Power Plant

Build up ECU.
Replace engine.
Repair cooling baffles.
Repair cowling.
Adjust cowl flaps.
Repair faulty wiring.
Troubleshoot.
Assist in dry motoring check.
Assist in wet motoring check.
Assist in engine start (manual mode).

Piston Engines

Remove/install reduction gear.
Check crankshaft run-out.
Check tappet clearance.
Check compression.
Extract broken stud.
Install helicoil.
Perform ground run.
Establish/check reference RPM.
Troubleshoot.

Turbine Engines

Replace module.
Replace fan blade.
Hot section inspection/boroscope check.
Carry out engine/compressor wash.
Carry out engine dry cycle.
Engine ground run.
Establish reference power.
Trend monitoring/gas path analysis.
Troubleshoot.

Fuel and control, piston

Replace engine driven pump.
Adjust AMC.
Adjust ABC.

Install carburetor/injector.
Adjust carburetor/injector.
Clean injector nozzles.
Replace primer line.
Check carburetor float setting.
Troubleshoot faulty system.

Fuel and control, turbine

Replace FCU.
Replace Engine Electronic Control Unit (FADEC).
Replace Fuel Metering Unit (FADEC).
Replace engine driven pump.
Clean/test fuel nozzles.
Clean/replace filters
Adjust FCU.
Troubleshoot faulty system.
Functional test of FADEC.

Ignition systems, piston

Change magneto.
Change ignition vibrator.
Change plugs.
Test plugs.
Check H.T. leads.
Install new leads.
Check timing.
Check system bonding.
Troubleshoot faulty system.

Ignition systems, turbine

Perform functional test of the ignition system.
Check glow plugs/igniters.
Check H.T. leads.
Check ignition unit.
Replace ignition unit.
Troubleshoot faulty system.

Engine Controls

Rig thrust lever.
Rig RPM control.
Rig mixture HP cock lever.
Rig power lever.
Check control sync (multi-eng).
Check controls for correct assembly and locking.
Check controls for range and sense of operation.
Adjust pedestal micro-switches.

Troubleshoot faulty system.

Engine Indicating

Replace engine instruments(s).

Replace oil temperature bulb.

Replace thermocouples.

Check calibration.

Troubleshoot faulty system.

Exhaust, piston

Replace exhaust gasket.

Inspect welded repair.

Pressure check cabin heater muff.

Troubleshoot faulty system.

Exhaust, turbine

Change jet pipe.

Change shroud assembly.

Install trimmers.

Inspect/replace thrust reverser.

Replace thrust reverser component.

Deactivate/reactivate thrust reverser.

Operational test of the thrust reverser system.

Oil

Change oil.

Check filter(s).

Adjust pressure relief valve.

Replace oil tank.

Replace oil pump.

Replace oil cooler.

Replace firewall shut off valve.

Perform oil dilution.

Troubleshoot faulty system.

Starting

Replace starter

Replace start relay.

Replace start control valve.

Check cranking speed.

Troubleshoot faulty system.

Turbines, piston engines

Replace PRT.

Replace turbo-blower.

Replace heat shields.

Replace waste gate.
Adjust density controller.

Engine water injection

Replace water/methanol pump.
Flow check water/methanol system.
Adjust water/methanol control unit.
Check fluid for quality.
Troubleshoot faulty system

Accessory gear boxes

Replace gearbox.
Replace drive shaft.
Inspect magnetic chip detector.

APU

Removal/installation of the APU.
Removal/installation of the inlet guide-vane actuator.
Operational test of the APU emergency shut-down test.
Operational test of the APU.

B. SPECIFIC TASKS FOR SAILPLANES AND POWERED SAILPLANES

Structures	Wooden/metal tube and fabric/composite/metallic
General activities	
Placards check or replace	x
Weighing, weight & balance sheet	x
Documentation of annual inspection, repair	x
Review records for compliance with airworthiness directives	x
Five annual inspections	x
Inspection after an occurrence	x
Dismantling/reinstallation of wings and empennages	x
Leveling and weighing	
Level the sailplane	x
Weighing, weight & balance sheet	x
Prepare a weight and balance amendment	x
Check the list of equipment	x
Flight controls and flight control systems	
Aileron, flaps: Removal — Balancing — Reinstallation	x
Elevator: Removal — Balancing — Reinstallation	x
Rudder: Removal — Balancing — Reinstallation	x
Rudder cable: Fabrication and installation	x
Elevator pushrod: Installation	x
Safeguarding of pins, screws, castellated nuts	x
Sealing of gaps	x
Electrical systems	
Electrical components, wiring: Removal — Installation	x
Batteries — Servicing	x
Avionics systems	
COM: Removal — Installation	x
NAV: Removal — Installation	x
XPDR: Removal — Installation	x
Antenna/antenna cable: Removal — Installation	x
Cabin equipment/systems	
Belts/safety harnesses: Removal — Installation	x
Oxygen system removal installation — Test	x
Canopy replacement or repair	x

Structures	Wooden/metal tube and fabric/composite/metallic
Pitot/static system: Removal — Installation — Test	x
Flight instruments: Removal — Installation	x
Installation of approved equipment	x
Compass: Installation — Compensation	x
Tow release: Removal — Installation	x
Water ballast system: Removal — Installation — Test	x
Undercarriage: Removal — Installation	x
Brake system: Replacement of components	x
Fuel — Engine — Propeller — Engine — Instruments	x
Refer to the tasks related to propeller, piston engine, fuel and control, ignition, engine indications and exhaust, which are contained in Table A ‘Specific tasks for aeroplanes’	
Verification and adjustment of folding system of powered sailplanes	x
Wooden structures/Metal tubes and fabric	
Inspection/testing for damages	x
Rib structure repair	x
Plywood skin repair	x
Recover or repair structure with fabric	x
Protective coating and finishing	x
Install patch on fabric material	x
Repair of fairings	x
Composite structures	
Laminate repair	x
Sandwich structure repair	x
Partial gel coat repair	x
Complete gel coating	x
Repair of fairings	x
Metal structures	
Crack testing	x
Repair of covering	x
Drilling cracks	x
Riveting jobs	x
Bonding of structures	x
Anti-corrosion treatment	x
Repair of fairings	x

C. SPECIFIC TASKS FOR BALLOONS AND AIRSHIPS

[[Table should be green]]

Tasks	Balloon - Hot air	Balloon - Gas (free/tethered)	Airship - Hot air	Airship - Gas
General activities:				
Functionality test of aircraft (*)	x	x	x	x
Placards check or replacement	x	x	x	x
Documentation annual inspection, repair, ADs, equipment (*)	x	x	x	x
Classification repair (*)	x	x	x	x
Weighing:				
Weighing and weighing report (*)	x	x	x	x
Servicing:				
Lubrication of controls when applicable		x	x	x
Cleaning of envelope, basket, burner	x	x	x	x
Inspections:				
Eight annual inspections (covering at least three different types) (*)	x			
Five annual inspections (covering at least two different types) (*)		x (free)		
Three annual inspections (covering at least two different types) (*)		x (tethered)	x	
Two annual inspections (*)				x
Strength test of envelope fabric (*)	x	x	x	x
Flight control systems: Removal — Inspection — Reinstallation				
Control surface cable				x
Trim system				x
Safeguarding of pins, screws, castellated nuts (*)		x (tethered)	x	x
Stick and pedals				x
Hydromechanical control systems		x (tethered)		x
Ballonet control systems (*)		x (tethered)	x	x
Electrical control systems		x (tethered)		x
Valves (gas valve, turning vent, parachute or rip panel) (*)	x	x	x	x
Control and shroud lines and pulleys	x	x	x	x
Elevator – stabilizer (incl. balancing if applicable)				x
Rudder (incl. balancing if applicable)				x
Drag rope		x (free)		
Electrical system:				
Removal – installation of electrical wires		x (tethered)	x	x

Tasks	Balloon - Hot air	Balloon - Gas (free/tethered)	Airship - Hot air	Airship - Gas
Removal – installation of electrical components		x (tethered)	x	x
Servicing of batteries	x	x	x	x
Communication system - Transponder:				
Removal – installation of COM	x	x	x	x
Removal – installation of NAV				x
Removal – installation of XPDR	x	x	x	x
Installation of antenna	x	x	x	x
Replacement of antenna cable	x	x	x	x
Cabin - Equipments:				
Pitot / static systems – tubes removal - installation - replacement				x
Flight instruments removal - installation - installation - replacement	x	x	x	x
Installation of an approved system	x	x	x	x
Magnetic compass installation - compensation				x
Fire extinguisher	x		x	x
Ballast - Replacement of:				
Water ballast (when applicable)				x
Sand/shot ballast (when applicable)		x		x
Valves - inspection and rigging of valves				x
Envelope:				
Inspection and repair of envelope panels/gores/seams	x	x	x	x
Inspection and repair of load tapes and attachment points	x	x	x	x
Inspection and repair of deflation system	x	x	x	
Inspection and repair of net		x		
Inspection and repair of mooring system		x (tethered)		
Electrostatic conductivity test (if type is approved for hydrogen) (*)		x		x
Ballonet inspection and repair		x		x
Inspection and fabrication of a suspension cable or rope	x	x	x	x
Inspection and fabrication of a catena			x	x
Load ring/frame:				
Crack detection (welded and machined parts) (*)	x	x	x	
Heater system:				
Removal, inspection and re-installation	x		x	
Inspection and cleaning of vaporizer and filter (*)	x		x	

