REPUBLIC OF MAURITIUS

DEPARTMENT OF CIVIL AVIATION

Sir Seewoosagur Ramgoolam International Airport, Plaine Magnien

MAURITIUS CIVIL AVIATION REQUIREMENTS

MCAR PART-66

AIRCRAFT MAINTENANCE ENGINEER LICENCE PART 66

ISSUE 2 | REV 00

11 April 2025

FOREWORD

Regulation 20 of the Civil Aviation Regulations presently in force requires that the Authority issues an Aircraft Maintenance Engineer Licence to a person competent to issue Certificate of Release to Service under Regulation 19 to an aircraft registered in Mauritius.

In order to harmonise the Mauritian requirements for licensing of aircraft maintenance engineers with the Standards and Recommended Practices of ICAO, Annexes 1, 8 and 19, the MCAR-Part-66 issue 01 Rev 00 dated 22 April 2011, is hereby replaced by the issue 02 Rev 00 dated 11 April 2025.

This MCAR-Part-66 is issued pursuant to Regulation 135(1) of the Civil Aviation Regulations as amended.

This MCAR-Part-66 of Mauritius establishes the requirements for the issue, renewal, endorsement and extension of an aircraft maintenance engineer's licence, authorisation, approval, certificate of competency and conditions of its validity and use. It also has a provision for converting the Aircraft Maintenance Engineer's Licence issued prior to the MCAR-Part-66 coming into force.

The MCAR-Part-66 is applicable to all personnel / Organisations engaged in maintenance and /or certification of aircraft registered in Mauritius with immediate effect.

Each requirement of the MCAR-Part-66 is followed by an Acceptable Means of Compliance (AMC) and associated Guidance Material (GM) as applicable.

All aircraft maintenance engineer licence issued in accordance with MCAR Part 66 issue 01 revision dated 22 April 2011 will remain valid until expiry and will be re-issued in the new format as per this MCAR.

Any suggestion on these requirements should be sent to the Director of Civil Aviation via email on civil-aviation@govmu.org for review and consideration.

This MCAR-Part-66 Issue 2 Rev 0 will be effective as from 11 April 2025.

I POKHUN
Director of Civil Aviation

RECORD OF REVISION

Amendment No.	Date of issue	Date entered	Entered by
Issue 01	22 April 2011	22 April 2011	DCA
Issue 02	11 April 2025	11 April 2025	DCA

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GENERAL

66.1 Authority

Authority" means the Director of Civil Aviation or such Authority as may be specified in any enactment as being responsible for promoting the safety of civil aviation in Mauritius.

66.2 Definitions

1. **Aircraft**: means any machine that can derive support in the atmosphere from the reactions of the air other than reactions of the air against the earth's surface.

2. **Aircraft Avionics**: means a term designating any electronic device – including its electrical part – for use in an aircraft, including radio, automatic flight control and instrument systems.

3. **Aircraft maintenance engineer licence or —AMEL**: means a document issued as evidence of qualification confirming that the person to whom it refers has met the MCAR-Part-66 knowledge and experience requirements for any aircraft basic category and aircraft type rating, if appropriate, specified in the document.

4. **Approved Maintenance Organisation**: means an organisation approved in accordance with regulation 22 of the Civil Aviation Regulations.

5. **Approved training** means training conducted under special curricula and supervision approved by the Authority that is conducted within an approved maintenance training organisation.

6. **Certification**: means the issuance of a certificate of release to service.

7. **Certifying staff**: means those personnel who are authorised by the MCAR-Part-145 approved maintenance organisation or other approved organisation in accordance with a procedure acceptable to the Authority to certify aircraft or aircraft components for release to service.

8. **Credit**: means recognition of alternative means or prior qualifications.

9. **Component**: means any engine, propeller, part or appliance;

10. **Continuing Airworthiness**: means all of the processes ensuring that, at any time in its operating life, the aircraft complies with the airworthiness requirements in force and is in a condition for safe operation;

11. **ELA1 Aircraft**: means the following manned light aircraft:

(i) an aeroplane with a maximum take-off mass (MTOM) of 1 200 kg or less that is not classified as complex motor-powered aircraft;

(ii) a sailplane or powered sailplane of 1 200 kg MTOM or less;

(iii) a balloon with a maximum design lifting gas or hot air volume of not more than 3 400 m^3 for hot air balloons, 1 050 m^3 for gas balloons, 300 m3 for tethered gas balloons;

(iv) an airship designed for not more than four occupants and a maximum design lifting gas or hot air volume of not more than 3 400 m^3 for hot air airships and 1 000 m^3 for gas airships;

12. **ELA2 Aircraft**: means the following manned Light Aircraft:

(i) an aeroplane with a Maximum Take-off Mass (MTOM) of 2000 kg or less that is not classified as “complex motor-powered aircraft”;

(ii) a sailplane or powered sailplane of 2000 kg MTOM or less;

(iii) a balloon;

(iv) a hot air ship;

(v) a gas airship meeting all of the following elements:

- 3% maximum static heaviness,
- Non-vectored thrust (except reverse thrust),
- Conventional and simple design of: structure, control system and ballonet system
- Non-power assisted controls;

(vi) a Very Light Rotorcraft.

12. **Large Aircraft**: means an aircraft, classified as an aeroplane with a maximum take-off mass of more than 5,700 kg, or a multiengine helicopter.

13. **Organisation procedures**: means the procedures applied by the MCAR-Part 145 approved maintenance organisation in accordance with the Maintenance Organisation Exposition (MOE) within the scope of the approval.

14. **MCAR-Part 66 Aircraft Maintenance Engineer Licence (AMEL)**: means an aircraft maintenance engineer licence issued in accordance with the requirements of MCAR - Part 66.

15. **Maintenance**: means any one or combination of the following activities: overhaul, repair, inspection, replacement, modification or defect rectification of an aircraft or component, with the exception of pre-flight inspection;

16. **Pre-Flight Inspection**: means the inspection carried out before flight to ensure that the aircraft is fit for the intended flight.

SECTION A — TECHNICAL REQUIREMENTS

SUBPART A — AIRCRAFT MAINTENANCE LICENCE

66.A.1 Scope

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

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,
- auto flight,
- 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 2000 kg 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' is contained in **66.2.**

'ELA2 gas airships' refers to those gas airships which meet the definition of 'ELA2 aircraft' that is contained in in **66.2.**

'Gas airships other than ELA2' refers to those gas airships which do not meet at least one condition of the definition of 'ELA2 aircraft' that is contained in contained in in 66.2.
66.2 Definitions.

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'.

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, helicopters with multiple engines, aeroplanes with maximum certified operating altitude exceeding FL290, aircraft equipped with fly-by-wire systems, gas airships other than ELA2 and other aircraft requiring an aircraft type rating when defined as such by the Authority.

The Authority 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 turbojet and multiple-turboprop aeroplanes classified by the Authority in this subgroup because of their lower complexity.

(ii) subgroup 2b:

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

(iii) subgroup 2c:

– single piston engine helicopters,
– those multiple piston engine helicopters classified by the Authority 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.

GM 66.A.5 Aircraft groups

The following table summarises the applicability of categories/subcategories of Part-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 • 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 Authority	X	X							
1 • Gas airships other than ELA2		X							X
2 2a: Single turboprop aeroplanes 2b: Single turbine helicopters	X	X	X						

2c: Single piston helicopters									
3 Piston engine aeroplanes	X	X	X						
3 • Non-pressurized ELA2 piston engine aeroplane	X	X	X	X					
3 ELA1 piston engine aeroplanes	X	X	X	X		X			
4 • Sailplanes • Powered sailplanes • Balloons • Airships not in Group 1		X X X X	X X X X		X	X	X	X	

66.A.10 Application

(a) An application for a MCAR-66 aircraft maintenance engineers' licence or amendment to such licence must be made on a **DCA Form 19** (see Appendix V) with appropriate fees in a manner established by the Authority and submitted thereto.

(b) An application for the change to an aircraft maintenance licence shall be made to Authority that issued the aircraft maintenance licence.

(c) In addition to the documents required in points **66.A.10(a), 66.A.10(b)** 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 Authority together with the **DCA Form 19**.

(d) Where the applicant for change of the basic categories qualifies for such change via the procedure referred to in **point 66.B.100**, the application shall be sent to the Authority referred to in point **66.1**.

(e) Where the applicant for change of the basic categories qualifies for such change via the procedure referred to in **point 66.B.105**, the maintenance organisation approved in accordance with **MCAR Part-145** shall send the aircraft maintenance licence together with the **DCA Form 19** to the Authority referred to in **point 66.1** for stamp and signature of the change or reissue of the licence, as appropriate.

(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. Applications for MCAR-66 aircraft maintenance engineer's licence must be submitted to the Authority using **DCA Form 19**.

2. 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. It is acceptable to cross refer in the **DCA Form 19** to other documents containing information on maintenance.

3. 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 Part-147** certificate of recognition for approved basic training.

4. Applicants claiming reduction in **66.A.30(a)** total experience based upon having successfully completed technical training in an organisation or institute recognised by the Authority 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 DCA 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 for the Authority 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.

66.A.15 Eligibility

An applicant for the grant of a MCAR-66 aircraft maintenance licence must:

1. be at least 18 years of age;

2. be able to read, write and communicate to an understandable level in English in which technical documentation and procedures necessary to support the issue of certificate of release to service are written; and

3. be able to demonstrate a need to hold the licence.

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 145.A.35 of MCAR Part-145. 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, powerplant and mechanical and electrical systems,

   – work on avionic systems requiring only 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 point 145.A.35 of MCAR Part-145. 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, power plant and mechanical and electrical systems; and

   – work on avionics 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 of the 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-Part-M and MCAR-Part-145; and

2. in the preceding 2-year period he/she has, either had 6 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 to service 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:

– Auto flight;
– 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 licence 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 means any maintenance that is carried out before flight to ensure that the aircraft is fit for the intended flight. It may include:

– trouble shooting;

– defect rectification;

– component replacement with use of external test equipment, if required;

– maintenance that will detect obvious unsatisfactory conditions/discrepancies/malfunctions, but does not require extensive in-depth inspection. It may also include internal structure, systems and powerplant items which are visible through quick opening access panels/doors/ports;

– repairs, modifications and other maintenance tasks which do not require extensive disassembly and can be accomplished by simple means;

Base Maintenance 'Base maintenance' refers to any maintenance for the aircraft other than line maintenance.

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 2 000 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 or 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 of maintenance experience in the preceding 2-year period 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 organisation:

   – 6 months of continuous employment within the same organisation; or

   – 6 months split up into different blocks, employed within the same or in different organisations.

   The 6-month 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 M.A.801(b)1, or as a combination thereof.

   When a licence holder maintains and releases aircraft in accordance with M.A.801(b)1, in certain circumstances this number of days may even be reduced by 50% when agreed in advance by the Authority. These circumstances consider the cases where the licence holder happens to be the owner of an aircraft and carries out maintenance on his/her own aircraft, or where a licence holder maintains an aircraft operated for low utilisation, 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-month 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;
– Trouble-shooting;
– 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 authorisation the experience should be on that particular aircraft or on a similar aircraft within the same licence (sub)category. Two aircraft can be considered to be 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, turboprop, turbofan, turboshaft, jet-engine or push propellers); and

– Flight control systems (only mechanical controls, hydro-mechanically powered controls

– or electro-mechanically powered controls); and

– Avionic systems (analogue systems or digital systems); and

– Structure (manufactured of metal, composite or wood).

For licences endorsed with (sub)group ratings:

– In the case of B1 licence endorsed with (sub)group ratings (either manufacturer subgroup or full (sub)group) as defined in **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 licence endorsed with (sub)group ratings (either manufacturer subgroup or full (sub)group) as defined in **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 MTOW and below' as defined in **66.A.45**, the holder should show experience on at least one aircraft type per aircraft structure (metal, composite, 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
- In the particular case of Part-145 organisations, the type of maintenance i.e. base, line;
- Type of activity i.e., perform, supervise, release;
- Category used (for example A, B1, B2, B3 or C).
- Duration in days or partial-days.

GM 66.A.20(b)2 Privileges

The sentence included in 66.A.20(b)2 ‘met the provision for the issue of the appropriate privileges’ 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:

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

– Type ratings which have been endorsed on a licence 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 Part-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 Part-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 Part-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 Part-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 used for the performance of maintenance;

   – 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.

66.A.25 Basic knowledge requirements

(i) 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);

(ii) 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 MCAR Part 66 and shall be conducted by either of the following:

(1) a training organisation approved in accordance with MCAR Part-147;

(2) the competent authority;

(3) for category L licences, another organisation as agreed by the competent authority.

(iii) 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. If the basic knowledge examinations have not been passed within that 10-year period, credits for basic knowledge examinations may be alternatively obtained by the applicant in accordance with point (d).

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.

(iv) The applicant may apply to the competent authority for full or partial credits for the basic knowledge requirements for:

(1) basic knowledge examinations which were passed more than 10 years before the application for an aircraft maintenance licence was submitted (see point (c));

(2) any other national technical training and examination considered by the competent authority as equivalent to the corresponding basic knowledge requirements of this Requirement. The applicant shall provide evidence of the granted credits by referring to an examination credit report approved by the competent authority in accordance with Section B, Subpart E, of this MCAR Part-66.

(v) A basic training course without Modules 1 and 2 of Appendix I to this MCAR Part 147 is considered a full basic training course approved in accordance with MCAR Part-147 only when knowledge of those Modules is subsequently demonstrated by the applicant by examination and is credited by the Authority.

(vi) 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 Requirement.

(vii) A person who fails a basic knowledge examination twice within a 3-month period shall be ineligible to reapply for that examination for a period specified by the Authority.

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 Part-66**.