Tasks	Balloon - Hot air	Balloon - Gas (free/tethered)	Airship - Hot air	Airship - Gas
Inspection and replacement of hoses (*)	x		x	
Inspection and replacement of pilot flame ignition unit (*)	x		x	
Sealing of fittings (*)	x		x	
Pressure and leak test (*)	x		x	
Disassembly and assembly of fuel cell (*)	x		x	
10-year inspection of fuel cell	x		x	
Basket/gondola:				
Removal, inspection and re-installation (as applicable)	x	x	x	x
Inspection and fabrication of a suspension cable or rope (*)	x	x		
Removal – installation of padding	x	x		
Removal – installation of belts - safety harness			x	x
Removal – installation of essential elements of the cabin	x	x	x	x
Inspection and fabrication of a basket wire	x	x		
Inspection of operational equipment and its fixation points	x	x	x	x
Crack detection and repair (welded parts and frames)	x	x	x	x
Landing gear:				
Removal, inspection and re-installation of wheels		x (tethered)	x	x
Removal, inspection and re-installation of brakes				x
Removal, inspection and re-installation of shock absorber				x
Fuel – Engine – Propeller – Engine instrument systems:				
Refer to tasks in blocks for aeroplanes			x	x
Wood structure:				
Structure repair	x	x		
Protective coating				
Composite structure:				
Laminate repair		x (tethered)		x
Sandwich structure repair		x (tethered)		x
Metallic structures:				
Crack detection (welded and machined parts)	x	x	x	x
Riveting jobs			x	x
Bonding of structures		x	x	x
Anti-corrosion treatment		x (tethered)	x	x
Repair of fairings		x (tethered)		x
Engine:				
Tasks for aeroplanes of comparable certification level			x	x

Tasks	Balloon - Hot air	Balloon - Gas (free/tethered)	Airship - Hot air	Airship - Gas
Exhaust system:				
Tasks for aeroplanes of comparable certification level			X	X
Propeller:				
Tasks for aeroplanes of comparable certification level			X	X
Fuel system:				
Tasks for aeroplanes of comparable certification level			X	X
Hydraulic system:				
Tasks for aeroplanes of comparable certification level			X	X
Pneumatic system:				
Tasks for aeroplanes of comparable certification level			X	X
Winch system:				
Witness winch inspection		x (tethered)		

2. List of tasks for OJT

The minimum list of tasks should be selected from the table below according to the following procedures and criteria:

- (i) Filter the ATA chapters (or sub-chapters, when required) applicable to the specific aircraft type (add others if they are missing).
- (ii) Identify relevant and significant tasks for each required category of INS, FOT, SGH, R/I, MEL and TS.
- (iii) Retain the required percentage for each task category, and throughout ATA chapters, as much as relevant to the particular aircraft type.

The selection of tasks should give precedence to tasks which are critical and complex in terms of:

- difficulty to execute;
- interpretation of the maintenance procedures / work instructions;
- specific tools and equipment;
- coordination among maintenance staff (teamwork);
- human factors (accessibility, human-machine interface (HMI), etc.);
- safety impact on the aircraft and the crew.

Removal and installation tasks include the final confirmation test, if required.

Credit may be given for similar tasks between ATA systems (e.g. pneumatic valves in ATA 21, 30 and 36), but this should be kept to a minimum.

Some tasks may be performed on another aircraft type as long as both the system and the task are similar.

The following table provides an acceptable method of selection of OJT tasks for B1 and B2 AML categories, per ATA chapter or sub-chapters, as required by point 6.2(e) of Appendix III to MCAR-66.

[[Table below should be green]]

OJT TASK SELECTION													
ATA Chapters	B1						B2						
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS	
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%	
Introduction subjects:													
05 Time limits / maintenance checks (see <i>Note</i> below)	X	—	—	—	—	—	X	—	—	—	—	—	—
06 Dimensions/Areas	X	—	—	—	—	—	X	—	—	—	—	—	—
07 Lifting and Shoring	X	—	—	—	—	—	X	—	—	—	—	—	—
08 Levelling and weighing	—	—	X	—	—	—	X	—	X	—	—	—	—
09 Towing and taxiing	—	—	X	—	—	—	—	—	X	—	—	—	—
10 Parking/mooring, Storing and Return to Service	—	—	X	—	—	—	—	—	X	—	—	—	—
11 Placards and Markings	X	—	—	—	—	—	X	—	—	—	—	—	—
12 Servicing	—	—	X	—	—	—	—	—	X	—	—	—	—
20 Standard practices – only type Particular (ATA 50 or 60)	X	—	X	—	—	—	X	—	X	—	—	—	—
Rotorcraft (only)													
18 Vibration and Noise Analysis (Blade tracking)	—	—	—	—	—	X	—	—	—	—	—	—	—
62 Rotors													
62-10 Rotor blades	X	—	—	X	—	—	—	—	—	—	—	—	—
62-20 Rotor head(s)	X	—	—	X	—	—	—	—	—	—	—	—	—
62-30 Rotor shaft(s) / swashplate assy(s)	X	—	—	X	—	—	—	—	—	—	—	—	—
62-40 Indicating	—	X	X	—	X	X	—	—	—	—	—	—	X
63 Rotor drives													
63-10 Engine/gearbox couplings	X	—	X	X	—	—	—	—	—	—	—	—	—
63-20 Gearbox(es)	X	—	X	X	—	—	—	—	—	—	—	—	—
63-30 Mounts, attachments	X	—	X	—	—	—	—	—	—	—	—	—	—

OJT TASK SELECTION												
ATA Chapters	B1						B2					
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%
63-40 Indicating	—	X	—	—	X	X	—	—	—	—	—	X
63-50 Rotor brake	X	—	—	X	—	—	—	—	—	—	—	—
63-60 Drain lines	X	—	—	—	—	—	—	—	—	—	—	—
64 Tail Rotor												
64-10 Rotor blades	X	—	X	X	—	—	—	—	—	—	—	—
64-20 Rotor head	X	—	—	X	—	—	—	—	—	—	—	—
64-40 Indicating	—	X	—	X	X	X	—	—	—	—	—	X
65 Tail-rotor drive												
65-10 Shafts	X	—	X	X	—	—	—	—	—	—	—	—
65-20 Gearboxes	X	—	X	X	—	—	—	—	—	—	—	—
65-40 Indicating	—	X	—	—	X	X	—	—	—	—	—	X
66 Folding blades / pylon												
66-10 Rotor blades	X	—	—	X	—	—	—	—	—	—	—	—
66-20 Tail pylon	X	—	—	—	—	—	—	—	—	—	—	—
66-40 Controls and indicating	—	X	—	—	—	X	—	—	—	—	—	X
67 Rotors flight control												
67-10 Rotor	X	—	—	—	—	—	—	—	—	—	—	—
67-20 Antitorque rotor control (yaw control)	X	—	—	—	—	X	—	—	—	—	—	—
67-30 Servocontrol system	X	—	—	—	—	X	—	—	—	—	—	—
Airframe systems:												
21 Air Conditioning												
21-10 Compression	—	—	X	X	—	X	—	—	—	—	—	—
21-20 Distribution	—	X	—	X	—	—	—	—	—	—	—	—
21-30 Pressurisation control	—	X	—	X	—	X	—	—	—	—	—	—
21-40 Heating	—	—	—	X	—	—	—	—	—	—	—	—
21-50 Cooling	—	—	—	X	—	—	—	—	—	—	—	—

OJT TASK SELECTION													
ATA Chapters	B1						B2						
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS	
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%	
21-60 Temperature control	—	X	—	X	—	X	—	—	—	—	—	—	—
22 Autoflight													
22-10 Autopilot	—	—	—	—	—	—	—	X	X	X	X	X	X
22-20 Speed attitude correction	—	—	—	—	—	—	—	X	—	—	—	—	X
22-30 Autothrottle	—	X	—	—	—	—	X	X	—	X	—	—	X
22-40 System monitor	—	—	—	—	—	—	—	X	—	—	—	—	X
22-50 Aerodynamic load alleviating	—	—	—	—	—	—	—	X	—	—	—	—	X
23 Communications													
23-10 Speech communications	—	X	—	—	—	—	—	X	—	X	—	—	X
23-15 SATCOM	—	X	—	—	—	—	X	X	—	X	—	—	X
23-20 Data transmission and automatic calling	—	X	—	—	—	—	—	X	—	X	—	—	X
23-30 Passenger address, entertainment and comfort	—	X	—	—	—	—	X	—	—	X	—	—	X
23-40 Interphone	—	X	—	—	—	—	X	—	—	X	—	—	X
23-50 Audio integrating	—	X	—	—	—	—	—	X	—	X	—	—	X
53-60 Static discharging	X	—	—	—	X	—	X	—	—	X	X	X	X
23-70 Audio and video monitoring	—	X	—	—	—	—	X	X	—	X	—	—	X
23-80 Integrated automatic tuning	—	—	—	—	—	—	—	X	—	X	—	—	X
24 Electrical Power													
24-10 Generator drive	X	X	X	X	X	X	X	X	—	—	X	X	X
24-20 AC Generation	—	X	—	—	—	X	X	X	—	—	X	X	X
24-30 DC generation	—	X	—	X	—	X	X	X	—	X	X	X	X
24-40 External power	X	—	X	—	—	—	X	X	X	—	X	X	X
24-50 AC electrical load distribution	—	X	—	—	—	X	X	X	—	—	—	—	X