2. Knowledge gained and examinations passed during previous experiences, for example, in military aviation and civilian apprenticeships will be credited where the Authority is satisfied that such knowledge and examinations are equivalent to that required by **Appendix I to MCAR Part-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 licence (sub)category, which means that category A should demonstrate a limited but adequate level of knowledge, whereas category B1, B2 and B3 should demonstrate a complete level of knowledge in the appropriate subject modules.

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

'Or as agreed by the Authority refers to the examination that is concluded by an organisation under a formal agreement (and oversight) of the Authority.

66.A.30 Basic experience requirements

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

1. for category A, subcategories B1.2 and B1.4 and category B3:

(i) 3 years of practical maintenance experience on operating aircraft, if the applicant has no previous relevant technical training; or

(ii) 2 years of practical maintenance experience on operating aircraft and completion of training considered relevant by the Authority as a skilled worker, in a technical trade; or

(iii) 1 year of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with MCAR Part-147;

2. for category B2 and subcategories B1.1 and B1.3:

(i) 5 years of practical maintenance experience on operating aircraft if the applicant has no previous relevant technical training; or

(ii) 3 years of practical maintenance experience on operating aircraft and completion of training considered relevant by the Authority as a skilled worker, in a technical trade; or

(iii) 2 years of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with MCAR Part-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 Authority, 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 Part-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).

For the inclusion of an additional subcategory in an existing L licence, the experience required by points (i) and (ii) shall be 12 and 6 months respectively.

The holder of an aircraft maintenance licence in category/subcategory B1.2 or B3 is
deemed to meet the basic experience requirements for a licence in subcategories L1C,
L1, L2C and L2.

3. for category C with respect to complex motor-powered aircraft (CMPA):

(i) 3 years of experience in 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 Part-145, at a maintenance organisation working

on CMPA, including 12 months of experience as base maintenance support staff; or

(ii) 5 years of experience in 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 Part-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 Annex II (Part-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 complex motor-powered aircraft:

(i) 3 years of experience exercising category B1 or B2 privileges on other than complex motor-powered aircraft or as support staff according to point 145.A.35, or a combination of both;

5. The academic degree shall be in a relevant technical discipline, issued by a university or any other higher educational institution recognised by the Authority.

(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 Part-66.**

(c) The experience shall be practical and involve a representative cross section of maintenance tasks on aircraft.

(d) At least 1 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 1 year, but shall be at least 3 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 Part-145 may be recognised when such maintenance is equivalent to that required by this Annex as established by the competent authority.

However, demonstration of additional experience in organisations approved in accordance with Annexes II or under the supervision of independent certifying staff, shall be required.

(f) Experience shall have been acquired within the 05 years preceding the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence.

AMC 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 terms of 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 (Part-145, M.A. Subpart F, Part-CAO, FAR-145, etc.) or under the supervision of independent certifying staff;

- may be combined with Part-147 approved training (or other training approved by the competent authority) 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 a 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 Authority, 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 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

Part-145 or similar, or experience in performing comparable work that is directly related to the continuing airworthiness of aircraft within a competent authority.

'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.

5. '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 Part-145 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 'Annex I aircraft' or 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.

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

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

To: From:	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 12months 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 Authority	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	

To: From:	Category C for CMPA	Category C for other than CMPA
	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 recent experience should be gained within the 12-month period prior to the date of application for the aircraft maintenance licence. The remainder of the recent 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).**

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

(a) If the Authority has established that the experience gained outside an aircraft maintenance organisation approved in accordance with Part-145 is equivalent to that

required by Part-66, the minimum additional experience in aircraft maintenance organisation(s) that is (are) approved in accordance with Part-145 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 Part-145 may include experience in aircraft maintenance gained in the armed forces, coast guard and police.

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

(a) The aircraft maintenance licence becomes invalid 4 years after its last issue or change, unless the holder submits his/her aircraft maintenance licence to the Authority that issued it, in order to verify that the information contained in the licence is the same as that contained in the Authority records, pursuant to point 66.B.120.

(b) The holder of an aircraft maintenance licence shall complete the relevant parts of DCA Form 19 (see Appendix V) and submit it with the holder's copy of the licence to the Authority that issued the original aircraft maintenance licence, unless the holder works in a maintenance organisation approved in accordance with MCAR Part-145 that has a procedure in its exposition whereby such organisation may submit the necessary documentation on behalf of the aircraft maintenance licence holder.

(c) Any certification privilege 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 Authority and (ii) when the holder has signed the document.

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

The validity of the aircraft maintenance licence is not affected by recency of maintenance experience whereas the validity of the **66.A.20** privileges is affected by maintenance experience as specified in

66.A.20(a).

66.A.45 Endorsement with aircraft ratings

(1) In order to be entitled to exercise certification privileges on a specific aircraft type, the holder of an aircraft maintenance licence needs to have their 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 subgroup rating or full subgroup 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-pressurised 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 Part-145.**

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

- the relevant category B1, B2 or C aircraft type training in accordance with **Appendix III to MCAR Part-66**;

- in the case of gas airship type ratings on a B2 or L5 licence, a type training approved by the Authority in accordance with point 66.B.130.

(3) 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 Part-66**, except in the case of gas airships, where it shall be directly approved by the Authority.

(4) By derogation from points (b) and (c), for Group 2 and 3 aircraft, aircraft type ratings may also be endorsed on a licence after:

- satisfactory completion of the relevant category B1, B2 or C aircraft type examination in accordance with **Appendix III to this MCAR Part-66**;

- in the case of B1 and B2 category, demonstration of practical experience in 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 by holding an academic degree as specified in point 66.A.30(a)(7), the first relevant aircraft type examination shall be at the category B1 or B2 level.

(5) For Group 2 aircraft:

(i) the endorsement of manufacturer subgroup ratings for category B1 and C licence holders requires complying with the aircraft type rating requirements for at least two aircraft types from the same manufacturer, which combined are representative of the applicable manufacturer subgroup;

(ii) the endorsement of full subgroup ratings for category B1 and C licence holders requires complying with the aircraft type rating requirements for at least three aircraft types from different manufacturers, which combined are representative of the applicable subgroup;

(iii) the endorsement of manufacturer subgroup and full subgroup 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 subgroup 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.

(6) 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, Group 3 rating shall be subject to the following limitations, which shall be endorsed on the licence:

- pressurised aeroplanes
- metal-structure aeroplanes,
- composite-structure aeroplanes,
- wooden-structure aeroplanes,
- aeroplanes with metal-tubing structure covered with fabric;

(iii) by derogation from point (f)(i), the holder of a B2L licence, endorsed with a full subgroup 2a or 2b, is entitled to be endorsed with Groups 3 and 4.

(7) For the B3 licence:

(i) the endorsement of the rating 'piston engine non-pressurised aeroplanes of 2000 kg MTOM and below' requires 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 (i) 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.

- wooden-structure aeroplanes,
- aeroplanes with metal-tubing structure covered with fabric,
- metal-structure aeroplanes,
- composite-structure aeroplanes.

(8) 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:

GM 66.A.45 Endorsement with aircraft ratings

The following table shows a summary of the aircraft rating requirements contained in 66.A.45, 66.A.50 and MCAR Part-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) and for the B3 licence (piston-engine non-pressurized aeroplanes of 2 000 kg MTOM and below), which are the possible limitations 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 Part-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**	**licence B2/B2L**	**C licence**
Group 1 aircraft, except Airships - Complex motor-powered aircraft. - Multiple engine helicopters. - Aeroplanes certified above FL290. - Aircraft equipped with fly-by-wire. - Other aircraft when defined by the Authority.	(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
Group 1 airships	(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
Group 2 aircraft	(For B1.1, B1.3, B1.4)	(For B2)	

Subgroups: 2a: single turboprop aeroplanes (*) 2b: single turbine engine helicopters (*) 2c: single piston engine helicopters (*) (*) Except those classified in Group 1.	**Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience) **Full SUBGROUP RATING** (type training + OJT) **or** (type examination + practical experience) on at least 3 aircraft representatives of that subgroup **Manufacturer SUBGROUP RATING** (type training + OJT) or (type examination + practical experience) on at least 2 aircraft representatives of that manufacturer subgroup	**Individual TYPE RATING** (type training + OJT) **or** (type examination + 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 examination Full SUBGROUP RATING type training or type examination on at least 3 aircraft representatives of that subgroup **Manufacturer SUBGROUP RATING** type training or type examination on at least 2 aircraft representatives of that manufacturer subgroup
<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 examination + practical experience) **Full GROUP 3 RATING** based on demonstration of practical experience **Limitations:** - Pressurized aeroplanes - Metal aeroplanes - Composite aeroplanes - Wooden aeroplanes	(For B2) **Individual TYPE RATING** (Type training + OJT) or (type examination + practical experience) (For B2 and B2L) **Full GROUP 3 RATING** based on demonstration of appropriate experience	**Individual TYPE RATING** type training or type examination **Full GROUP 3 RATING** based on demonstration of practical experience

	- Metal tubing & fabric Aeroplanes		
Piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below	(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)**
Group 4 aircraft: 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 aero planes' rating, − For L3H: 'hot-air balloons' rating, − For L3G: 'gas balloons' rating, − For L4H: 'hot-air airships' rating, − For L4G: 'ELA2 gas airships' rating, all based on demonstration of practical experience **Limitations:**	(For B2 and B2L) **Full GROUP 4 RATING** based on demonstration of practical experience	Not applicable

	see 66.A.45(h)		

GM 66.A.45(b) Endorsement with aircraft ratings

An aircraft type rating includes all the aircraft models/variants listed in column 2 of **Appendix I to AMC to Part-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 Part-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, 145.A.35(a) and M.A.607(a)**, 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 L#H 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 Part-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.

GM 66.A.45(h)2 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, no limitations are possible for the 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.

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 Authority.

(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 referred to in point 66.B.300.

AMC 66.A.50(b) Limitations

1. The appropriate experience required to remove the limitations referred to 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 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 in just one aircraft type, provided this type is representative of the (sub)group in relation to the limitation being removed.

3. It is acceptable that this experience is gained in aircraft not covered by the Basic Regulation, provided that this experience is relevant and representative of the corresponding (sub)group. As example would be the experience to remove a limitation such as ‘aircraft with metal tubing structure covered with fabric’, which may be gained in ultralight aircraft.

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.

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.

66.A.70 Conversion provisions

(a) An aircraft maintenance engineers licence issued prior to the effective date of this MCAR Part 66 shall be replaced with a MCAR-66 aircraft maintenance licence upon renewal without further examination.

(b) 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 before the entry into force of the applicable licence category or subcategory provided for in this MCAR Part-66;

(ii) the basic knowledge requirements and the basic examination standards laid down in Appendices I and II to this MCAR-Part-66

(c) By derogation from point (c), for aircraft not used by licenced air carriers in accordance, 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 point **66.A.50** to ensure that the certifying staff privileges before the entry into force of the applicable MCAR Part-66 licence category/subcategory and those of the converted MCAR Part-66 aircraft maintenance licence remain the same.

(d) Limitations on MCAR-Part-66 aircraft maintenance engineer licence may be removed when the licence holder successfully applies to the Authority for their removal after fulfilling the necessary theoretical and practical requirements, or any experience as required by the Authority.

GM 66.A.70 Conversion provisions

1. As described in **point 66.A.70**, the conversion provisions apply to the holder of a certifying staff qualification valid to the date of entry into force of MCAR Part-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.
This should not be mistaken with the responsibilities linked to the airworthiness review, which was performed at different periods (typically varying from 6 months to 3 years). This is an activity which is performed at very specific points of time and not after every maintenance activity. Since an airworthiness review (or equivalent term used in the national systems) is not performed after every maintenance event before the aircraft takes flight, an airworthiness review cannot be considered as a maintenance release. This means that the conversion provisions described in 66.A.70 are not applicable to persons performing airworthiness review functions unless their signature was required after every maintenance event before the aircraft can take flight.

2. The conversion applies to ‘certifying staff qualifications’ such as, for example:

- holding a national licence (or completed the process to obtain such a national licence);

- having completed a qualification process defined by the Authority, or

- equivalent body under the national system, to become certifying staff;

- 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 Part-66 which means those qualifications valid before the following dates:

- 28 September 2005 for aircraft above 5 700 kg MTOM;

- 28 September 2006 for aircraft of 5 700 kg MTOM and below.

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 licence are those valid before the Authority had the obligation to start issuing such licences, which means the following:

- for the B3 licence, those qualifications valid before 28 September 2012;
- for the B2L licence, those qualifications valid before 5 March 2019;
- for the L licence, those qualifications valid before 1 October 2019.

4. Although only those certifying staff qualifications gained prior to the dates indicated above are eligible for conversion, this does not mean that the application for conversion has to be submitted prior to those dates. The applicant is entitled to have the conversion performed irrespective of when he/she applies for conversion.

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 in the past to a B1.2 licence with limitations linked to some missing elements of the **Part-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 Part-66 Appendix I, II or VII** 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 **Part-66 Appendix I** and II, all the modules/subjects corresponding to the B1 licence except for electrical power systems. This person would be issued a **Part-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 the Civil Aviation Regulations other than complex motor-powered aircraft, an example of limitations could be where a person holds a pre-Part-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-Part-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 the Civil Aviation Regulations.
- 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-Part-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

Part-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 the Civil Aviation Regulations.
- 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-Part-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 an MCAR- Part-66 aircraft maintenance licence in the L2 subcategory, with the following limitations (exclusions):

- aircraft involved in commercial air transport (this limitation always exists);
- ELA1 aeroplanes;
- wooden-structure aircraft covered with fabric;
- aeroplanes with metal-tubing structure covered with fabric.

One more example would be the case where a person holds a pre-MCAR-Part-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 Part-66 aircraft maintenance licence in the L1C subcategory, with the following limitations:

- aircraft involved in commercial air transport (this limitation always exists).
- complex maintenance tasks described **in Appendix VII to MCAR** Part-M, standard changes
- described in Part 21 point 21.A.90B, and standard repairs described in MCAR Part 21 point 21.A.431B.

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

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

66.A.71 Duplicate Aircraft Maintenance Engineer's Licence

Where an Aircraft Maintenance Engineers Licence has been lost or mutilated, the holder of aircraft maintenance engineer's licence may apply to Authority for the issue of a duplicate licence upon payment of the appropriate fee.

AMC 66.A.71 Duplicate AME Licence

(a) If an AME has lost the original AMEL, he/she may apply on DCA Form 66-05 enclosing following supporting documents to the Authority for the issue of a duplicate licence.

(i) Affidavit duly notarised by Authorised notary.
(ii) Copy of FIR lodged with the police station for the loss.
(iii) Fee as per the Civil Aviation Regulations.
(iv) Copy of AMEL if available.

(b) If the original AMEL had mutilated, the holder of the licence may apply on DCA Form 19-05 with the mutilated AMEL and fee as per the Civil Aviation Regulations to the Authority for the issue of a duplicate licence.

66.A.75 Approvals

The Authority may grant Approval to the holder of Aircraft Maintenance Engineer's Licence / other appropriately qualified person employed in an approved maintenance organization to certify maintenance work in respect of an aircraft, engine, system component, instrument, accessory or item of equipment including radio equipment not required to be covered under license, after inspection, maintenance, overhaul, repair, modification or test performed in accordance with the procedures approved by the Authority upon being satisfied that the applicant has sufficient knowledge, experience and has passed such examinations as specified in subpart C of this MCAR Part-66.

66.A.80 Authorisation

The Authority may grant authorization to the holders of an Aircraft Maintenance Engineer's Licence to carry out maintenance of any new aircraft, engine or system which has been brought into the organization and which is not within the scope of his licence and to issue a certificate of release thereof, provided that the Authority is satisfied that the applicant has sufficient knowledge, experience and training and has passed such examination as specified in subpart D of this MCAR Part-66.

66.A.85 Certificate of Competency

The Authority may grant a Certificate of Competency to an applicant employed in an organisation approved by Authority to perform specialized processes which may affect the airworthiness of an aircraft, upon being satisfied that the applicant has competency and skill and has passed examinations as specified in subpart E of this MCAR Part- 66.

66.A.90 Medical Fitness

Certifying staff must not exercise the privileges of their certification authorisation if they know or suspect that their physical or mental condition renders them unfit to exercise such privileges. All B2 certifying staff must undergo an eyesight test including colour vision, which is particularly important in this respect.

Subpart B

AIRCRAFT OTHER THAN AEROPLANES AND HELICOTPERS

66.A.100 General

Micro-light Aircraft, Gliders, balloons or airships may be certified by an aircraft maintenance engineer holding a licence in Category A or Category B1. Certification of micro light aircraft, gliders, paraplanners, balloons or airships may be carried out by category A or B1 licence holder and authorised by the Authority to carry out and certify such maintenance work. The holder of AME licence should have undergone relevant training and gained minimum three months maintenance experience prior to exercising the privileges of the authorisation.

SUBPART C

COMPONENTS

66.A.200 General

Approval to persons employed in an organisation approved by the Authority to certify maintenance work carried out on aircraft, engine or components shall be issued in accordance with requirements and procedures specified in Appendix to Subpart C or requirements and procedures approved in the Maintenance Organisation's Exposition.

SUBPART D

Authorisation

66.A.300 General

Authorisation to persons employed in an organisation approved by the Authority to carry out maintenance of any new aircraft, engine or system which has been brought into the organisation and which is not within the scope of his licence, shall be issued in accordance with the requirements and procedures specified in Appendix to Subpart D.

SUBPART E

Certificate of Competency

66.A.400 General

Certificate of Competency to persons employed in an approved organisation to carry out and certify specialised process which may affect the airworthiness of an aircraft shall be issued in accordance and procedures specified in Appendix to Subpart E.

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.

66.A.500 Revocation, suspension or limitation of the aircraft maintenance licence

The Authority shall, on reasonable grounds after due enquiry, revoke, suspend or limit the MCAR Part-66 aircraft maintenance engineer's licence or direct the MCAR Part-145 approved maintenance organisation to revoke, suspend or limit the MCAR Part-145 certification authorisation 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) If the Authority is not satisfied that the holder of the licence and authorisation is a fit and proper person to hold such licence and authorisation;

(2) In the case where the Authority has determined that the safe operation of the aircraft is adversely affected, the Authority may provisionally suspend the MCAR Part-66 aircraft maintenance engineer's licence without prior notice;

(3) The holder has obtained the aircraft maintenance engineer's licence or an authorisation or an approval or a certificate of competency and/or the certification privileges by fraudulent means;

(4) The holder has failed to carry out requested maintenance combined with failure to report such fact to the organisation or person who requested the maintenance;

(5) The holder has failed 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;

(6) The holder has performed work or granted a certificate in respect of work which has not been performed in a careful and competent manner and was responsible for compromising the airworthiness of the aircraft;

(7) The holder has signed a certificate in respect of any matter which he is not licensed to deal with in contravention to the Civil Aviation Regulations or MCAR Part-66;

(8) The holder has issued 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;

(9) The holder has falsified the maintenance record;

(10) The holder has carried out maintenance or has issued a certificate of release to service while under the influence of alcohol or any other intoxicating or any psychoactive substance;

(11) Found carrying out unfair means when examined;

(12) It is undesirable for any other reason that the holder should continue to exercise his privileges granted under the Civil Aviation Regulations or the MCAR Part-66.

(13) The Authority may withhold issue or extension or renewal of a licence or authorisation or approval or certificate of competency if, for reasons to be recorded in writing it considers it expedient to do so in public interest.

(14) The holder of a MCAR Part-66 aircraft maintenance engineer's licence that has been suspended or revoked shall forthwith forward the licence to the Authority.

APPENDICES TO MCAR PART-66

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 is indicated by knowledge levels (1, 2 or 3) of 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 on 3 levels 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’:

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. ELECTRONICS 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/ELECTR-ONIC 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 11, 16 & 17 as B1.2 or
12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	n/a	n/a	X	X	n/a	n/a	n/a	
13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	n/a	n/a	n/a	n/a	n/a	X	X	

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			
14. PROPULSION	n/a	n/a	n/a	n/a	n/a	X	X	12 & 15 as B1.3 or 12 & 16 as B1.4 or 13 & 14 as B2
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

MODULE 3. ELECTRICAL FUNDAMENTALS	LEVEL		
	A	B1 B2 B2L	B3
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. ELECTRONICS FUNDAMENTALS	LEVEL		
	A	B1 B3	B2 B2L
4.1 Semiconductors *4.1.1 Diodes* (a) Description and characteristics;	—	2	2
(b) Operation and function.	—	—	2
4.1.2 Transistors (a) Description and characteristics;	—	1	2
(b) Filters.	—	—	2
4.1.3 Integrated circuits (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 steels 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 materials;	—	1	1
(c) Repair and inspection procedures.	—	2	1
6.3 Aircraft materials – composite and non-metallic			
6.3.1 Composite and non-metallic other than wood and fabric			
(a) Characteristics;	1	2	2
(b) Detection of defects	1	2	—

MODULE 6. MATERIALS AND HARDWARE	LEVEL		
	A	B1 B3	B2 B2L
(c) Repairs and inspection procedures.	—	2	1
6.3.2 Wooden structures	1	1	—
6.3.3 Fabric covering	—	1	—
6.4 Corrosion			
(a) Chemical fundamentals;	1	1	1
(b) Types of corrosion.	2	3	2
6.5 Fasteners			
6.5.1 Screw threads	2	2	2
6.5.2 Bolts, studs and screws	2	2	2
6.5.3 Locking devices	2	2	2
6.5.4 Aircraft rivets	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			

MODULE 7. MAINTENANCE PRACTICES	LEVEL		
	A	B1 B3	B2 B2L
7.14.1 Sheet metal	—	2	—
7.14.2 Composite and non-metallic	—	2	—
7.14.3 Additive manufacturing	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 technique ;	—	2	1
(d) Disassembly and re-assembly techniques;	2	2	2
(e) Troubleshooting 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 & 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

MODULE 9. HUMAN FACTORS	LEVEL
	ALL
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 Maintenance and certification	—	1
10.10 Cybersecurity in aviation maintenance	1	1

MODULE 11. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 11. 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 aerodynamic 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 — aeroplane					
11.3.1 Fuselage, doors, windows (ATA 52/53/56)					
(a) Construction principles;	1	1	2	2	1
(b) Airborne towing devices;	1	1	1	1	1

MODULE 11. AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL				
	A1	A2	B1.1	B1.2	B3
(c) Doors.	1	1	2	1	-
11.3.2 Wings (ATA 57)	1	1	2	2	1
11.3.3 Stabilizers (ATA 55)	1	1	2	2	1
11.3.4 Flight control surfaces (ATA 55/57)	1	1	2	2	1
11.3.5 Nacelles/pylons (ATA 54)	1	1	2	2	1
11.4 Air conditioning and cabin pressurisation (ATA 21)					
(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 system.	—	1	—	3	1
11.5 Instruments/avionic systems					
11.5.1 Instrument systems (ATA 31)	1	1	2	2	2
11.5.2 Avionic Systems Fundamentals of system layouts and operation of: — Auto flight *(ATA 22)*, — Communications *(ATA 23)*, — Navigation Systems *(ATA 34)*.	1	1	1	1	1
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	2	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) Indication 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)					

MODULE 11. AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL				
	A1	A2	B1.1	B1.2	B3
(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
(d) Tail protection.	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 On-board maintenance systems (ATA 45)	1	—	2	—	—
11.19 Integrated Modular Avionics (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 (ATA 51)		
(a) General concept;	2	2
(b) Construction methods of 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

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A3 A4	B1.3 B1.4
12.7.2 Avionic systems Fundamentals of system layouts and operation of: Auto Flight *(ATA 22)*; Communications *(ATA 23)*; Navigation Systems *(ATA 34)*.	1	1
12.8 Electrical Power (ATA 24)	1	3
12.9 Equipment and furnishings (ATA 25) (a) Emergency equipment; Seats, harnesses, and belts; Lifting systems;	2	2
(b) Emergency flotation systems; Cabin layout, cargo retention; Equipment layout; 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)	2	3
12.17 Integrated Modular Avionics (ATA 42) (a) Overall system description and theory	1	2
(b) Typical system layouts	1	2
12.18 On-board Maintenance Systems (ATA 45) Central maintenance computers; Data-loading system; Electronic library system.	1	2
12.19 Information Systems (ATA 46)	1	2

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

C/N: Communication & Navigation; Ins.: Instruments; A/F: Auto flight; Sur.: Surveillance; A/S: Airframe & 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 concept;	2	2	—	—	—	—	—
(b) Fundamentals of structural systems;	1	1	—	—	—	—	—
13.3 *Auto flight (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 *On-board maintenance systems (ATA 45)*	3	—	—	—	—	—	—
13.11 *Air conditioning 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

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL						
	B2	B2L Basic	B2L C/N	B2L Ins.	B2L A/F	B2L Sur.	B2L A/S
(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) System;	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 (ATA 42)*							
(a) Overall system description and theory;	3	-	—	—	—	—	—
(b) Typical system layouts.	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

MODULE 14. PROPULSION	LEVEL B2 B2L Instruments B2L Airframe & Systems
(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 Turboshaft engines	1	2
15.18 Auxiliary power units (APUs)	1	2
15.19 Power plant 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 Power plant installation	1	2
16.12 Engine monitoring and ground operation	1	3
16.13 Engine storage and preservation	—	2
16.14 Alternative piston engine constructions	1	1

MODULE 17. PROPELLER

MODULE 17A. PROPELLER	LEVEL	
	A1 A2	B1.1 B1.2 B3
17.1 Fundamentals	1	2
17.2 Propeller cconstruction	1	2
17.3 Propeller pitch ccontrol	1	2
17.4 Propeller ssynchronising	—	2
17.5 Propeller ice protection	1	2
17.6 Propeller mmaintenance	1	3
17.7 Propeller sstorage 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.