OJT TASK SELECTION													
ATA Chapters	B1						B2						
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS	
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%	
24-60 Electrical load distribution	—	X	—	—	—	X	X	X	—	—	—	X	
25 Equipment & Furnishings													
25-10 Flight compartment	X	X	X	X	X	—	X	X	—	—	—	—	
25-20 Passenger compartment	X	—	—	X	—	—	—	—	—	—	—	—	
25-30 Galley	X	X	—	X	—	—	X	X	—	—	—	—	
25-40 Lavatories	X	X	—	—	—	—	X	—	—	—	—	—	
25-50 Additional compartments	X	X	—	—	—	—	—	—	—	—	—	—	
50-00 Cargo accessory compartment	X	—	—	—	—	—	—	—	—	—	—	—	
50-10 Cargo compartments	X	—	—	—	—	—	—	—	—	—	—	—	
50-20 Cargo loading systems	X	X	—	—	—	X	—	X	—	—	—	X	
50-30 Cargo-related systems	X	—	—	—	—	—	—	—	—	—	—	—	
50-50 Accessory	X	—	—	—	—	—	—	—	—	—	—	—	
50-60 Insulation	X	—	—	—	—	—	—	—	—	—	—	—	
25-60 Emergency	X	X	X	X	—	—	X	X	—	—	—	—	
26 Fire Protection													
26-10 Detection	—	X	-	X	—	X	—	X	—	—	—	X	
26-20 Extinguishing	—	X	X	X	—	—	—	—	—	—	—	—	
26-30 Explosion suppression	X	—	—	—	—	—	—	—	—	—	—	—	
27 Flight Controls													
27-10 Aileron and tab	X	X	—	X	—	X	—	X	—	—	—	—	
27-20 Rudder and tab	X	X	—	X	—	X	—	X	—	—	—	—	
27-30 Elevator and tab	X	X	—	X	—	X	—	X	—	—	—	—	
27-40 Horizontal stabiliser	X	X	—	X	—	X	—	X	—	—	—	—	
27-50 Flaps	X	X	—	X	—	X	—	X	—	—	—	—	
27-60 Spoiler, drag devices and	X	X	—	X	—	X	—	X	—	—	—	—	

OJT TASK SELECTION												
ATA Chapters	B1						B2					
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%
variable aerodynamic fairings												
27-70 Gust lock and dampener	X	X	X	X	—	X	—	X	—	—	—	—
27-80 Lift augmenting	—	X	X	X	—	X	—	X	—	—	—	—
28 Fuel Systems												
28-10 Storage	X	—	X	X	X	—	—	—	X	—	—	—
28-20 Distribution	—	—	—	X	—	—	—	X	—	—	—	—
28-30 Dump	X	—	—	—	—	—	—	-	—	—	—	
28-40 Indicating	—	X	—	—	—	X	X	X	—	—	—	X
47-00 Nitrogen generation system	X	X	X	X	X	X	—	X	—	—	—	—
29 Hydraulic Power												
29-10 Main	X	X	X	X	—	—	—	X	—	—	—	—
29-20 Auxiliary	—	X	X	X	—	—	—	X	—	—	—	—
29-30 Indicating	—	X	—	X	—	X	—	X	—	—	—	X
30 Ice & Rain Protection												
30-10 Aerofoil	X	X	—	X	—	—	—	—	—	—	—	—
30-20 Air intakes	X	X	—	—	—	—	—	—	—	—	—	—
30-30 Pitot and static	X	—	—	X	—	—	X	X	—	—	—	X
30-40 Windows, windshields and doors	—	X	—	X	—	—	—	X	—	—	—	X
30-50 Antennas and radomes	X	—	—	X	—	—	X	X	—	—	—	X
30-60 Propellers/rotors	X	—	—	—	—	—	—	—	—	—	—	—
30-70 Water lines	X	—	—	—	—	—	X	—	—	—	—	—
30-80 Detection	—	X	—	X	—	X	—	X	—	—	—	X
31 Indicating / Recording Systems												
31-10 Instrument and control panels	—	X	—	X	—	—	—	X	—	X	X	X

OJT TASK SELECTION												
ATA Chapters	B1						B2					
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%
30-20 Independent instruments	—	X	—	—	—	—	—	X	—	X	—	X
30-30 Recorders	—	X	—	—	—	—	—	X	X	X	—	—
30-40 Central computers	—	—	—	—	—	—	—	X	—	X	—	X
31-50 Central warning systems	—	X	—	—	—	—	—	X	—	X	X	X
31-60 Central display systems	—	X	—	—	—	—	—	X	—	X	—	X
31-70 Automatic data reporting systems	—	—	—	—	—	—	—	X	X	X	—	X
32 Landing Gear												
32-10 Main gear and doors	X	X	X	X	—	—	—	—	—	—	—	—
32-20 Nose gear and doors	X	X	X	X	—	—	—	—	—	—	—	—
32-30 Extension and retraction	X	X	—	X	—	X	—	—	—	—	—	—
32-40 Wheels and brakes	X	—	X	X	—	—	—	—	—	—	—	—
32-50 Steering	X	X	X	X	—	X	—	—	—	—	—	—
32-60 Position indication and warning	—	X	—	X	—	X	X	X	—	X	—	X
32-70 Supplementary gear	X	X	X	X	—	—	—	—	—	—	—	—
33 Lights												
33-10 Flight compartment	X	X	—	X	—	—	X	X	—	X	—	X
33-20 Passenger compartment	X	X	—	X	—	—	X	X	—	X	—	X
33-30 Cargo and service compartments	X	X	—	—	—	—	X	X	—	—	—	X
33-40 Exterior	X	X	—	X	—	—	X	X	—	—	—	X
33-50 Emergency lighting	X	—	—	X	—	—	X	X	—	X	—	X
34 Navigation												
34-10 Flight environment data	—	X	—	—	—	—	—	X	—	—	—	X
34-20 Attitude and direction	—	X	—	—	—	—	—	X	—	X	X	X

OJT TASK SELECTION												
ATA Chapters	B1						B2					
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%
34-30 Landing and taxiing aids	—	—	—	—	—	—	—	X	—	X	X	X
34-40 Independent position determining	—	X	—	—	—	—	—	X	—	X	X	X
34-50 Dependent position determining	—	—	—	—	—	—	—	X	—	X	X	X
34-60 Flight management computing	—	X	—	—	—	—	—	X	X	X	X	X
35 Oxygen												
35-10 Crew	X	X	X	X	—	X	—	—	—	—	—	—
35-20 Passengers	X	X	—	X	—	—	—	—	—	—	—	—
35-30 Portable	X	—	—	—	—	—	—	—	—	—	—	—
36 Pneumatic												
36-10 Distribution	X	X	—	X	—	X	—	X	—	—	—	—
36-20 Indicating	—	X	—	X	—	X	X	X	—	—	—	X
37 Vacuum												
37-10 Distribution	—	X	—	X	—	X	—	—	—	—	—	—
37-20 Indicating	—	X	—	X	—	X	—	X	—	—	—	X
38 Water/Waste												
38-10 Potable	—	X	X	X	—	—	—	X	—	—	—	—
38-20 Wash	—	—	—	—	—	—	—	—	—	—	—	—
38-30 Waste disposal	—	X	X	X	—	—	—	X	—	—	—	—
38-40 Air supply	X	X	—	—	—	—	—	—	—	—	—	—
41 Water Ballast												
41-10 Storage	X	—	—	—	—	—	—	—	—	—	—	—
41-20 Dump	X	—	—	—	—	—	—	—	—	—	—	—
41-30 Indication	X	—	—	—	—	—	—	—	—	—	—	X
42 Integrated modular avionics	—	X	—	—	—	—	X	X	X	X	X	X
44 Cabin Systems												

OJT TASK SELECTION												
ATA Chapters	B1						B2					
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%
44-20 In-flight entertainment system	—	X	—	—	—	—	—	X	—	X	X	X
44-30 External communication system	—	X	—	—	—	—	—	X	—	X	X	X
44-40 Cabin mass memory system	—	—	—	—	—	—	—	X	—	X	X	X
44-50 Cabin monitoring system	—	—	—	—	—	—	—	X	—	X	X	X
44-60 Miscellaneous cabin system	—	—	—	—	—	—	—	X	—	X	X	X
45 On-Board Maintenance System (or covered in 31)	—	X	—	—	—	—	—	X	—	X	X	X
46 Information Systems												
46-10 Aeroplane general information systems	—	—	—	—	—	—	—	X	—	X	X	X
46-20 Flight deck information systems	—	X	—	—	—	—	—	X	—	X	X	X
46-30 Maintenance information systems	—	X	—	—	—	—	—	X	—	X	X	X
46-40 Passenger cabin information systems	—	X	—	—	—	—	—	X	—	X	X	X
46-50 Miscellaneous information systems	—	—	—	—	—	—	—	X	—	X	X	X
Airframe Structures:												
52 Doors												
52-10 Passenger/crew	X	—	X	X	X	—	—	—	—	—	—	—
52-20 Emergency exits	X	—	X	X	X	—	—	—	—	—	—	—
52-30 Cargo	X	—	—	—	—	—	—	—	—	—	—	—
52-40 Service and miscellaneous	X	—	—	—	—	—	—	—	—	—	—	—

OJT TASK SELECTION													
ATA Chapters	B1						B2						
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS	
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%	
52-50 Fixed interior	X	—	—	—	—	—	—	—	—	—	—	—	—
52-60 Entrance stairs	X	—	—	—	—	—	—	—	—	—	—	—	—
52-70 Monitoring and operation	—	X	—	—	—	—	X	X	—	—	—	X	—
52-80 Landing gear	X	—	X	—	—	—	—	—	—	—	—	—	—
53 Fuselage	X	—	—	—	—	X	—	—	—	—	—	—	—
54 Nacelles/Pylons	X	—	—	—	—	—	—	—	—	—	—	—	—
55 Stabilisers	X	—	—	—	—	—	—	—	—	—	—	—	—
56 Windows	X	—	—	—	—	X	—	—	—	—	—	—	—
57 Wings	X	—	—	—	—	—	—	—	—	—	—	—	—
Auxiliary power units (APUs):													
49 Auxiliary power unit													
49-10 Power plant	X	X	—	X	X	X	—	X	—	—	—	—	—
49-20 Engine	X	X	—	X	—	—	—	—	—	—	—	—	—
49-30 Engine fuel and control	—	X	—	X	—	—	—	—	—	—	—	—	—
49-40 Ignition/starting	—	X	—	—	—	—	X	—	—	—	—	X	—
49-50 Air	X	—	—	—	—	—	—	—	—	—	—	—	—
49-60 Engine controls	—	—	—	X	—	—	—	—	—	—	—	—	—
49-70 Indicating	—	X	—	—	—	—	—	—	—	—	—	—	—
49-80 Exhaust	X	—	—	—	—	—	—	—	—	—	—	—	—
49-90 Oil	—	—	X	—	—	—	—	—	—	—	—	—	—
Turbine Engines:													
70 Standard practices and engine performance	X	—	—	—	—	X	—	—	—	—	—	—	—
71 Powerplant	X	—	X	—	—	—	—	—	—	—	—	—	—
71-10 Cowling	X	—	X	X	—	—	—	—	—	—	—	—	—
71-20 Mounts	X	—	—	—	—	—	—	—	—	—	—	—	—
71-30 Fire seals	X	—	—	—	—	—	—	—	—	—	—	—	—
71-40 Attach fittings	X	—	—	—	—	—	—	—	—	—	—	—	—

OJT TASK SELECTION													
ATA Chapters	B1						B2						
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS	
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%	
71-50 Electrical harness	X	X	—	X	—	—	X	—	—	—	—	—	X
71-60 Air intakes	X	—	—	—	—	—	—	—	—	—	—	—	
72T Engine Turbine /Turboprop/ Ducted Fan /Unducted fan	X	—	X	X	—	—	—	—	—	—	—	—	—
73 Engine Fuel and Control													
73-10 Distribution	X	—	—	—	—	—	—	—	—	—	—	—	—
73-20 Controlling (FADEC)	X	X	—	X	X	X	—	X	—	—	—	—	X
73-30 Indicating	X	X	—	—	X	—	—	X	—	—	—	—	X
74 Ignition													
74-10 Electrical power	X	X	—	X	—	—	X	X	—	—	—	—	X
74-20 Distribution	X	X	—	—	—	—	X	X	—	—	—	—	X
74-30 Switching	X	X	—	X	—	—	X	X	—	—	—	—	X
75 Air													
75-10 Engine antiicing	X	X	—	X	X	X	—	—	—	—	—	—	—
75-20 Cooling	X	—	—	—	—	—	—	—	—	—	—	—	—
75-30 Compressor control	—	X	—	—	—	—	—	—	—	—	—	—	—
75-40 Indicating	—	X	—	—	—	—	—	X	—	—	—	—	X
76 Engine controls													
76-10 Power control (FADEC)	—	X	—	—	X	—	—	X	—	—	—	—	X
76-20 Emergency shutdown	—	—	—	—	X	—	—	—	—	—	—	—	—
77 Engine Indicating	—	X	—	—	X	X	X	X	—	—	X	X	X
78 Exhaust													
78-30 Thrust reverser	X	—	—	X	X	X	—	X	—	—	—	—	X
79 Oil	X	—	X	X	—	—	—	—	—	—	—	—	—
80 Starting	X	X	—	X	X	X	—	—	—	—	—	—	—
83 Accessory Gearboxes	X	—	X	X	—	—	—	—	—	—	—	—	—

OJT TASK SELECTION													
ATA Chapters	B1						B2						
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS	
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%	
Piston Engines:													
70 Standard practices and engine performance	X	—	—	—	—	X	—	—	—	—	—	—	—
71 Powerplant	X	—	X	—	—	—	—	—	—	—	—	—	—
71-10 Cowling	X	—	X	X	—	—	—	—	—	—	—	—	—
71-20 Mounts	X	—	—	—	—	—	—	—	—	—	—	—	—
71-30 Fire seals	X	—	—	—	—	—	—	—	—	—	—	—	—
71-40 Attach fittings	X	—	—	—	—	—	—	—	—	—	—	—	—
71-50 Electrical harness	X	X	—	X	—	—	X	—	—	—	—	—	X
71-60 Air intakes	X	—	—	—	—	—	—	—	—	—	—	—	—
72R Engine - reciprocating	X	—	X	X	—	—	—	—	—	—	—	—	—
73 Engine Fuel and Control	X	X	—	X	X	X	—	—	—	—	—	—	—
73-10 Distribution	X	—	—	—	—	—	—	—	—	—	—	—	—
73-20 Controlling (FADEC)	X	X	—	X	X	X	—	X	—	—	—	—	X
73-30 Indicating	X	X	—	—	X	—	X	X	—	—	—	—	X
74 Ignition													
74-10 Electrical power	X	X	—	X	—	X	X	X	—	—	—	—	X
74-20 Distribution	X	X	—	—	—	—	X	X	—	—	—	—	X
74-30 Switching	X	X	—	X	—	—	X	X	—	—	—	—	X
76 Engine Control	X	X	—	X	—	X	-	X	—	—	—	—	X
77 Engine Indicating	—	X	—	—	X	X	X	X	—	—	X	X	X
78 Exhaust	X	—	—	—	—	—	—	—	—	—	—	—	—
79 Oil	X	—	X	X	—	—	—	—	—	—	—	—	—
80 Starting	X	X	—	X	X	X	—	—	—	—	—	—	—
81 Turbines (reciprocating engines)	X	X	X	X	—	—	—	—	—	—	—	—	—
83 Accessory Gear Boxes	X	—	X	X	—	—	—	—	—	—	—	—	—

OJT TASK SELECTION												
ATA Chapters	B1						B2					
	INS	FOT	SGH	R/I	MEL	TS	INS	FOT	SGH	R/I	MEL	TS
Requirements: % of task categories	75%	50%	50%	50%	25%	25%	75%	50%	50%	50%	25%	25%
Propellers:												
61 Propellers/ Propulsion												
61-10 Propeller assembly	X	—	X	X	—	—	—	—	—	—	—	—
61-20 Controlling	—	—	—	X	X	—	—	—	—	—	—	—
61-30 Braking	X	—	—	—	—	—	—	—	—	—	—	—
61-40 Indicating	—	X	—	—	X	X	—	X	—	—	—	X
61-50 Propulsor duct	X	—	—	—	—	—	—	—	—	—	—	—
61B Propeller Pitch Control	—	X	—	X	X	X	—	—	—	—	—	—
61C Propeller Synchronising	—	X	—	—	—	X	—	X	—	—	—	X
61D Propeller Electronic control	—	X	X	X	X	X	—	X	—	—	—	X
61E Propeller Ice Protection	X	X	—	—	X	X	—	—	—	—	—	—

Note: For ATA Chapter 5, select at least one task from category (a), two tasks from category (b), and three tasks from category (c):

(a) Perform and/or assist in performing a scheduled maintenance check:

- accomplishment of 100-hour check (general aviation (GA) aircraft);
- accomplishment of a 'daily' or 'weekly', 'service', 'transit' or equivalent check;
- active participation in a scheduled check, e.g.: 'A-Check', 'B-Check', 'C-Check' or the equivalent of a base maintenance check.