MODULE 1. MATHEMATICS

MODULE 1. MATHEMATICS	LEVEL			
	A	B1	B2 B2L	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	2	2
1.2 Algebra a) Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions; 1 2 2 2	1	1	2	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	1
1.3 Geometry a) Simple geometrical constructions; — 1 1 1	-	1	1	1
b) Graphical representation; nature and uses of graphs, graphs of equations/functions; 2 2 2 2	2	2	2	2

MODULE 1. MATHEMATICS	LEVEL			
	A	B1	B2 B2L	B3
c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates	-	2	2	2

MODULE 2. PHYSICS

MODULE 2. PHYSICS	LEVEL			
	A	B1	B2 B2L	B3
2.1 Matter Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds; States: solid, liquid and gaseous; Changes between states	1	1	1	1
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; Pressure and buoyancy in liquids (barometers).	1	2	1	1
2.2.2 Kinetics Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular	1	2	1	1

MODULE 2. PHYSICS	LEVEL			
	A	B1	B2 B2L	B3
motion (centrifugal/centripetal forces); Periodic motion: pendular movement; Simple theory of vibration, harmonics and resonance; Velocity ratio, mechanical advantage and efficiency				
2.2.3 Dynamics a) Mass; Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;	1	2	1	1
b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance)	1	2	2	1
2.2.4 Fluid dynamic a) Specific gravity and density; b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility	2	2	2	2

MODULE 2. PHYSICS	LEVEL			
	A	B1	B2 B2L	B3
on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	1	2	1	1
2.3 Thermodynamics a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition; 2 2 2 2	2	2	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	-	2	2	1
2.4 Optics (Light) Nature of light; speed of light; Laws of reflection and refraction: reflection at plane surfaces,	-	2	2	-

MODULE 2. PHYSICS	LEVEL			
	A	B1	B2 B2L	B3
reflection by spherical mirrors, refraction, lenses; Fibre optics.				
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	2	-

MODULE 3. ELECTRICAL FUNDAMENTALS

MODULE 3. ELECTRICAL FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
3.1 Electron Theory Structure and distribution of electrical charges within: atoms, molecules, ions, compounds; Molecular structure of conductors, semiconductors and insulators.	1	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 a vacuum.	1	2	2	1
3.3 Electrical Terminology The following terms, their units and factors affecting them:	1	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL			
		A	B1	B2 B2L	B3
	potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow				
3.4	Generation of Electricity Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	1	2	2	2
3.5	DC Sources of Electricity Construction and basic chemical action 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 photo-cells.	1	2	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.	-	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
3.7 Resistance/Resistor a) Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings; Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallel combinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge;	-	2	2	1
b) Positive and negative temperature coefficient conductance; 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	1	-
3.8 Power	-	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL			
		A	B1	B2 B2L	B3
	Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.				
3.9	Capacitance/Capacitor Operation and function of a capacitor; Factors affecting 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 parallel circuits; Exponential charge and discharge of a capacitor, time constants; Testing of capacitors.	-	2	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; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor;	-	2	2	1
	b) Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy	-	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL			
		A	B1	B2 B2L	B3
	currents; Precautions for care and storage of magnets. — 2 2 1				
3.11	Inductance/Inductor 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 the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of 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.	-	2	2	1
3.12	DC Motor/Generator Theory Basic motor and generator theory; Construction and purpose of components in DC generator; Operation of, and factors affecting output and direction of current flow in DC generators; Operation of, and factors affecting output power, torque, speed and direction of rotation of	-	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL			
		A	B1	B2 B2L	B3
	DC motors; Series wound, shunt wound and compound motors; Starter Generator construction				
3.13	AC Theory 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/3 phase principles.	1	2	2	1
3.14	Resistive (R), Capacitive (C) and Inductive (L) Circuits — 2 2 1 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	-	2	2	1
3.15	Transformers 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; Calculation of line and phase voltages and currents; Calculation of power in a three-phase system; Primary and Secondary current, voltage, turns ratio, power, efficiency; Auto transformers.	-	2	2	1
3.16	Filters	-	1	1	-

MODULE 3. ELECTRICAL FUNDAMENTALS		LEVEL			
		A	B1	B2 B2L	B3
	Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.				
3.17	AC Generators 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 advantage and uses; Permanent Magnet Generators	-	2	2	1
3.18	AC Motors 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, inductor, shaded or split pole.	-	2	2	1

MODULE 4. ELECTRONIC FUNDAMENTALS

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
4.1 Semiconductors 4.1.1 Diodes a) Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon-controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.	-	2	2	2
b) Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation; 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, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.	-	-	2	-
4.1.2 Transistors a) Transistor symbols; Component description and orientation; Transistor characteristics and properties. b) Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors; Basic appreciation of other	-	1	2	1

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
transistor types 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	-	-	2	-
4.1.3 Integrated Circuits a) Description and operation of logic circuits and linear circuits/operational amplifiers;	-	1	-	1
b) Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator,	-	-	2	-

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.				
4.2 Printed Circuit Board Description and use of printed circuit boards.				
4.3 Servomechanisms a) Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters; b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null,	-	1	-	-

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
damping, feedback, deadband; 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; Servomechanism defects, reversal of synchro leads, hunting.	-	-	2	-

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
5.1 Electronic Instrument Systems Typical systems arrangements and cockpit layout of electronic instrument systems	1	2	2	3	1
5.2 Numbering Systems Numbering systems: binary, octal and hexadecimal;	-	1	-	2	

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.					-
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. b) Interpretation of logic diagrams.	-	2	-	2	-
	-	-	-	2	-

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
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). b) Computer related terminology; Operation, layout and interface of the major components in a micro-computer including their associated bus systems; Information contained in single and multiaddress instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.	1	2	-	-	-
	-	-	-	2	-
5.7 Microprocessors 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.	-	-	-	2	-
5.8 Integrated Circuits Operation and use of encoders and decoders; Function of encoder types; Uses of medium, large and very large-scale integration.	-	-	-	2	-

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
5.9 Multiplexing Operation, application and identification in logic diagrams of multiplexers and demultiplexers.	-	-	-	2	-
5.10 Fibre Optics 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.	-	1	1	2	-
5.11 Electronic Displays Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.	-	2	1	2	1
5.12 Electrostatic Sensitive Devices Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component and personnel anti-static protection devices	1	2	2	2	1
5.13 Software Management Control Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.	-	2	1	2	1
5.14 Electromagnetic Environment	-	2	2	2	

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
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.					1
5.15 Typical Electronic/Digital Aircraft Systems General arrangement of typical electronic/digital aircraft systems and associated BITE (Built in Test Equipment) such as: a) For B1 and B2 only: ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly-by-Wire FMS-Flight Management System IRS-Inertial Reference System; b) For B1, B2 and B3: ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Alert Collision Avoidance System Integrated Modular Avionics	-	2	2	2	1

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
Cabin Systems Information Systems					

MODULE 6. MATERIALS AND HARDWARE

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
7.1 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	2
b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	-	1	1	1
7.2 Aircraft Materials — Non-Ferrous a) Characteristics, properties and identification of common nonferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	1	2	1	2
b) Testing of non-ferrous material for hardness, tensile strength,				

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
fatigue strength and impact resistance.	-	1	1	1
7.3 Aircraft Materials — Composite and Non-Metallic 6.3.1 Composite and non-metallic other than wood and fabric a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents; b) The detection of defects/deterioration in composite and non-metallic material; Repair of composite and non-metallic material.	1	2	2	2
	1	2	2	2
6.3.2 Wooden structures Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.	1	2	-	2
6.3.3 Fabric covering Characteristics, properties and types of fabrics used in aeroplanes;	1	2	-	2

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.				
6.4 Corrosion a) Chemical fundamentals; Formation by, galvanic action process, microbiological, stress;	1	1	1	1
b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	2	3	2	2
6.5 Fasteners 6.5.1 Screw threads Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads.	2	2	2	2
6.5.2 Bolts, studs and screws 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.	2	2	2	2
6.5.3 Locking devices Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.	2	2	2	2

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
6.5.4 Aircraft rivets Types of solid and blind rivets: specifications and identification, heat treatment	1	2	1	2
6.6 Pipes and Unions a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;	2	2	2	2
b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	2	2	1	2
6.7 Springs Types of springs, materials, characteristics and applications	-	2	1	1
6.8 Bearings Purpose of bearings, loads, material, construction; Types of bearings and their application.	1	2	2	1
6.9 Transmissions 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.	1	2	2	1

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
6.10 Control Cables Types of cables; End fittings, turnbuckles and compensation devices; Pulleys and cable system components; Bowden cables; Aircraft flexible control systems.	1	2	1	2
6.11 Electrical Cables and Connectors 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.	1	2	2	2

MODULE 7A. MAINTENANCE PRACTICES

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 7B.

MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
	A	B1	B2 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. Also, instruction in 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 extinguishing agents.	3	3	3
7.2 Workshop Practices	3	3	3

MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
	A	B1	B2 B2L
Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.			
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 Avionic General Test Equipment Operation, function and use of avionic general test equipment	-	2	3
7.5 Engineering Drawings, Diagrams and Standards Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying 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; Wiring diagrams and schematic diagrams	1	2	2
7.6 Fits and Clearances 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.	1	2	3

MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
	A	B1	B2 B2L
7.7 Electrical Wiring Interconnection System (EWIS) Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial 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; EWIS installations, inspection, repair, maintenance and cleanliness standards	1	3	3
7.8 Riveting Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	1	2	-
7.9 Pipes and Hoses Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	1	2	-
7.10 Springs Inspection and testing of springs.	1	2	-
7.11 Bearings Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	1	2	-
7.12 Transmissions	1	2	-

MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
	A	B1	B2 B2L
Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.			
7.13 Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	1	2	-
7.14 Material handling 7.14.1 Sheet Metal Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work.			
7.14.2 Composite and non-metallic Bonding practices; Environmental conditions; Inspection methods.	-	2	-
7.15 Welding, Brazing, Soldering and Bonding a) Soldering methods; inspection of soldered joints.	-	2	2
b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints	-	2	-

MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
	A	B1	B2 B2L
7.16 Aircraft Weight and Balance a) Centre of Gravity/Balance limits calculation: use of relevant documents;	-	2	2
b) Preparation of aircraft for weighing; Aircraft weighing.	-	2	-
7.17 Aircraft Handling and Storage Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling/defueling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies. Effects of environmental conditions on aircraft handling and operation.	2	2	2
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; c) Non-destructive inspection techniques including, penetrant, radiographic, eddy	-	2	-

MODULE 7A. MAINTENANCE PRACTICES	LEVEL		
	A	B1	B2 B2L
current, ultrasonic and boroscope methods; d) Disassembly and re-assembly techniques; 2 2 2 e) Trouble shooting techniques.	-	2	1
	2	2	2
	-	2	2
7.19 Abnormal Events a) Inspections following lightning strikes and HIRF penetration; b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	2
	2	2	-
7.20 Maintenance Procedures 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.	1	2	2

MODULE 7B. MAINTENANCE PRACTICES

Note: The scope of this module shall reflect the technology of aeroplanes relevant to the B3 category.

MODULE 7B. MAINTENANCE PRACTICES	LEVEL
	B3
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. Also, instruction in 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 extinguishing agents.	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
7.3 Tools 3 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
7.4 Avionic General Test Equipment Operation, function and use of avionic general test equipment.	1
7.5 Engineering Drawings, Diagrams and Standards Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying 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; Wiring diagrams and schematic diagrams.	2
7.6 Fits and Clearances 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.	2

MODULE 7B. MAINTENANCE PRACTICES		LEVEL
		B3
7.7	Electrical Cables and Connectors Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion; Co-axial cables: testing and installation precautions; Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.	2
7.8	Riveting Riveted joints, rivet spacing and pitch; Tools used for riveting and dimpling; Inspection of riveted joints.	2
7.9	Pipes and Hoses Bending and belling/flaring aircraft pipes; Inspection and testing of aircraft pipes and hoses; Installation and clamping of pipes.	2
7.10	Springs Inspection and testing of springs.	2
7.11	Bearings Testing, cleaning and inspection of bearings; Lubrication requirements of bearings; Defects in bearings and their causes.	2
7.12	Transmissions Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	2
7.13	Control Cables Swaging of end fittings; Inspection and testing of control cables; Bowden cables; aircraft flexible control systems.	2
7.14	Material handling 7.14.1 Sheet Metal Marking out and calculation of bend allowance; Sheet metal working, including bending and forming; Inspection of sheet metal work	2
	7.14.2 Composite and non-metallic	2

MODULE 7B. MAINTENANCE PRACTICES	LEVEL
	B3
Bonding practices; Environmental conditions; Inspection methods.	
7.15 Welding, Brazing, Soldering and Bonding a) Soldering methods; inspection of soldered joints;	2
b) Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded joints.	2
7.16 Aircraft Weight and Balance a) Centre of Gravity/Balance limits calculation: use of relevant documents;	2
b) Preparation of aircraft for weighing; Aircraft weighing	2
7.17 Aircraft Handling and Storage Aircraft taxiing/towing and associated safety precautions; Aircraft jacking, chocking, securing and associated safety precautions; Aircraft storage methods; Refuelling/defueling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies; Effects of environmental conditions on aircraft handling and operation.	2
7.18 Disassembly, Inspection, Repair and Assembly Techniques a) Types of defects and visual inspection techniques; Corrosion removal, assessment and reprotection;	3
b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes; c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods;	2
d) Disassembly and re-assembly techniques; e) Trouble shooting techniques.	2

MODULE 7B. MAINTENANCE PRACTICES	LEVEL
	B3
	2
	2
7.19 Abnormal Events a) Inspections following lightning strikes and HIRF penetration.	2
b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2
7.20 Maintenance Procedures 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.	2

MODULE 8. BASIC AERODYNAMICS

MODULE 8. BASIC AERODYNAMICS	LEVEL			
	A	B1	B2 B2L	B3
8.1 Physics of the Atmosphere International Standard Atmosphere (ISA), application to aerodynamics.	1	2	2	1
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	1	2	2	1

MODULE 8. BASIC AERODYNAMICS	LEVEL			
	A	B1	B2 B2L	B3
(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.				
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	2	1
8.4 Flight Stability and Dynamics Longitudinal, lateral and directional stability (active and passive).	1	2	2	1

MODULE 9A. HUMAN FACTORS

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 9B.

MODULE 9A. HUMAN FACTORS	LEVEL		
	A	B1	B2 B2L
9.1 General The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.	1	2	2
9.2 Human Performance and Limitations	1	2	2

MODULE 9A. HUMAN FACTORS		LEVEL		
		A	B1	B2 B2L
	Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.			
9.3	Social Psychology Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.	1	1	1
9.4	Factors Affecting Performance Fitness/health; Stress: domestic and work related; Time pressure and deadlines; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	2	2	2
9.5	Physical Environment Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment.	1	1	1
9.6	Tasks Physical work; Repetitive tasks; Visual inspection; Complex systems	1	1	1
9.7	Communication Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information.	1	2	1
9.8	Human Error	1	2	2

MODULE 9A. HUMAN FACTORS		LEVEL		
		A	B1	B2 B2L
	Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e., accidents); Avoiding and managing errors.			
9.9	Hazards in the Workplace Recognising and avoiding hazards; Dealing with emergencies.	1	2	2

MODULE 9B. HUMAN FACTORS

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 9B.