(b) Review the aircraft maintenance log for correct completion:

- closure of MEL/CDL items;
- dent and buckle chart review, including inspections on fuselage and skin damages assessment in accordance with the SRM;
- fuel or oil leakage tests.

(c) Perform unscheduled inspection following:

- hard landing;

- overweight taxiing;
- bird/hail strike;
- aborted take-off;
- high-energy stop;
- wheel-bearing failure;
- exceedance of max NLG steering angle;
- landing gear shimmy/vibrations;
- lightning strike / HIRF;
- tail strike;
- winglet strike;
- severe turbulence / extreme high winds;
- airframe vibrations;
- ice/snow conditions;
- flight control overspeed down;
- hot-air duct rupture;
- relief pressure panels open;
- mercury spillage;
- galley spill;
- hydraulic fluid reaction with titanium;
- cabin overpressure;
- exceedance of fuel imbalance;
- smoke/fumes in the cabin;
- abnormal doors operations;
- ferry flight maintenance;
- others.

GM1 Appendix II to AMC Aircraft type practical experience and On-the-Job-Training – List of tasks

The following list represents an example of OJT tasks for B1.1 and B2 (Aeroplanes Turbine) AML categories. The list is not exhaustive, nor tailored to a specific aircraft type, and should be reviewed and adjusted as necessary.

[[Table should be green]]

Task No	ATA Chapters	Task description	B1.1	B2
1	05	Time limits / maintenance checks	X	X
2	05	Time limits / maintenance checks	X	X
3	05	Time limits / maintenance checks	X	—
4	05	Time limits / maintenance checks	X	—
5	05	Time limits / maintenance checks	X	X
6	05	Time limits / maintenance checks	X	—
7	05	Time limits / maintenance checks	X	X
8	06	Dimensions / areas	X	X
9	07	Lifting and shoring	X	—
10	07	Lifting and shoring	X	—
11	08	Levelling and weighing	X	—
12	08	Levelling and weighing	X	—
13	08	Levelling and weighing	X	X
14	09	Towing and taxiing	X	—
15	10	Parking/mooring, storing and return to service	X	—
16	10	Parking/mooring, storing and return to service	X	—
17	11	Placards and marking	X	X
18	12	Servicing	X	—
19	12	Servicing	X	—
20	12	Servicing	X	—
21	12	Servicing	X	—
22	12	Servicing	X	—

Task No	ATA Chapters	Task description	B1.1	B2
23	12 Servicing	Perform landing gear servicing	X	—
24	12 Servicing	Perform waste / potable water servicing	X	—
25	12 Servicing	Connect ground power	X	X
26	12 Servicing	Lubricate flight control elements	X	—
27	20 Standard practices	Perform aircraft grounding	X	X
28	20 Standard practices	Perform ESDS device inspection	X	X
	21 Air conditioning	
29	21-20 Distribution	Replace recirculation filter	X	—
30	21-40 Heating	Replace combustion heater	X	—
31	21-20 Distribution	Clean outflow valve	X	—
32	21-20 Distribution	Replace outflow valve	X	—
33	21-50 Cooling	Replace ACM / Air cycle unit	X	—
34	21-50 Cooling	Replace heat exchanger	X	—
35	21-30 Pressurisation control	Replace pressurisation controller	X	X
36	21-30 Pressurisation control	Perform pressurisation system functional test	X	X
37	21-20 Distribution	Perform equipment cooling system functional test	X	X
38	21-20 Distribution	Check configuration of AVX compartment ventilation system	X	X
39	21-30 Pressurisation control	Perform air-conditioning system functional test	X	X
40	21-60 Temperature control	Perform temperature control system functional test	X	X
41	21 Air conditioning	Troubleshoot faulty system	X	X
42	22 Autoflight	Replacement of autothrottle servomechanisms components	X	—
43	22 Autoflight	Replace actuator	X	—
44	22 Autoflight	Replace controller	X	X
45	22 Autoflight	Replace amplifier	X	X
46	22 Autoflight	Replace autoflight system LRU	X	X
47	22 Autoflight	Perform yam damper operational test	X	X
48	22 Autoflight	Perform autopilot functional test	X	X
49	22 Autoflight	Perform autopilot gain adjustment	—	X
50	22 Autoflight	Check augmentation system	X	X
51	22 Autoflight	Check operation of autothrottle	X	X
52	22 Autoflight	Perform autoland functional test	X	X

Task No	ATA Chapters		Task description	B1.1	B2
53	22	Autoflight	Check flight management systems	X	X
54	22	Autoflight	Perform Mach trim functional test	—	X
55	22	Autoflight	Upload FM data	X	X
56	22	Autoflight	Troubleshoot faulty system	—	X
57	23	Communications	Perform interphone system operational test	X	X
58	23	Communications	Service interphone components	X	X
59	23	Communications	Replace HF unit	X	X
60	23	Communications	Replace VHF unit	X	X
61	23	Communications	Replace antenna	X	X
62	23	Communications	Perform voice recorder operational test	X	X
63	23	Communications	Replace voice recorder	X	X
64	23	Communications	Perform static discharge components inspection	X	X
65	23	Communications	Perform radio functional test	—	X
66	23	Communications	Perform SELCAL operational test	X	X
67	23	Communications	Perform co-axial cable repair	—	X
68	23	Communications	Perform ELT operational test	X	X
69	23	Communications	Troubleshoot faulty system	—	X
70	24	Electrical power	Supply/remove APU power	X	X
71	24	Electrical power	Remove/install battery	X	X
72	24	Electrical power	Charge battery	X	X
73	24	Electrical power	Perform battery charger operational test	X	X
74	24	Electrical power	Perform standby power system functional test	X	X
75	24	Electrical power	Replace IDG oil filter	X	X
76	24	Electrical power	Remove/install IDG	X	X
77	24	Electrical power	Perform IDG functional test	X	X
78	24	Electrical power	Replace switch	X	X
79	24	Electrical power	Replace CB	X	X
80	24	Electrical power	Replace voltage regulator	—	X
81	24	Electrical power	Perform voltage regulator functional test	X	X
82	24	Electrical power	Perform electrical feeder cable repair	—	X
83	25	Equipment and furnishings	Perform emergency equipment inspection	X	X
84	25	Equipment and furnishings	Replace carpets	X	—

Task No	ATA Chapters	Task description	B1.1	B2
85	25 Equipment and furnishings	Perform crew seats operational test	X	—
86	25 Equipment and furnishings	Replace crew seats	X	—
87	25 Equipment and furnishings	Replace passenger seats	X	—
88	25 Equipment and furnishings	Perform seats and seat belts inspection	X	—
89	25 Equipment and furnishings	Check ELT for compliance with applicable regulations	X	X
90	25 Equipment and furnishings	Perform escape slide inspection	X	—
91	25 Equipment and furnishings	Remove/install escape slide	X	—
92	25 Equipment and furnishings	Perform upholstery repair	X	—
93	25 Equipment and furnishings	Remove/install interior panels	X	—
94	25 Equipment and furnishings	Remove/install cargo compartment panels	X	—
95	25 Equipment and furnishings	Perform cargo loading system inspection	X	—
96	25 Equipment and furnishings	Perform cargo loading system functional test	X	X
97	25 Equipment and furnishings	Replace cargo loading system actuator	X	—
98	26 Fire protection	Check fire bottle content	X	—
99	26 Fire protection	Remove/install fire bottle	X	—
100	26 Fire protection	Replace fire bottle squib	X	—
101	26 Fire protection	Check portable fire-extinguisher content	X	—
102	26 Fire protection	Perform smoke detection system functional test	X	X
103	26 Fire protection	Perform smoke detectors inspection	X	X
104	26 Fire protection	Remove/install smoke detectors	X	X
105	26 Fire protection	Perform fire protection system inspection	X	X
106	26 Fire protection	Perform fire protection system functional test	X	X
107	26 Fire protection	Perform engine fire detection system inspection	X	X
108	26 Fire protection	Troubleshoot faulty system	X	X
109	27 Flight controls	Perform horizontal stabiliser components inspection	X	—
110	27 Flight controls	Perform horizontal stabiliser operational test	X	X
111	27 Flight controls	Remove/install horizontal stabiliser	X	—
112	27 Flight controls	Perform elevator components inspection	X	—
113	27 Flight controls	Perform elevator operational test	X	X
114	27 Flight controls	Remove/install elevator	X	—

Task No	ATA Chapters	Task description	B1.1	B2
115	27 Flight controls	Perform aileron components inspection	X	—
116	27 Flight controls	Perform aileron operational test	X	X
117	27 Flight controls	Remove/install aileron	X	—
118	27 Flight controls	Perform rudder components inspection	X	—
119	27 Flight controls	Perform rudder operational test	X	X
120	27 Flight controls	Remove/install rudder	X	—
121	27 Flight controls	Remove/install trim tab	X	—
122	27 Flight controls	Perform LE flap components inspection	X	—
123	27 Flight controls	Perform LE flap operational test	X	X
124	27 Flight controls	Perform LE devices alternate operation	X	X
125	27 Flight controls	Remove/install LE flap	X	—
126	27 Flight controls	Perform TE flap components inspection	X	—
127	27 Flight controls	Perform TE flap operational test	X	X
128	27 Flight controls	Perform TE devices alternate operation	X	X
129	27 Flight controls	Remove/install TE flap	X	—
130	27 Flight controls	Perform spoiler components inspection	X	—
131	27 Flight controls	Perform spoiler operational test	X	X
132	27 Flight controls	Remove/install spoiler	X	—
133	27 Flight controls	Perform slat component inspection	X	—
134	27 Flight controls	Perform slat operational test	X	X
135	27 Flight controls	Remove/install slat	X	—
136	27 Flight controls	Replace control cable and fittings	X	—
137	27 Flight controls	Perform control cable tension adjustment	X	—
138	27 Flight controls	Remove/install actuator	X	—
139	27 Flight controls	Remove/install powered control unit	X	—
140	27 Flight controls	Perform flight controls functional test	X	X
141	27 Flight controls	Perform stall warning system functional test	X	X
142	27 Flight controls	Perform control column operational test	X	X
143	27 Flight controls	Deactivate/reactivate servo control	X	-
144	27 Flight controls	Check / adjust gearbox oil level	X	-
145	27 Flight controls	Troubleshoot faulty system	X	X
146	28 Fuel systems	Perform fuel/defuel system components inspection	X	—

Task No	ATA Chapters	Task description	B1.1	B2
147	28 Fuel systems	Fuel quantity indicating system functional test	X	X
148	28 Fuel systems	Perform fuel transfer between tanks	X	—
149	28 Fuel systems	Perform booster pump inspection	X	—
150	28 Fuel systems	Remove/install booster pump	X	—
151	28 Fuel systems	Remove/install fuel selector	X	—
152	28 Fuel systems	Perform fuel tank inspection	X	—
153	28 Fuel systems	Remove/install fuel control valve	X	—
154	28 Fuel systems	Remove/install fuel level indicator	X	—
155	28 Fuel systems	Remove/install fuel line	X	—
156	28 Fuel systems	Remove/install flame arrestor	X	—
157	28 Fuel systems	Remove/install water drain valve	X	—
158	28 Fuel systems	Perform fuel content calculation	X	—
159	28 Fuel systems	Check fuel quantity gauge calibration	X	—
160	28 Fuel systems	Perform fuel feed/selectors functional test	X	X
161	28 Fuel systems	Perform fuel dump system functional test	X	X
162	28 Fuel systems	Troubleshoot faulty system	X	X
163	29 Hydraulic power	Perform hydraulic system components inspection	X	—
164	29 Hydraulic power	Check hydraulic system indication	X	x
165	29 Hydraulic power	Perform hydraulic system functional test	X	X
166	29 Hydraulic power	Check auxiliary system indication	X	x
167	29 Hydraulic power	Perform auxiliary system functional test	X	X
168	29 Hydraulic power	Depressurise/pressurise hydraulic reservoirs	X	—
169	29 Hydraulic power	Perform pressurisation module leak check	X	—
170	29 Hydraulic power	Perform shut-off valve operational test	X	X
171	29 Hydraulic power	Replace hydraulic filter	X	—
172	29 Hydraulic power	Replace engine-driven pump	X	—
173	29 Hydraulic power	Replace hydraulic system valve	X	—
174	29 Hydraulic power	Replace hydraulic system line	X	—
175	29 Hydraulic power	Perform power transfer unit operational test	X	X
176	29 Hydraulic power	Remove/install power transfer unit	X	—
177	29 Hydraulic power	Troubleshoot faulty system	X	X
178	30 Ice and rain protection	Perform windshield wiper system components inspection	X	—

Task No	ATA Chapters	Task description	B1.1	B2
179	30 Ice and rain protection	Replace windshield wiper	X	—
180	30 Ice and rain protection	Replace windshield wiper motor	X	—
181	30 Ice and rain protection	Adjust windshield wiper tension	X	—
182	30 Ice and rain protection	Perform ice detection components inspection	X	—
183	30 Ice and rain protection	Check ice detection indication	X	X
184	30 Ice and rain protection	Perform de-icing/anti-icing system components inspection	X	—
185	30 Ice and rain protection	Perform de-icing/anti-icing system functional test	X	X
186	30 Ice and rain protection	Replace de-icing/anti-icing valve	X	—
187	30 Ice and rain protection	Replace solenoid valve	X	X
188	30 Ice and rain protection	Perform probe heating system components inspection	X	—
189	30 Ice and rain protection	Perform probe heating system functional test	X	X
190	30 Ice and rain protection	Perform window heating system component inspection	X	—
191	30 Ice and rain protection	Perform window heating system functional test	X	X
192	30 Ice and rain protection	Troubleshoot faulty system	X	X
193	31 Indicating/recording systems	Perform flight data recorder system components inspection	X	X
194	31 Indicating/recording systems	Perform flight data recorder system operational test	X	X
195	31 Indicating/recording systems	Remove/install flight data recorder	X	X
196	31 Indicating/recording systems	Remove/install clock	X	X
197	31 Indicating/recording systems	Remove/install master caution unit	X	X
198	31 Indicating/recording systems	Perform flight data recorder data retrieval	X	X
199	31 Indicating/recording systems	Perform data acquisition unit functional test	X	X
200	31 Indicating/recording systems	Remove/install data acquisition unit	X	X
201	31 Indicating/recording systems	Perform warning system functional test	X	X
202	31 Indicating/recording systems	Perform EIS operational test	X	X
203	31 Indicating/recording systems	Troubleshoot faulty system	—	X
204	32 Landing gear	Perform tyres and brakes inspection	X	—

Task No	ATA Chapters		Task description	B1.1	B2
205	32	Landing gear	Replace brake unit	X	—
206	32	Landing gear	Perform wheels assembly	X	—
207	32	Landing gear	Perform wheels inspection	X	—
208	32	Landing gear	Replace wheels	X	—
209	32	Landing gear	Replace steering actuator	X	—
210	32	Landing gear	Perform NLG steering rigging	X	—
211	32	Landing gear	Perform autobrake system components inspection	X	—
212	32	Landing gear	Perform autobrake system functional test	X	X
213	32	Landing gear	Perform landing gear alternate brake control components inspection	X	—
214	32	Landing gear	Perform landing gear alternate brake control functional test	X	X
215	32	Landing gear	Perform parking brake components inspection	X	—
216	32	Landing gear	Perform parking brake functional test	X	X
217	32	Landing gear	Perform antiskid operational test	X	X
218	32	Landing gear	Perform landing gear extension/retraction system components inspection	X	—
219	32	Landing gear	Replace landing gear retraction actuator	X	—
220	32	Landing gear	Perform landing gear extension/retraction system functional test	X	X
221	32	Landing gear	Replace uplock/downlock assembly	X	—
222	32	Landing gear	Perform sensor adjustment	X	X
223	32	Landing gear	Perform landing gear operational test	X	X
224	32	Landing gear	Perform landing gear abnormal operational test	X	X
225	32	Landing gear	Replace landing gear door	X	—
226	32	Landing gear	Replace landing gear control cable	X	—
227	32	Landing gear	Replace landing gear safety sensor	X	—
228	32	Landing gear	Replace landing gear shock strut	X	—
229	32	Landing gear	Replace shimmy damper	X	—
230	32	Landing gear	Perform air-ground system functional test	X	X
231	32	Landing gear	Troubleshoot faulty system	X	X
232	33	Lights	Perform interior lights inspection	X	X
233	33	Lights	Perform interior lights operational test	X	X
234	33	Lights	Replace interior lights	X	X

Task No	ATA Chapters	Task description	B1.1	B2
235	33 Lights	Replace push-button switch	X	X
236	33 Lights	Perform cargo lights	X	X
237	33 Lights	Perform cargo lights operational test	X	X
238	33 Lights	Replace cargo lights	X	X
239	33 Lights	Perform exterior lights inspection	X	X
240	33 Lights	Perform exterior lights operational test	X	X
241	33 Lights	Replace exterior lights	X	X
242	33 Lights	Perform emergency lights inspection	X	X
243	33 Lights	Perform emergency lights operational test	X	X
244	33 Lights	Replace emergency lights	X	X
245	33 Lights	Perform landing lights inspection	X	X
246	33 Lights	Perform landing lights operational test	X	X
247	33 Lights	Replace landing lights	X	X
248	33 Lights	Perform navigation lights inspection	X	X
249	33 Lights	Perform navigation lights operational test	X	X
250	33 Lights	Replace navigation lights	X	X
251	33 Lights	Perform logo lights inspection	X	X
252	33 Lights	Perform logo lights operational test	X	X
253	33 Lights	Replace logo lights	X	X
254	33 Lights	Troubleshoot faulty system	X	X
255	34 Navigation	Perform Pitot-static system components inspection	X	X
256	34 Navigation	Replace Pitot-static probe	—	X
257	34 Navigation	Perform static and total air pressure drain fitting	—	X
258	34 Navigation	Perform static pressure port inspection	—	X
259	34 Navigation	Replace static pressure port	—	X
260	34 Navigation	Replace VOR/ILS	—	X
261	34 Navigation	Perform VOR/ILS functional test	—	X
262	34 Navigation	Replace DME	—	X
263	34 Navigation	Perform DME functional test	—	X
264	34 Navigation	Perform inertial reference system functional test	—	X
265	34 Navigation	Replace inertial reference unit	—	X
266	34 Navigation	Perform altimeter functional test	—	X