MODULE 9B. HUMAN FACTORS		LEVEL
		B3
9.1	General The need to take human factors into account; Incidents attributable to human factors/human error; 'Murphy's' law.	2
9.2	Human Performance and Limitations Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access	2
9.3	Social Psychology Responsibility: individual and group; Motivation and de-motivation; Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership.	1
9.4	Factors Affecting Performance Fitness/health; Stress: domestic and work related; Time pressure and deadlines;	2

MODULE 9B. HUMAN FACTORS		LEVEL
		B3
	Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	
9.5	Physical Environment Noise and fumes; Illumination; Climate and temperature; Motion and vibration; Working environment	1
9.6	Tasks Physical work; Repetitive tasks; Visual inspection; Complex systems	1
9.7	Communication Within and between teams; Work logging and recording; Keeping up to date, currency; Dissemination of information	2
9.8	Human Error Error models and theories; Types of error in maintenance tasks; Implications of errors (i.e. accidents); Avoiding and managing errors.	2
9.9	Hazards in the Workplace Recognising and avoiding hazards; Dealing with emergencies.	2

MODULE 10. AVIATION LEGISLATION

MODULE 10. AVIATION LEGISLATION	LEVEL			
	A	B1	B2 B2L	B3
10.1 Regulatory Framework	1	1	1	1
10.2Certifying Staff — Maintenance Detailed understanding of Part-66.	2	2	2	2
10.3 Approved Maintenance Organisations	2	2	2	2

MODULE 10. AVIATION LEGISLATION	LEVEL			
	A	B1	B2 B2L	B3
Detailed understanding of Part-145 and Part-M Subpart F.				
10.4 Air operations General understanding of Regulations. Air Operators Certificates; Operator's responsibilities, in particular regarding continuing airworthiness and maintenance; Aircraft Maintenance Programme; MEL//CDL; Documents to be carried on board; Aircraft placarding (markings).	1	1	1	1
10.5 Certification of aircraft, parts and appliances a) General General understanding of Part 21.	-	1	1	1
b) Documents Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.	-	2	2	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A	B1.1
12.1 Theory of Flight 11.1.1. Aeroplane Aerodynamics and Flight Controls Operation and effect of:	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A	B1.1
— 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, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading-edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels		
11.1.2. High Speed Flight Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; Factors affecting airflow in engine intakes of high-speed aircraft; Effects of sweepback on critical Mach number	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A	B1.1
12.2 Airframe Structures — General Concepts a) 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; Aircraft bonding. b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding; Methods of surface protection, such as chromatin, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks.	2	2
	1	2
12.3 Airframe Structures — Aeroplanes 11.3.1 Fuselage (ATA 52/53/56) Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments;	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
	Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.		
	11.3.2 Wings (ATA 57) Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.	1	2
	11.3.3 Stabilisers (ATA 55) Construction; Control surface attachment.	1	2
	11.3.4 Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing-Mass and aerodynamic.	1	2
	11.3.5 Nacelles/Pylons (ATA 54) Nacelles/Pylons : — Construction, — Firewalls, — Engine mounts.	1	2
12.4	Air Conditioning and Cabin Pressurisation (ATA 21) 11.4.1 Air supply Sources of air supply including engine bleed, APU and ground cart.	1	2
	11.4.2 Air Conditioning	1	3

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
	Air conditioning systems; Air cycle and vapor cycle machines; Distribution systems; Flow, temperature and humidity control system.		
12.5	Instruments/Avionic Systems 11.5.1 Instrument Systems (ATA 31) 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; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.	1	2
12.6	Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power.	1	3

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
12.7	Equipment and Furnishings (ATA 25)		
a)	Emergency equipment requirements; Seats, harnesses and belts.	2	2
b)	Cabin lay-out; Equipment lay-out; Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1
12.8	Fire Protection (ATA 26)		
a)	Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3
b)	Portable fire extinguisher.	1	2
12.9	Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust lock systems; Balancing and rigging; Stall protection/warning system.	1	3
12.10	Fuel Systems (ATA 28)	1	3

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
	System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defueling; Longitudinal balance fuel systems.		
12.11	Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic; Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.	1	3
12.12	Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; De-icing systems: electrical, hot air, pneumatic and chemical; Rain repellent; Probe and drain heating; Wiper systems.	1	3
12.13	Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres;	2	3

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
	Steering; Air-ground sensing.		
12.14	Lights (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency	2	3
12.15	Oxygen (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings	1	3
12.16	Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU (Auxiliary Power Unit), compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	1	3
12.17	Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	2	3
12.18	On Board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
12.19	Integrated Modular Avionics (ATA42) Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: 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. Core System; Network Components.	1	2
12.20	Cabin Systems (ATA44) The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System (CIDS)) and between the aircraft cabin and ground stations (Cabin Network Service (CNS)). They include voice, data, music and video transmissions. CIDS provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange between the different related Line Replaceable Units (LRUs) and they are typically operated via Flight Attendant Panels (FAPs).	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
	CNS typically consists of a server, interfacing with, among others, the following systems: — 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). CNS may host functions such as: — access to pre-departure/departure reports; — e-mail/intranet/internet access; passenger database.		
12.21	Information Systems (ATA46) The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does 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;	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A	B1.1
	Miscellaneous Information System.		

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Note 1: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 11C.

Note 2: The scope of this Module shall reflect the technology of aeroplanes pertinent to the A2 and B1.2 subcategory.

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
11.1	Theory of Flight 11.1.1. Aeroplane Aerodynamics and Flight Controls 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, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading-edge devices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels	1	2

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
	11.1.2. High Speed Flight — N/A	-	-
11.2	Airframe Structures — General Concepts a) 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; Aircraft bonding. b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments; Structure assembly techniques: riveting, bolting, bonding;	2	2

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
	Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; Airframe symmetry: methods of alignment and symmetry checks	1	2
11.3	Airframe Structures — Aeroplanes 11.3.1 Fuselage (ATA 52/53/56) Construction and pressurisation sealing; Wing, tail-plane, pylon and undercarriage attachments; Seat installation; Doors and emergency exit: construction and operation; Windows and windscreen attachment	1	2
11.4	Air Conditioning and Cabin Pressurisation (ATA 21) Pressurisation and air conditioning systems; Cabin pressure controllers, protection and warning devices; Heating systems.	1	3
11.5	Instruments/Avionic Systems 11.5.1 Instrument Systems (ATA 31) Pitot static: altimeter, air speed indicator, vertical speed indicator;	1	2

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
	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 cockpit; Other aircraft system indication.		
	11.5.2 Avionic Systems Fundamentals of system lay-outs and operation of: — Auto Flight (ATA 22), — Communications (ATA 23), — Navigation Systems (ATA 34).	1	1
11.6	Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation; Voltage regulation; Power distribution; Inverters, transformers.	1	3
11.7	Equipment and Furnishings (ATA 25) a) Emergency equipment requirements; Seats, harnesses and belts. b) Cabin lay-out;	2	2

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
	Equipment lay-out; Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1
11.8	Fire Protection (ATA 26)		
a)	Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	1	3
b)	Portable fire extinguisher.	1	2
11.9	Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.	1	3
11.10	Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defueling.	1	3
11.11	Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids;	1	3

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
	Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems;		
11.12	Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing systems: electrical, hot air and chemical; Probe and drain heating; Wiper systems.	1	3
11.13	Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering; Air-ground sensing.	2	3
11.14	Lights (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency	2	3
11.15	Oxygen (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings	1	3
11.16	Pneumatic/Vacuum (ATA 36) System lay-out;	1	3

	MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
		A2	B1.2
	Sources: engine/APU (Auxiliary Power Unit), compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.		
11.17	Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing; Corrosion aspects.	2	3

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Note: The scope of this module shall reflect the technology of aeroplanes pertinent to the B3 category

	MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
		B3
11.1	Theory of Flight Aeroplane Aerodynamics and Flight Controls Operation and effect of: — roll control: ailerons, — pitch control: elevators, stabilators, variable incidence stabilisers and canards, — yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices, slots, slats, flaps, flaperons; Drag inducing devices, spoilers, lift dumpers, speed brakes; Effects of wing fences, saw tooth leading edges; Boundary layer control using, vortex generators, stall wedges or leading-edge devices; Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels	1

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B3
11.2	Airframe Structures — General Concepts a) 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; Aircraft bonding.	2
	a) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive 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	2
11.3	Airframe Structures — Aeroplanes 11.3.1 Fuselage (ATA 52/53/56) Construction and pressurisation sealing; Wing, tail-plane, pylon and undercarriage attachments; Seat installation; Doors and emergency exit: construction and operation; Windows and windscreen attachment.	1
	11.3.2 Wings (ATA 57) Construction;	1

	MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
		B3
	Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.	
	11.3.3 Stabilisers (ATA 55) Construction; Control surface attachment.	1
	11.3.4 Flight Control Surfaces (ATA 55/57) Construction and attachment; Balancing — mass and aerodynamic.	1
	11.3.5 Nacelles/Pylons (ATA 54) Nacelles/Pylons : — Construction, — Firewalls, — Engine mounts.	1
11.4	Air Conditioning (ATA 21) Heating and ventilation systems.	1
11.5	Instruments/Avionic Systems 11.5.1 Instrument Systems (ATA 31) 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; Angle of attack indication, stall warning systems; Glass cockpit; Other aircraft system indication.	1
	11.5.2 Avionic Systems Fundamentals of system lay-outs and operation of: — Auto Flight (ATA 22), — Communications (ATA 23), — Navigation Systems (ATA 34).	1
11.6	Electrical Power (ATA 24) Batteries Installation and Operation; DC power generation;	2

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B3
	Voltage regulation; Power distribution; Inverters, transformers.	
11.7	Equipment and Furnishings (ATA 25) Emergency equipment requirements; Seats, harnesses and belts.	2
11.8	Fire Protection (ATA 26) Portable fire extinguisher.	2
11.9	Flight Controls (ATA 27) Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.	3
11.10	Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defueling.	2
11.11	Hydraulic Power (ATA 29) System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical; Filters; Pressure Control; Power distribution; Indication and warning systems;	2
11.12	Ice and Rain Protection (ATA 30)	1

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B3
Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic and chemical; Probe and drain heating; Wiper systems.	
11.13 Landing Gear (ATA 32) Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and autobraking; Tyres; Steering.	2
11.14 Lights (ATA 33) External: navigation, anti-collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency	2
11.15 Oxygen (ATA 35) System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings	2
11.16 Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU (Auxiliary Power Unit), compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	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* 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 settling, overpitching; Auto-rotation; Ground effect	1	2
12.2	*Flight Control Systems* Cyclic control; Collective control; Swashplate; Yaw control: Anti-Torque 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* Rotor alignment; Main 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; Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.	1	3

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A3 A4	B1.3 B1.4
12.5 Airframe Structures a) 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 of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive 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 of surface protection, such as chromating, anodising, painting; Surface cleaning. Airframe symmetry: methods of alignment and symmetry checks.	1	2
12.6 Air Conditioning (ATA 21) *12.6.1 Air supply* Sources of air supply including engine bleed and ground cart	1	2
1.6.2 Air conditioning	1	3

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A3 A4	B1.3 B1.4
	Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.		
12.7	*Instruments/Avionic Systems* 12.7.1 Instrument Systems (ATA 31) 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 — HUMS; Glass cockpit; Other aircraft system indication.	1	2
	12.7.1 Instrument Systems (ATA 31) 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 — HUMS; Glass cockpit; Other aircraft system indication.	1	2
	12.7.2 Avionic Systems Fundamentals of system layouts and operation of: Auto Flight (ATA 22); Communications (ATA 23); Navigation Systems (ATA 34).	1	1

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A3 A4	B1.3 B1.4
12.8	*Electrical Power (ATA 24)* Batteries Installation and Operation; DC power generation, AC power generation; Emergency power generation; Voltage regulation, Circuit protection. Power distribution; Inverters, transformers, rectifiers; External/Ground power.	1	1
12.9	*Equipment and Furnishings (ATA 25)* a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems;	2	2
	b) Emergency flotation systems; Cabin lay-out, cargo retention; Equipment lay-out; Cabin Furnishing Installation	1	1
12.10	*Fire Protection (ATA 26)* Fire and smoke detection and warning systems; Fire extinguishing systems; System tests.	1	3
12.11	*Fuel Systems (ATA 28)* System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defueling.	1	3
12.12	*Hydraulic Power (ATA 29)* System lay-out; Hydraulic fluids; Hydraulic reservoirs and accumulators; Pressure generation: electric, mechanical, pneumatic;	1	3

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A3 A4	B1.3 B1.4
	Emergency pressure generation; Filters; Pressure Control; Power distribution; Indication and warning systems; Interface with other systems.		
12.13	*Ice and Rain Protection (ATA 30)* Ice formation, classification and detection; Anti-icing and De-icing systems: electrical, hot air and chemical; Rain repellent and removal; Probe and drain heating; Wiper system.	1	3
12.14	*Landing Gear (ATA 32)* Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, Tyres, brakes; Steering; Air-ground sensing; Skids, floats.	2	3
12.15	*Lights (ATA 33)* External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	2	3
12.16	*Pneumatic/Vacuum (ATA 36)* System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure and vacuum pumps; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	1	3
12.17	*Integrated Modular Avionics (ATA42)*	1	2

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL	
		A3 A4	B1.3 B1.4
	Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: 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. Core System; Network Components.		
12.18	*On Board Maintenance Systems (ATA45)* Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	1	2
12.19	*Information Systems (ATA46)* The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does 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

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL B2 B2L
13.1 Theory of Flight a) Aeroplane Aerodynamics and Flight Controls Operation and effect of: — roll control: ailerons and spoilers; — pitch control: elevators, stabilators, variable incidence stabilisers and canards; and — yaw control: rudder limiters; Control using elevons, ruddervators; High lift devices: slots, slats, flaps; Drag inducing devices: spoilers, lift dumpers, speed brakes; and Operation and effect of trim tabs, servo tabs and control surface bias.	1
b) High Speed Flight Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number.	1
c) Rotary Wing Aerodynamics Terminology; Operation and effect of cyclic, collective and anti-torque controls	1
13.2 Structures — General Concepts Fundamentals of Structural Systems	1
Zonal and Station Identification Systems	2
Electrical bonding	2
Lightning strike protection provision.	2

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
13.3	*Auto flight (ATA 22)* *(a)* Fundamentals of automatic flight control including working principles and current terminology; Command signal processing; Modes of operation: roll, pitch and yaw channels; Yaw dampers; Stability Augmentation System in helicopters; Automatic trim control; Autopilot navigation aids interface;	3
	(b) Autothrottle systems; Automatic landing systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions	3
13.4	*Communication/Navigation (ATA 23/34)* *(a)* Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter; Working principles of following systems: — Very High Frequency (VHF) communication; — High Frequency (HF) communication; — Audio; — 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); — Global Positioning System (GPS), Global Navigation Satellite Systems (GNSSs); — Data Link. *(b)* — Air Traffic Control transponder, secondary surveillance radar; — Traffic Alert and Collision Avoidance System (TCAS); — Weather avoidance radar; — Radio altimeter; — Automatic Dependent Surveillance	3

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
	— Broadcast (ADS-B). 3 (c) — Microwave Landing System (MLS); — Very Low Frequency and hyperbolic navigation (VLF/Omega); — Doppler navigation; — Inertial Navigation System (INS); — ARINC (Aircraft Radio Incorporated) communication and reporting.	
13.5	*Electrical Power (ATA 24)* Batteries installation and operation; Direct Current (DC) power generation; Alternating Current (AC) power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection; External/Ground power.	3
13.6	*Equipment and Furnishings (ATA 25)* Electronic emergency equipment requirements; Cabin entertainment equipment.	3
13.7	Flight Controls (ATA 27) *(a)* Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks; Stall protection systems. *(b)* System operation: electrical, fly-by-wire.	3 2
13.8	*Instruments (ATA 31)* Classification;	3

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
	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; Fuel-quantity-indicating systems; Gyroscopic principles; Artificial horizons; Slip indicators; Directional gyros; Ground Proximity Warning Systems (GPWSs); Compass systems; Flight Data Recording Systems (FDRSs); Electronic Flight Instrument Systems (EFISs); 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.	
13.9	*Lights (ATA 33)* External: navigation, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	3
13.10	*On Board Maintenance Systems (ATA 45)* Central maintenance computers; Data-loading system; Electronic-library system; Printing system; Structure-monitoring (damage tolerance monitoring).	2
13.11	*Air Conditioning and Cabin Pressurisation (ATA 21)* 13.11.1. Air supply	

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
	Sources of air supply including engine bleed, APU and ground cart	
	13.11.2. *Air Conditioning*	
	Air-conditioning systems;	2
	Air cycle and vapour cycle machines;	3
	Distribution systems;	
	Flow, temperature and humidity control system.	1
		3
	13.11.3. *Pressurisation*	
	Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.	3
	13.11.4. *Safety and warning devices*	
	Protection and warning devices.	3
13.12	*Fire Protection (ATA 26)*	
	(a) Fire and smoke detection and warning systems; Fire-extinguishing systems; System tests;	3
	(b) Portable fire extinguisher.	1
13.13	*Fuel Systems (ATA 28)*	
	System layout;	1
	Fuel tanks;	1
	Supply systems;	1

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
	Dumping, venting and draining;	1
	Cross feed and transfer;	1
	Indications and warnings;	1
	Refuelling and defueling;	1
	Longitudinal-balance fuel systems.	1
13.14	*Hydraulic Power (ATA 29)* System layout;	1
	Hydraulic fluids;	1
	Hydraulic reservoirs and accumulators;	1
	Pressure generation: electrical, mechanical, pneumatic;	3
	Emergency pressure generation;	3
	Filters;	1
	Pressure control;	3

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL
		B2 B2L
	Power distribution;	1
	Indication and warning systems;	1
	Interface with other systems.	3
13.15	*Ice and Rain Protection (ATA 30)*	
	Ice formation, classification and detection;	2
	Anti-icing systems: electrical, hot-air and chemical;	2
	De-icing systems: electrical, hot-air, pneumatic, chemical;	3
	Rain-repellent;	1
	Probe and drain-heating;	3
	Wiper systems.	1
13.16	*Landing Gear (ATA 32)*	
	Construction, shock absorbing;	1
	Extension and retraction systems: normal and emergency;	3
	Indications and warnings;	3
	Wheels, brakes, antiskid and automatic braking systems;	3
	Tyres;	3

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL B2 B2L
	Steering;	1
	Air-ground sensing.	3
		3
13.17	*Oxygen (ATA 35)*	3
	System layout: cockpit, cabin;	
	Sources, storage, charging and distribution;	3
	Supply regulation;	3
	Indications and warnings.	3
13.18	*Pneumatic/Vacuum (ATA 36)*	2
	System layout;	
	Sources: engine/APU,	2
	compressors, reservoirs, ground supply;	
	Pressure control;	3
	Distribution;	1
	Indications and warnings;	3
	Interfaces with other systems.	3

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL B2 B2L
13.19	*Water/Waste (ATA 38)* Water system layout, supply, distribution, servicing and draining; Toilet system layout, flushing and servicing.	2
13.20	*Integrated Modular Avionics (ATA 42)* Core system; Network components. Note: Functions that may be typically integrated into the IMA modules are among others: — 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; — tyre pressure indication; — oleo pressure indication; — brake temperature monitoring.	3
13.21	*Cabin Systems (ATA 44)* The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System (CIDS)) and between the aircraft cabin and ground stations (Cabin Network Service (CNS)). They include voice, data, music and video transmissions. CIDS provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange between the different related Line Replaceable Units (LRUs) and they are typically operated via Flight Attendant Panels (FAPs).	3

MODULE 13. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS		LEVEL B2 B2L
	CNS typically consists of a server, interfacing with, among others, the following systems: — 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). CNS may host functions such as: — access to pre-departure/departure reports; — e-mail/intranet/internet Access ; — passenger database.	
13.22	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, 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. 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 systems.	3

MODULE 14. PROPULSION

MODULE 14. PROPULSION	LEVEL B2 B2L
14.1 Turbine Engines a) Constructional arrangement and operation of turbojet, turbofan, turboshaft and turbo propeller engines;	1
b) Electronic Engine control and fuel metering systems (FADEC)	2
14.2 Engine Indicating Systems Exhaust gas temperature/Interstage turbine temperature systems; Engine speed; Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; Oil pressure and temperature; Fuel pressure, temperature and flow; Manifold pressure; Engine torque; Propeller speed.	2
14.3 Starting and Ignition Systems Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	2

MODULE 15. GAS TURBINE ENGINE

MODULE 15. GAS TURBINE ENGINE	LEVEL	
	A	B1
15.1 Fundamentals Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; The relationship between force, work, power, energy, velocity, acceleration; Constructional	1	2

MODULE 15. GAS TURBINE ENGINE		LEVEL	
		A	B1
	arrangement and operation of turbojet, turbofan, turboshaft, turboprop		
15.2	Engine Performance 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* Compressor inlet ducts Effects of various inlet configurations; Ice protection.	2	2
15.4	*Compressors* Axial and centrifugal types; Constructional features and operating principles and applications; Fan balancing; Operation: 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* Constructional features and principles of operation.	1	2
15.6	*Turbine Section* Operation and characteristics of different turbine blade types; Blade to disk attachment; Nozzle guide vanes; Causes and effects of turbine blade stress and creep.	2	2
15.7	*Exhaust* Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.	1	2

MODULE 15. GAS TURBINE ENGINE		LEVEL	
		A	B1
15.8	*Bearings and Seals* Constructional features and principles of operation.	-	2
15.9	*Lubricants and Fuels* Properties and specifications; Fuel additives; Safety precautions.	1	2
15.10	*Lubrication Systems* System operation/lay-out and components.	1	2
15.11	*Fuel Systems* Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	1	2
15.12	*Air Systems* Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	1	2
15.13	*Starting and Ignition Systems* Operation of engine start systems and components; Ignition systems and components; Maintenance safety requirements.	1	2
15.14	*Engine Indication Systems* 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.	1	2
15.15	*Power Augmentation Systems* Operation and applications; Water injection, water-methanol;	-	1

MODULE 15. GAS TURBINE ENGINE		LEVEL	
		A	B1
	Afterburner systems		
15.16	**Turbo-prop Engines** Gas coupled/free turbine and gear coupled turbines; Reduction gears; Integrated engine and propeller controls; Overspeed safety devices.	1	2
15.17	*Turbo-shaft Engines* Arrangements, drive systems, reduction gearing, couplings, control systems.	1	2
15.18	*Auxiliary Power Units (APUs)* Purpose, operation, protective systems	1	2
15.19	*Powerplant Installation* Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	1	2
15.20	*Fire Protection Systems* Operation of detection and extinguishing systems.	1	2
15.21	*Engine Monitoring and Ground Operation* Procedures for starting and ground run-up; Interpretation of engine power output and parameters; Trend (including oil analysis, vibration and boroscope) monitoring; Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; Compressor washing/cleaning; Foreign Object Damage.	1	3
15.22	*Engine Storage and Preservation* Preservation and depreservation for the engine and accessories/systems.		

MODULE 16. PISTON ENGINE

MODULE 16. PISTON ENGINE		LEVEL		
		A	B1	B3
17.1	*Fundamentals* Mechanical, thermal and volumetric efficiencies; Operating principles stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	1	2	2
17.2	*Engine Performance* Power calculation and measurement; Factors affecting engine power; Mixtures/leaning, pre-ignition.	1	2	2
17.3	*Engine Construction* 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	2
17.4	*Engine Fuel Systems* 16.4.1 Carburettors Types, construction and principles of operation; Icing and heating.	1	2	2
	16.4.2 *Fuel injection systems* Types, construction and principles of operation.	1	2	2
17.5	*Starting and Ignition System* Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low- and high-tension systems.	1	2	2
17.6	*Induction, Exhaust and Cooling Systems* Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	1	2	2
17.7	*Supercharging/Turbocharging*	1	2	2

MODULE 16. PISTON ENGINE		LEVEL		
		A	B1	B3
	Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection.			
17.8	*Lubricants and Fuels* Properties and specifications; Fuel additives; Safety precautions.	1	2	2
17.9	*Lubrication Systems* System operation/lay-out and components.	1	2	2
17.10	*Engine Indication Systems* Engine speed; Cylinder head temperature; Coolant temperature; Oil pressure and temperature; Exhaust Gas Temperature; Fuel pressure and flow; Manifold pressure.	1	2	2
17.11	*Powerplant Installation* Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	1	2	2
17.12	*Engine Monitoring and Ground Operation* 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 engine manufacturer.	1	3	2
17.13	*Engine Storage and Preservation*	-	2	1

MODULE 16. PISTON ENGINE		LEVEL		
		A	B1	B3
	Preservation and depreservation for the engine and accessories/system			

MODULE 17A. PROPELLER

Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 17B.

MODULE 17A. PROPELLER		LEVEL	
		A	B1
17.1	*Fundamentals* 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 Construction methods and materials used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	1	2
17.3	*Propeller Pitch Control* 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

MODULE 17A. PROPELLER		LEVEL	
		A	B1
17.6	*Propeller Maintenance* Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	1	3
17.7	*Propeller Storage and Preservation* Propeller preservation and depreservation.	1	2

MODULE 17B. PROPELLER

Note: The scope of this Module shall reflect the propeller technology of aeroplanes pertinent to the B3 category.

MODULE 17B. PROPELLER		LEVEL
		B3
17.1	*Fundamentals* 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.	2
17.2	*Propeller Construction* Construction methods and material used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.	2
17.3	*Propeller Pitch Control* Speed control and pitch change methods, mechanical and electrical/electronic;	2

MODULE 17B. PROPELLER		LEVEL B3
	Feathering and reverse pitch; Overspeed protection.	
17.4	*Propeller Synchronising* Synchronising and synchrophasing equipment.	2
17.5	*Propeller Ice Protection* Fluid and electrical de-icing equipment	2
17.6	*Propeller Maintenance* Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	2
17.7	*Propeller Storage and Preservation* Propeller preservation and depreservation.	2

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

1. General

1.1. All basic knowledge examination shall be conducted by the Authority. The examination session(s) will be held as and when required but not more than twice per calendar year. All type examinations and skill test shall be conducted by an organisation approved by the Authority on need basis in accordance with a procedure approved by the Authority. Applications for type examinations and skill test shall be made to the respective organisation.

1.2. Candidates who have passed the HSC/GGE Advance level or equivalent examination with Physics, Chemistry and Mathematics who has not a structured MCAR Part-66 course in a MCAR Part-147 organisation, but gained at least five years of aeronautical engineering experience in an MCAR Part-145 organisation and desirous of appearing in knowledge examinations conducted by the Authority are required to apply to Authority, on DCA Form 19-07.

1.3. An application for candidates referred to in 1.1 shall be forwarded by the Quality Manager of the approved AMO at least 90 days before an examination session can be scheduled.

1.4. Candidates scoring less than 45% marks in a particular basic knowledge examination module during two consecutive sessions will not be permitted to appear in the same module during the subsequent session for at least 12 months.

1.5. Candidates appearing in AME Licence examinations shall abide by the instructions issued to them by the Authority.

1.6. Under MCAR Part-66 candidates who have either failed a multiple choice or essay examination cannot have recourse to re-assessment, review or recount but will have to re- examined as per the MCAR-66 requirements

1.7. All basic examinations shall 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.

1.8. Each multi-choice question shall have three alternative answers of which only one shall 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.