Task No	ATA Chapters		Task description	B1.1	B2
267	34	Navigation	Replace altimeter	—	X
268	34	Navigation	Perform air data computer functional test	—	X
269	34	Navigation	Replace air data computer	—	X
270	34	Navigation	Perform air speed indicator functional test	—	X
271	34	Navigation	Replace air speed indicator	—	X
272	34	Navigation	Perform weather radar functional test	—	X
273	34	Navigation	Replace weather radar	—	X
274	34	Navigation	Perform TCAS functional test	—	X
275	34	Navigation	Replace TCAS	—	X
276	34	Navigation	Perform ATC transponder functional test	—	X
277	34	Navigation	Replace ATC transponder	—	X
278	34	Navigation	Perform EGPWS functional test	—	X
279	34	Navigation	Replace EGPWS	—	X
280	34	Navigation	Perform ADF functional test	—	X
281	34	Navigation	Replace ADF	—	X
282	34	Navigation	Perform satellite communications system functional test	—	X
283	34	Navigation	Update FM system database	—	X
284	34	Navigation	Perform magnetic compass calibration	X	X
285	34	Navigation	Troubleshoot faulty system	—	X
286	35	Oxygen	Perform crew oxygen system components inspection	X	—
287	35	Oxygen	Service crew oxygen system	X	—
288	35	Oxygen	Perform crew oxygen system functional test	X	X
289	35	Oxygen	Perform passenger oxygen system inspection	X	—
290	35	Oxygen	Service passenger oxygen system	X	—
291	35	Oxygen	Perform passenger oxygen system functional test	X	X
292	35	Oxygen	Replace regulator	X	—
293	35	Oxygen	Replace valve	X	—
294	35	Oxygen	Replace oxygen generator	X	—
295	35	Oxygen	Replace discharge disk	X	—
296	35	Oxygen	Replace protective breathing equipment	X	—
297	35	Oxygen	Perform auto-deployment test	X	X

Task No	ATA Chapters		Task description	B1.1	B2
298	35	Oxygen	Troubleshoot faulty system	X	X
299	36	Pneumatic	Perform pneumatic system components inspection	X	—
300	36	Pneumatic	Perform pneumatic system functional test	X	X
301	36	Pneumatic	Perform pneumatic system leakage test	X	—
302	36	Pneumatic	Replace filter	X	—
303	36	Pneumatic	Replace duct	X	—
304	36	Pneumatic	Remove/install shut-off valve	X	—
305	36	Pneumatic	Remove/install regulating valve	X	—
306	36	Pneumatic	Remove/install regulator	X	—
307	36	Pneumatic	Troubleshoot faulty system	X	X
308	37	Vacuum	Perform vacuum system components inspection	X	—
309	37	Vacuum	Perform vacuum system functional test	X	X
310	37	Vacuum	Replace vacuum pump	X	—
311	37	Vacuum	Remove/install regulator	X	—
312	37	Vacuum	Replace filter	X	—
313	37	Vacuum	Troubleshoot faulty system	X	X
314	38	Water/waste	Perform water system components inspection	X	—
315	38	Water/waste	Perform water system functional test	X	X
316	38	Water/waste	Depressurise/pressurise water tank	X	—
317	38	Water/waste	Replace water pump	X	—
318	38	Water/waste	Replace water faucet	X	—
319	38	Water/waste	Perform water heater operational check	X	—
320	38	Water/waste	Perform waste system components inspection	X	—
321	38	Water/waste	Perform waste system functional test	X	X
322	38	Water/waste	Replace waste pump	X	—
323	38	Water/waste	Replace valve	X	—
324	38	Water/waste	Replace tank	X	—
325	38	Water/waste	Perform lavatory drain valve operational test	X	—
326	38	Water/waste	Troubleshoot faulty system	X	X
327	45	Onboard maintenance system	Perform communications management unit functional test	X	X
328	45	Onboard maintenance system	Replace communications management unit	X	X

Task No	ATA Chapters	Task description	B1.1	B2
329	45 Onboard maintenance system	Perform communications management unit data retrieval	X	X
330	45 Onboard maintenance system	Troubleshoot faulty system	—	X
331	49 Auxiliary Power Unit	Perform APU components inspection	X	—
332	49 Auxiliary Power Unit	Perform APU functional test	X	X
333	49 Auxiliary Power Unit	Record APU data	X	—
334	49 Auxiliary Power Unit	Perform APU start/shutdown	X	X
335	49 Auxiliary Power Unit	Replace APU air inlet door actuator	X	—
336	49 Auxiliary Power Unit	Replace APU air inlet switch	X	—
337	49 Auxiliary Power Unit	Replace APU fuel nozzle	X	—
338	49 Auxiliary Power Unit	Replace APU igniter plug	X	—
339	49 Auxiliary Power Unit	Perform chip detector inspection	X	—
340	49 Auxiliary Power Unit	Perform APU emergency shutdown system functional test	X	X
341	49 Auxiliary Power Unit	Troubleshoot faulty system	X	X
342	51 Structures	Apply protective treatment	X	—
343	52 Doors	Perform entry door components inspection	X	—
344	52 Doors	Perform entry door operational test	X	—
345	52 Doors	Remove/install entry door	X	—
346	52 Doors	Perform crew door components inspection	X	—
347	52 Doors	Perform crew door operational test	X	—
348	52 Doors	Perform emergency exit door components inspection	X	—
349	52 Doors	Perform emergency exit door operational test	X	—
350	52 Doors	Remove/install emergency exit door	X	—
351	52 Doors	Perform cargo door components inspection	X	—
352	52 Doors	Perform cargo door operational test	X	—
353	52 Doors	Perform compartments doors components inspection	X	—
354	52 Doors	Perform compartments doors operational test	X	—
355	52 Doors	Perform snubber replacement	X	—
356	52 Doors	Perform locking mechanism rigging/adjustment	X	—
357	52 Doors	Perform air stair functional test	X	X
358	52 Doors	Perform door warning system functional test	X	X

Task No	ATA Chapters		Task description	B1.1	B2
359	52	Doors	Troubleshoot faulty system	X	X
360	53	Fuselage	Perform radome inspection	X	—
361	53	Fuselage	Perform damage assessment	X	—
362	53	Fuselage	Perform structural repair	X	—
363	54	Nacelles/pylons	Perform nacelle/pylon components inspection	X	—
364	54	Nacelles/pylons	Remove/install nacelle strut	X	—
365	55	Stabilisers	Perform vertical stabiliser inspection	X	—
366	55	Stabilisers	Perform horizontal stabiliser inspection	X	—
367	55	Stabilisers	Perform horizontal stabiliser conductive strip repair	X	—
368	56	Windows	Perform passenger cabin windows inspection	X	—
369	56	Windows	Remove/install passenger window	X	—
370	56	Windows	Perform flight compartment windows inspection	X	—
371	56	Windows	Remove/install flight compartment window	X	—
372	56	Windows	Perform flight compartment windows operational test	X	—
373	57	Wings	Perform wing structure inspection	X	—
374	57	Wings	Replace wing tip	X	—
375	57	Wings	Replace wing rib	X	—
376	57	Wings	Perform wing structural repair	X	—
377	70	Standard practices and engine performance	Perform fluorescent penetrant inspection	X	—
378	70	Standard practices and engine performance	Perform engine wiring harness repair	X	X
379	71	Power plant	Perform power plant components inspection	X	—
380	71	Power plant	Perform powerplant removal/installation	X	—
381	71	Power plant	Replace engine mounts	X	—
382	71	Power plant	Perform FOD inspection	X	—
383	71	Power plant	Remove/install engine harness	X	—
384	71	Power plant	Perform power plant adjustment/test	X	—
385	71	Power plant	Perform (assist) in engine dry motoring	X	—
386	71	Power plant	Perform (assist) in engine run	X	—
387	71	Power plant	Troubleshoot faulty system	X	X
388	72	Engine	Perform fan assembly inspection	X	—