1.9. Each essay question requires the preparation of a written answer and the candidate shall be allowed 20 minutes to answer each such question.

1.10. Suitable essay questions shall be drafted and evaluated using the knowledge syllabus in Appendix I Modules 7A, 7B, 9A, 9B and 10.

1.11. 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.

1.12. The model answer will also be broken down into a list of the important points known as Key Points.

1.13. The pass mark for each module and sub-module multi-choice part of the examination is 75 %.

1.14. 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.

1.15. 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.

1.16. Penalty marking systems shall not be used to determine whether a candidate has passed.

1.17. A failed module may not be retaken for at least 90 days following the date of the failed module examination, except in the case of a maintenance training organisation approved in accordance with MCAR Part-147 which conducts a course of retraining tailored to the failed subjects in the particular module when the failed module may be retaken after 30 days.

1.18. The time periods required by point 66.A.25 apply to each individual module examination, with the exception of those module examinations which were passed as part of another category licence, where the licence has already been issued.

1.19. The maximum number of consecutive attempts for each module is three. Further sets of three attempts are allowed with a 1 year waiting period between sets.

The applicant shall confirm in writing to the approved maintenance training organisation or the Authority to which they apply for an examination, the number and dates of attempts during the last year and the organisation or the Authority where these attempts took place. The maintenance training organisation or the Authority is responsible for checking the number of attempts within the applicable timeframes.

2. Number of questions per module

2.1 MODULE 1 - MATHEMATICS

Category A: 16 multi-choice and 0 essay questions. Time allowed 20 minutes.
Category B1: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.
Category B2 and B2L: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.
Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

2.2 MODULE 2 – PHYSICS

Category A: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.
Category B1: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B2 and B2L: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

2.3 MODULE 3 ELECTRICAL FUNDAMENTALS

Category A: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B1: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B2 and B2L: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B3: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.

2.4 MODULE 4 ELECTRONIC FUNDAMENTALS

Category B1: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B2 and B2L: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.
Category B3: 8 multi-choice and 0 essay questions. Time allowed 10 minutes.

2.5 MODULE 5 DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

Category A: 16 multi-choice and 0 essay questions. Time allowed 20 minutes.
Category B1.1 and B1.3: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.
Category B1.2 and B1.4: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B2 and B2L: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B3: 16 multi-choice and 0 essay questions. Time allowed 20 minutes.

2.6 MODULE 6 MATERIALS AND HARDWARE

Category A: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B1: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B2 and B2L: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.
Category B3: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

2.7 MODULE 7A MAINTENANCE PRACTICES

Category A: 72 multi-choice and 2 essay questions. Time allowed 90 minutes plus 40 minutes.
Category B1: 80 multi-choice and 2 essay questions. Time allowed 100 minutes plus 40 minutes.
Category B1: 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.

MODULE 7B - MAINTENANCE PRACTICES

Category B3: 60 multi-choice and 2 essay questions. Time allowed 75 minutes plus 40 minutes.

2.8 MODULE 8 BASIC AERODYNAMICS

Category A: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B2 and B2L: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B3: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

2.9 MODULE 9A HUMAN FACTORS

Category A: 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B1: 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

Category B2 and B2L: 20 multi-choice and 1 essay question. Time allowed 25 minutes plus 20 minutes.

MODULE 9B - HUMAN FACTORS

Category B3: 16 multi-choice and 1 essay questions. Time allowed 20 minutes plus 20 minutes.

2.10 MODULE 10 AVIATION LEGISLATION

Category A: 32 multi-choice and 1 essay question. Time allowed 40 minutes plus 20 minutes.

Category B1: 40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

Category B2 and B2L: 40 multi-choice and 1 essay question. Time allowed 50 minutes plus 20 minutes.

Category B3: 32 multi-choice and 1 essay questions. Time allowed 40 minutes plus 20 minutes.

2.11 MODULE 11A TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

Category A: 108 multi-choice and 0 essay questions. Time allowed 135 minutes.

Category B1: 140 multi-choice and 0 essay questions. Time allowed 175 minutes.
MODULE 11B PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS
Category A: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B1: 100 multi-choice and 0 essay questions. Time allowed 125 minutes.
MODULE 11C PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS
Category B3: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

2.12 MODULE 12 HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS:
Category A: 100 multi-choice and 0 essay questions. Time allowed 125 minutes.
Category B1: 128 multi-choice and 0 essay questions. Time allowed 160 minutes.

2.13 MODULE 13 AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS
Category B2: 180 multiple-choice and 0 essay questions. Time allowed: 225 minutes. Questions and time allowed may be split into two examinations, as appropriate.

Category B2L:

System rating	Number of multiple-choice questions	Time allowed (minutes)
Basic requirements (Submodules 13.1, 13.2, 13.5 and 13.9)	28	35
COM/NAV (Submodule 13.4(a))	24	30
INSTRUMENTS (Submodule 13.8)	20	25
AUTOFLIGHT (Submodules 13.3(a) and 13.7)	28	35
SURVEILLANCE (Submodule 13.4(b))	8	10
AIRFRAME SYSTEMS (Submodules 13.11 to 13.18)	32	40

2.14 MODULE 14 — PROPULSION
Category B2 and B2L: 24 multiple-choice and 0 essay questions. Time allowed 30 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 A: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.
Category B1: 92 multi-choice and 0 essay questions. Time allowed 115 minutes.

2.16 MODULE 16 — PISTON ENGINE
Category A: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B1: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B3: 68 multi-choice and 0 essay questions. Time allowed 85 minutes.

2.17 MODULE 17A — PROPELLER
Category A: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B1: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

2.18 MODULE 17B — PROPELLER
Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

3. Examination Results

3.19 Results of the written basic knowledge examination will be published within 30 working days of the last day of an examination session.

3.20 Individual result sheets shall be forwarded to the passed candidates only. In the event of non-receipt of a result sheet even after 30 days of declaration of result, candidates may request the Authority for issuance of a duplicate result sheet.

Appendix III — Aircraft type training and examination 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- Part-147 or EASA- Part 147 or an equivalent Part 147 as approved by the Authority. The training organisation can also be accepted to provide limited training following a desktop review for individual, not in employment with any Part 145 organisation.

(ii) Shall comply, except as permitted by the differences training provided for in point (c), with the standard set out in point 3.1 of this Appendix and, if available, the relevant elements defined in the mandatory part of the operational suitability data established in accordance with Mauritius Civil Aviation Regulations and Requirement.

(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 3 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- Part-147 or EASA- Part 147 or an equivalent Part 147 as approved by the Authority. The training organisation can also be accepted to provide limited training following a desktop review for individual, not in employment with any Part 145 organisation.

(ii) Shall comply, except as permitted by the differences training described in point (c), with the standard set out in point 3.2 of this Appendix.

(iii) Shall include a representative cross-section of maintenance activities relevant to the aircraft type.

(iv) Shall include demonstrations using equipment, components, simulators, other training devices or aircraft.

(v) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(c) Differences training

(i) Differences training is the training required in order to cover the differences between two different aircraft type ratings of the same manufacturer as determined by the Authority.

(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.

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 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 interrelationships 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, powerplant, component and functional checks as specified in the aircraft 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.

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 according to approved 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 30000 kg:	
B1.1	150
B1.2	120
B2	100
C	30
Aeroplanes with a maximum take-off mass equal or less than 30000 kg and above 5700 kg:	
B1.1	120
B1.2	100
B2	100
C	25
Aeroplanes with a maximum take-off mass of 5700 kg and below	
B1.1	80
B1.2	60
B2	60
C	15
Helicopters	
B1.3	120
B1.4	100
B2	100

C	25

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 Authority.

(d) Justification of course duration:

Training courses carried out a maintenance training organisation appropriately approved in accordance with MCAR Part-147 or EASA Part 147 or equivalent Part 147 as Approved by the Authority 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 Authority by the training needs analysis as described above.

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

- The minimum attendance required to the trainee, in order to meet the objectives of the course.
- The maximum number of hours of 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 avionic aspects for B2.

Level Chapters	**Aeroplanes turbine**		**Aeroplanes piston**		**Helicopters turbine**		**Helicopters piston**		**Avionics**
Licence 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 and 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 particular	1	1	1	1	1	1	1	1	1
Helicopters									
18 Vibration and Noise Analysis (Blade tracking)	—	—	—	—	3	1	3	1	—

Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Licence category	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B2**
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
27A Flight Control Surfaces (All)	3	1	3	1	—	—	—	—	1

Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Licence category	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B2**
52 Doors	3	1	3	1	—	—	—	—	1
Zonal and 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
21C Safety and Warning Devices	3	1	3	1	3	1	3	1	3
22 Auto flight	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 and 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 and 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

Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Licence category	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B2**
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
46 Information Systems	2	1	2	1	2	1	2	1	3
50 Cargo and Accessory Compartments	3	1	3	1	3	1	3	1	1
Turbine Engine									
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

Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Licence category	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B2**
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, Supercharging/Turbocharging, Lubrication Systems).	—	—	3	1	—	—	3	1	1
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

Level Chapters	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
Licence category	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B1**	**C**	**B2**
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

(f) Multimedia Based Training (MBT) methods may be used to satisfy the theoretical training element either in the classroom or in a virtual controlled environment subject to the acceptance of the Authority approving the training course.

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 are 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.

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:											
5 Time limits/maintenance checks	X/X	—	—	—	—	—	—	—	—	—	—
6 Dimensions/Areas (MTOM, etc.)	X/X	—	—	—	—	—	—	—	—	—	—
7 Lifting and Shoring	X/X	—	—	—	—	—	—	—	—	—	—
8 Levelling and weighing	X/X	—	X	—	—	—	—	X	—	—	—
9 Towing and taxiing	X/X	—	X	—	—	—	—	X	—	—	—
10 Parking/mooring, Storing and Return to Service	X/X	—	X	—	—	—	—	X	—	—	—
11 Placards and Markings	X/X	—	—	—	—	—	—	—	—	—	—
12 Servicing	X/X	—	X	—	—	—	—	X	—	—	—

Chapters	B1/ B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
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 specific	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)											
53 Fuselage	X/—	—	—	—	—	X	—	—	—	—	—
54 Nacelles/Pylons	X/—	—	—	—	—	—	—	—	—	—	—
55 Stabilisers	X/—	—	—	—	—	—	—	—	—	—	—
56 Windows	X/—	—	—	—	—	X	—	—	—	—	—
57 Wings	X/—	—	—	—	—	—	—	—	—	—	—

Chapters	B1/ B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
27A Flight Control Surfaces	X/—	—	—	—	—	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 Auto flight	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 and 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 and 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	—
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

Chapters	B1/ B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
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
50 Cargo and Accessory Compartments	X/X	—	X	—	—	—	—	—	—	—	—
Turbine/Piston Engine Module:											
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 Power Plant	X/—	X	X	—	—	—	—	X	—	—	—
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	—	—	—	—

Chapters	B1/ B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
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 Injection	X/—	X	—	—	—	—	—	—	—	—	—
83 Accessory Gearboxes	X/—	—	X	—	—	—	—	—	—	—	—
84 Propulsion Augmentation	X/—	X	—	—	—	—	—	—	—	—	—
Auxiliary Power Units (APUs):											
49 Auxiliary Power Units (APUs)	X/—	X	X	—	—	X	—	—	—	—	—
Piston Engines:											
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	—	—	—	—	—	—	—	—	—	—
70B Engine Performance	—	—	—	—	—	X	—	—	—	—	—
71 Power Plant	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	—	—	—	—
76 Engine Controls	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	—	—	—	—	—

Chapters	B1/ B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
82 Water Injection	X/—	X	—	—	—	—	—	—	—	—	—
83 Accessory Gearboxes	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 multi-choice type. Each multi-choice question shall have 3 alternative answers of which only one shall 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 chapter1 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.

(e) The examination shall 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 instruction. The number of questions for each chapter and level shall be proportionate to:

– the effective training hours spent teaching at that chapter and level,

– the learning objectives as given by the training needs analysis.

The Authority 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.

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 examination standard (Appendix III to Part-66)

Shall be conducted by a maintenance training organisation appropriately approved in accordance with MCAR- Part-147 or EASA- Part 147 or an equivalent Part 147 as approved by the Authority. The training organisation can also be accepted to provide limited training following a desktop review for individual, not in employment with any Part 145 organisation.

The examination shall be oral, written or practical assessment based, or a combination thereof and it shall comply with the following requirements:

(a) Oral examination questions shall be open.

(b) Written examination questions shall be essaying type or multi-choice questions.

(c) Practical assessment shall determine a person's competence to perform a task.

(d) Examinations shall be on a sample of chapters1 drawn from point 3 type training/examination syllabus, at the indicated level.

(e) 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.

(f) 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.

(g) The examination shall ensure that the following objectives are met:

1. Properly discuss with confidence the aircraft 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

(h) The following conditions apply to the examination:

1. The maximum number of consecutive attempts is three. Further sets of three attempts are allowed with a 1 year waiting period between sets. 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.

2. The applicant shall confirm in writing to the maintenance training organisation or the Authority to which they apply for an examination, the number and dates of attempts during the last year and the maintenance training organisation or the Authority where these attempts took place. The maintenance training organisation or the Authority is responsible for checking the number of attempts within the applicable timeframes.

3. The type examination 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.

4. Type examination shall be performed with at least one examiner present. The examiner(s) shall not have been involved in the applicant's training.

(i) A written and signed report shall be made by the examiner(s) to explain why the candidate has passed or failed.

6. On the Job Training

On the Job Training (OJT) shall be approved by the Authority who has issued the licence. The OJT must be conducted in an approved MCAR Part 145, EASA Part 145 or equivalent Authority.