Task No	ATA Chapters	Task description	B1.1	B2
389	72 Engine	Remove/install fan blade	X	—
390	72 Engine	Replace acoustical panel	X	—
391	72 Engine	Perform engine compressor inspection	X	—
392	72 Engine	Perform engine combustion case inspection	X	—
393	72 Engine	Perform engine turbine inspection	X	—
394	72 Engine	Perform gearbox assembly inspection	X	—
395	72 Engine	Perform compressor wash	X	—
396	72 Engine	Perform HPC borescope inspection	X	—
397	72 Engine	Perform hot section borescope inspection	X	—
398	72 Engine	Perform HPT borescope inspection	X	—
399	72 Engine	Remove/install igniter	X	—
400	72 Engine	Remove/install fuel nozzle	X	—
401	72 Engine	Troubleshoot faulty system	X	X
402	73 Engine fuel and control	Perform engine fuel system components inspection	X	—
403	73 Engine fuel and control	Replace engine fuel filters	X	—
404	73 Engine fuel and control	Replace engine-driven pump	X	—
405	73 Engine fuel and control	Perform FADEC functional test	X	—
406	73 Engine fuel and control	Remove/install engine electronic control module/unit	X	—
407	73 Engine fuel and control	Troubleshoot faulty system	X	X
408	74 Ignition	Perform ignition system components visual inspection	X	—
409	74 Ignition	Perform ignition system functional test	X	X
410	74 Ignition	Remove/install igniter plug	X	—
411	74 Ignition	Remove/install ignition exciter	X	—
412	74 Ignition	Troubleshoot faulty system	X	X
413	75 Air	Perform engine air system components inspection	X	—
414	75 Air	Remove/install VSV actuator	X	—
415	75 Air	Remove/install VBV actuator	X	—
416	75 Air	Perform engine air system functional test	X	X
417	76 Engine controls	Perform engine controls components inspection	X	—
418	76 Engine controls	Perform engine controls	X	—
419	76 Engine controls	Perform engine controls functional test	X	X

Task No	ATA Chapters	Task description	B1.1	B2
420	76 Engine controls	Perform thrust lever rigging	X	—
421	76 Engine controls	Remove/install thrust lever	X	—
422	76 Engine controls	Troubleshoot faulty system	X	X
423	77 Engine indicating	Perform engine indicating components inspection	X	—
424	77 Engine indicating	Perform engine indicating functional test	X	X
425	77 Engine indicating	Replace engine instrument	X	X
426	77 Engine indicating	Replace engine thermocouples	X	X
427	77 Engine indicating	Replace oil temperature bulb	X	X
428	77 Engine indicating	Troubleshoot faulty system	X	X
429	78 Exhaust	Perform exhaust components inspection	X	—
430	78 Exhaust	Perform thrust reverser operational test	X	X
431	78 Exhaust	Deactivate/reactivate thrust reverser for maintenance	X	—
432	78 Exhaust	Remove/install thrust reverser	X	—
433	78 Exhaust	Remove/install blocker door	X	—
434	78 Exhaust	Replace shroud assembly	X	—
435	79 Oil	Perform oil system components inspection	X	—
436	79 Oil	Perform oil system functional test	X	X
437	79 Oil	Replace oil filter	X	—
438	79 Oil	Replace oil pump	X	—
439	79 Oil	Replace oil cooler	X	—
440	79 Oil	Remove/install oil pressure sensor	X	X
441	79 Oil	Remove/install oil tank	X	—
442	79 Oil	Troubleshoot faulty system	X	X
443	80 Starting	Perform engine starting system components inspection	X	—
444	80 Starting	Perform engine starting system functional test	X	X
445	80 Starting	Replace engine start valve	X	—
446	80 Starting	Remove/install engine starter	X	—
447	80 Starting	Remove/install starter relay	X	X
448	80 Starting	Troubleshoot faulty system	X	X

Appendix III Evaluation of the competence: assessment and assessors

This Appendix applies to the competence assessment performed by the designated assessors (and their qualifications).

1) What does “competence” mean and areas of focus for assessment

The assessment should aim at measuring the competence by evaluating three major factors associated to the learning objectives:

- Knowledge;
- Skills;
- Attitude;

Generally, knowledge is evaluated by examination. The purpose of this document is not to describe the examination process: this material mainly addresses the evaluation of “skills” and “attitude” after training containing practical elements. Nevertheless, the trainee needs to demonstrate to have sufficient knowledge to perform the required tasks.

“Attitude” is indivisible from the “skill” as this greatly contributes to the safe performance of the tasks.

The evaluation of the competence should be based on the learning objectives of the training, in particular:

- the (observable) desired performance. This covers what the trainee is expected to be able to do and how the trainee is expected to behave at the end of the training;
- the (measurable) performance standard that must be attained to confirm the trainee’s level of competence in the form of tolerances, constraints, limits, performance rates or qualitative statements; and
- the conditions under which the trainee will demonstrate competence. Conditions consist of the training methods, the environmental, situational and regulatory factors.

The assessment should focus on the competencies relevant to the aircraft type and its maintenance such as, but not limited to:

- Environment awareness (act safely, apply safety precautions and prevent dangerous situations);
- Systems integration (demonstrate understanding of aircraft systems interaction – identify, describe, explain, plan, execute);
- Knowledge and understanding of areas requiring special emphasis or novelty (areas peculiar to the aircraft type, domains not covered by MCAR-66 Appendix I, practical training elements that cannot be imparted through simulation devices, etc.);
- Using reports and indications (the ability to read and interpret);
- Aircraft documentation finding and handling (identify the appropriate aircraft documentation, navigate, execute and obey the prescribed maintenance procedures);

- Perform maintenance actions (demonstrate safe handling of aircraft, engines, components and tools);
- Aircraft final/close-up and report (apply close up, initiate appropriate actions/follow-up/records of testing, establish and sign maintenance records/logbooks).

2) How to assess

As far as feasible, the objectives of the assessment should be associated with the learning objectives and the passing level; it means that observable criteria should be set in order to measure the performance and should remain as objective as possible.

The general characteristics of effective assessment are: objective, flexible, acceptable, comprehensive, constructive, organised and thoughtful. At the conclusion, the trainee should have no doubt about what he/she did well, what he/she did poorly and how he/she can improve.

The following is a non-exhaustive list of questions that may be posed to assist assessment:

- What are the success factors for the job?
- What are typical characteristics of a correct behaviour for the task?
- What criteria should be observed?
- What level of expertise is expected?
- Is there any standard available?
- What is the pass mark? For example:
 - “Go-no go” situation;
 - How to allocate points? Minimum amount to succeed;
 - “Must know or execute” versus “Good to know or execute” versus “Don’t expect the candidate to be an expert”.
- Minimum or maximum time to achieve? Use time effectively and efficiently.
- What if the trainee fails? How many times is the trainee allowed to fail?
- When and how should the trainee be prepared for the assessment?
- What proportion of judgment by the instructor out of collaboration with the trainee is needed during the evaluation stage?

The assessment may be:

- diagnostic (prior to a course), formative (re-orientate the course on areas where there is a need to reinforce) or summative (partial or final evaluation);
- performed task-by-task, as a group of tasks or as a final assessment;

One method might be an initial assessment to be performed by the trainee himself, then discussing areas where the perceptions of the trainee’s performance by the assessors differ in order to:

- develop the self-assessment habits;
- make the assessment more acceptable and understandable to both parties.

A “box-ticking” exercise would be pointless. Experience has shown that assessment sheets have largely evolved over time into assessment of groups of “skills” because in practice such things eventually detracted from the training and assessment that it was intended to serve: evaluate at a point of time, encourage and orientate the training needs, improve safety and ultimately qualify people for their duties.

In addition, many other aspects should be appropriately considered during the assessment process such as stress and environmental conditions, difficulty of the test, history of evaluation (such as tangible progresses or sudden and unexpected poor performance made by the trainee), amount of time necessary to build competence, etc.

All these reasons place more emphasis on the assessor and highlight the function of the organisation’s approval.

3) Who should assess

In order to qualify, the assessor should:

- Be proficient and have sufficient experience or knowledge in:
 - human performance and safety culture;
 - the aircraft type (necessary to have the certifying staff privileges in case of CRS issuances);
 - training/coaching/testing skills;
 - instructional tools to use;
- Understand the objective and the content of the practical elements of the training that is being assessed;
- Have interpersonal skills to manage the assessment process (professionalism, sincerity, objectivity and neutrality, analysis skills, sense of judgement, flexibility, capability of evaluating the supervisor’s or instructor’s reports, handling of trainee’s reactions to failing assessment with the cultural environment, being constructive, etc.);
- Be ultimately designated by the organisation to carry out the assessment.

The roles may be combined for:

- the assessor and the instructor for the practical elements of the Type Rating Training; or
- the assessor and the supervisor for the On-the-Job Training.

provided that the objectives associated to each role are clearly understood and that the competence and qualification criteria according to the company’s procedures are met for both functions. Whenever possible (depending on the size of the organisation), it is recommended to split the roles (two different persons) in order to avoid any conflicts of interests.

When the functions are not combined, the role of each function should be clearly understood.