It shall be conducted at and under the control of a maintenance organisation appropriately approved for the maintenance of the particular aircraft type and shall be assessed by designated assessors appropriately qualified.

It shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(a) Objective:

The objective of OJT is to gain the required competence and experience in performing safe maintenance.

(b) Content:

OJT shall cover a cross section of tasks acceptable to the Authority. The OJT 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 maintenance tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

Each task shall be signed off by the student and countersigned by a designated supervisor.

The tasks listed shall refer to an actual job card/work sheet, etc.

The final assessment of the completed OJT is mandatory and shall be performed by a designated assessor appropriately qualified.

The following data shall be addressed on the OJT worksheets/logbook:

1. Name of Trainee;
2. Date of Birth;
3. Approved Maintenance Organisation;
4. Location;
5. Name of supervisor(s) and assessor, (including licence number if applicable);
6. Date of task completion;
7. Description of task and job card/work order/tech log, etc.;
8. Aircraft type and aircraft registration;
9. Aircraft rating applied for.

In order to facilitate the verification by the Authority, demonstration of the OJT shall consist of (i) detailed worksheets/logbook and (ii) a compliance report demonstrating how the OJT meets the requirement of this MCAR Part 66.

AMC to Appendix III to Part-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.

AMC to Section 1 of Appendix III to Part-66 'Aircraft Type Training and Examination Standard. On-the-Job Training'

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 Part-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, synthetic training devices (STD), computer-based training devices (CBT), etc.

AMC to Paragraphs 1(b), 3.2 and 4.2 of Appendix III to Part-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 Part-66.

3. The duration of the practical training should ensure that the content of training required by paragraph 3.2 of Appendix III to Part-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 six months unless a shorter duration meeting the objectives of the training and taking into account pedagogical aspects (maximum duration per day) is justified to the 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 Part-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.

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

7. The practical element (for powerplant and avionics systems) of the Type Rating Training may be subcontracted by the approved Part-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 Part-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 Part-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).

AMC to point 3.1(d) of Appendix III to Part-66 'Aircraft Type Training and Examination Standard. On-the-Job Training'

Training Needs Analysis 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 Part-66, has been determined based on:

   - generic categories of aircraft and minimum standard equipment fit

   - the estimated average duration of standard courses imparted in Europe

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 Part-66.

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 evaluation done by the Authority should be performed on a case-by-case basis appropriate to the aircraft type. For example, while it would be exceptional for a theoretical course for a transport category complex motor-powered aircraft such as an A330 or B757 to be below the minimum duration shown, it would not necessarily be exceptional in the case of a General Aviation (GA) business aircraft such as a Learjet 45 or similar. Typically, the TNA for a GA aircraft course would demonstrate that a course of a shorter duration satisfies the requirements.

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 Part-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 Part-66 Appendix III.

(d) For each chapter described in the theoretical element table contained in paragraph 3.1 of Part-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 Part-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 Part-66);
- Organise the training into modules in a logical sequence (adequate combination of chapters as defined in Appendix III of Part-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 equipment, teaching methods and blending of the teaching methods 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;

- The training provider's resources available to the learner.

(h) It is acceptable to differentiate between issues which have to be led by an instructor and issues which may be delivered through interactive simulation training devices and/or covered by web-based elements. 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 Authority 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 for the trainee in order to meet the objectives of the course should not be less than 90 % of the tuition hours of the 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.

AMC to Section 5 of Appendix III to Part-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.

AMC to Section 6 of Appendix III to Part-66 'Aircraft Type Training and Examination Standard. On-the-Job Training'

On-the-Job Training (OJT)

1. 'A maintenance organisation appropriately approved for the maintenance of the particular aircraft type' means a Part-145, M.A. Subpart F or Part-CAO approved maintenance organisation holding an A rating for such aircraft.

2. The OJT should include one to one supervision and should involve actual work task performance on aircraft/components, covering line and/or base maintenance tasks.

3. The use of simulators for OJT should not be allowed.

4. The OJT should cover at least 50% of the tasks contained in Appendix II to AMC to Part-66. Some tasks should be selected from each paragraph of the Appendix II list. Tasks should be selected among those applicable to the type of aircraft and licence (sub)category applied for. Other tasks than those in the Appendix II may be considered as a replacement when they are relevant. Typically, in addition to the variety and the complexity, the OJT tasks should be selected because of their frequency, safety, novelty, etc.

5. Up to 50% of the required OJT may be undertaken before the aircraft theoretical type training starts.

6. The organisation providing the on-the-job training should provide trainees a schedule or plan indicating the list of tasks to be performed under 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 is countersigned by the corresponding supervisor. The logbook format and its use should be clearly defined.

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

- It is sufficient that the completion of individual OJT tasks is confirmed by the direct supervisor(s), without being necessary the direct evaluation of the assessor.

- During the day-to-day OJT performance, the supervision aims at overseeing the complete process, including task completion, use of manuals and procedures, observance of safety measures, warnings and recommendations and adequate behaviour in the maintenance environment.

- The supervisor(s) should personally observe the work being performed to ensure the safe completeness and should be readily available for consultation, if needed during the OJT performance.

- The supervisor(s) should countersign the tasks and release the maintenance tasks as the trainee is still not qualified to do so.

- The supervisor(s) should therefore:

  - have certifying staff or support staff privileges relevant to the OJT tasks;

  - be competent for the selected tasks;

  - be safety-orientated;

  - be capable to coach (setting objectives, giving training, performing supervision, evaluating, handling trainee's reactions and cultural issues, managing objectively and positively debriefing sessions, determining the need for extra training or reorientate the training, reporting, etc.);

  - be designated by the approved maintenance organisation to carry out the supervision.

8. Regarding the assessor, the following should be considered:

- The function of the assessor, as described in Section 6 of Appendix III to Part-66, is to conduct the final assessment of the completed OJT. This assessment should include confirmation of the completion of the required diversity and quantity of OJT and should be based on the supervisor(s) reports and feedback.

- In Section 6 of Appendix III to Part-66, the term 'designated assessor appropriately qualified' means that the assessor should demonstrate training and experience on the assessment process being undertaken and should 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 Part-66.

9. The procedures for OJT of a Part-145 organisation should be included into the Exposition Manual of the approved maintenance organisation (chapter 3.15, as indicated in AMC 145.A.70(a)).

However, since these procedures are approved by the Authority of the maintenance organisation, and providing training is not one of the privileges of a maintenance organisation, they can only be used when the licensing authority is the same as the Authority of the maintenance organisation. In other cases, it is up to the licensing authority to decide whether it accepts such procedures for the purpose of approving the OJT (refer to AMC 66.B.115).

Appendix IV — Experience requirements for extending a Part-66 aircraft maintenance licence

The table below shows the experience requirements for adding a new category or subcategory to an existing Part-66 licence.

The experience shall be practical maintenance experience in operating aircraft in the subcategory relevant to the application.

The experience requirement will be reduced by 50 % if the applicant has completed an approved Part-147 course relevant to the subcategory.

To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3
A1	—	6 months	6 months	6 months	2 years	6 months	2 years	1 year	2 years	1 year	6 months

To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3
A2	6 months	—	6 months	6 months	2 years	6 months	2 years	1 year	2 years	1 year	6 months
A3	6 months	6 months	—	6 months	2 years	1 year	2 years	6 months	2 years	1 year	1 year
A4	6 months	6 months	6 months	—	2 years	1 year	2 years	6 months	2 years	1 year	1 year
B1.1	None	6 months	6 months	6 months	—	6 months	6 months	6 months	1 year	1 year	6 months
B1.2	6 months	None	6 months	6 months	2 years	—	2 years	6 months	2 years	1 year	None
B1.3	6 months	6 months	None	6 months	6 months	6 months	—	6 months	1 year	1 year	6 months
B1.4	6 months	6 months	6 months	None	2 years	6 months	2 years	—	2 years	1 year	6 months
B2	6 months	6 months	6 months	6 months	1 year	1 year	1 year	1 year	—	—	1 year
B2L	6 months	6 months	6 months	6 months	1 year	1 year	1 year	1 year	1 year	—	1 year
B3	6 months	None	6 months	6 months	2 years	6 months	2 years	1 year	2 years	1 year	—

Appendix V — Application Form — DCA Form 19

1. This Appendix contains the form used for applying for the aircraft maintenance licence referred to in this MCAR Part-66.

APPLICATION FOR INITIAL/AMENDMENT/RENEWAL OF PART-66 AIRCRAFT MAINTENANCE LICENCE (AML)	**DCA Form 19**
Name:Click or tap here to enter text. Address: Click or tap here to enter text. Tel: Click or tap here to enter text. E-mail: Click or tap here to enter text. Nationality: Click or tap here to enter text. Date and Place of Birth: Click or tap here to enter text.	
PART-66 AML DETAILS (if applicable): Licence No: Click or tap here to enter text. Date of Issue: Click or tap to enter a date.	
APPLICATION FOR: (Tick relevant boxes) Initial AML ☐ Amendment of AML ☐ Renewal of AML ☐	

(Sub)categories	A	B1	B2	B2L	B3	C	L (see below)
Aeroplane Turbine	☐	☐					
Aeroplane Piston	☐	☐					
Helicopter Turbine	☐	☐					
Helicopter Piston	☐	☐					
Avionics			☐	☐	See system ratings below		
Piston engine non-pressurised aeroplanes of MTOM of 2t and below					☐		
Complex motor-powered aircraft						☐	
Aircraft other than complex motor-powered aircraft						☐	
System ratings for B2L licence:							
1. auto flight				☐			
2. instruments				☐			
3. com/nav				☐			
4. surveillance				☐			
5. airframe systems				☐			
L-licence 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: Gas balloons							☐
L4H: Hot-air airships							☐
L4G: ELA2 gas airships							☐
L5: Gas airship other than ELA2							☐

Type endorsements/Rating endorsement/Limitation removal (if applicable):
Click or tap here to enter text.

I wish to apply for Choose an item.of Part-66 AML, as indicated, and confirm that the information contained in this form was correct at the time of application.

I herewith confirm that:

1. I never had a Part-66 AML issued in another State which was revoked or suspended in any other State.

I also understand that any incorrect information could disqualify me from holding a Part-66 AML.

Signed: Name: Click or tap here to enter text.

Date: Click or tap to enter a date.
I wish to claim the following credits (if applicable): Experience credits for Part-147 training Examination credits for equivalent exam certificates *Please enclose all relevant certificates*
Recommendation (if applicable): It is hereby certified that the applicant has met the relevant Part-66 maintenance knowledge and experience requirements and it is recommended that the authority grants or endorses the Part-66 AML. Signed: Name: Click or tap here to enter text. Position: Click or tap here to enter text. Date: Click or tap to enter a date.

DCA FORM 19, Issue 02 REV 00, xxxxxx

Appendix VI — Aircraft Maintenance Licence referred to in MCAR Part-66 — DCA Form 26

1. An example of the aircraft maintenance licence referred to in MCAR Part-66 can be found on the following pages.

2. The document shall be printed in the standardised form shown but may be reduced in size to allow it being generated by computer. When the size is reduced, care shall be taken to ensure that sufficient space is available in those places where official seals or stamps are required. Computer-generated documents need not have all the boxes incorporated when any such box remains blank, so long as the document can clearly be recognised as an aircraft maintenance licence issued in accordance with MCAR Part-66.

3. The document may be filled in either in English or the official language of the of the Authority. In the latter case, a second copy in English shall be attached to the document for any licence holder who needs to use the licence outside that the country to ensure understanding for the purpose of mutual recognition.

4. Each licence holder shall have a unique licence holder number, established on the basis of a national identifier and an alpha-numeric designator.

5. The document may have the pages in a different order to the one of these examples and needs not have some or any divider lines as long as the information contained is positioned in such a manner that each page lay-out can clearly be identified with the format of the example of the aircraft maintenance licence contained herein.

6. The document shall be prepared by the Authority. However, it may also be prepared by any maintenance organisation approved in accordance with MCAR Part-145, where the Authority agrees to this and the preparation takes place in accordance with a procedure laid down in the maintenance organisation exposition referred to in point 145.A.70 of MCAR Part-145. In all cases, the Authority shall issue the document.

7. The preparation of any change to an existing aircraft maintenance licence shall be carried out by the Authority. However, it may also be prepared by any maintenance organisation approved in accordance with MCAR Part-145, where the Authority agrees to this and the preparation takes place in accordance with a procedure laid down in the maintenance organisation exposition referred to in point 145.A.70 of MCAR Part-145. In all cases, the Authority shall change the document.

8. The holder of the aircraft maintenance licence shall keep it in good condition and shall ensure that no unauthorised entries are made. Failure to comply with this rule may invalidate the license or lead to the holder not being permitted to hold any certification privilege. It may also result in prosecution under national law.

9. The aircraft maintenance licence issued in accordance with MCAR Part-66 shall be recognised in the by the Mauritius Department of Civil Aviation.

10. The DCA Form 26 will be used to include privileges, where such privileges are covered by the scope of MACR Part-66.

11. With regard to the aircraft type rating page of the aircraft maintenance licence, the Authority may decide not to issue this page until the first aircraft type rating needs to be endorsed and may need to issue more than one aircraft type rating page depending on the number of type ratings to be listed.

12. Notwithstanding point 11, each page issued shall be in the format of this example and contain the specified information for that page.

13. The aircraft maintenance licence shall clearly indicate that the limitations are exclusions from the certification privileges. If there are no limitations applicable, the LIMITATIONS page shall state ‘No limitations.

14. Where a pre-printer format is used for issuing the aircraft maintenance licence, any category, subcategory or type rating box which does not contain a rating entry shall be marked to show that the rating is not held.

Republic of Mauritius

Part-66
AIRCRAFT MAINTENANCE
LICENCE

Licence No. MU
.66. [XXXX]

DCA FORM 26 ISSUE 2 REV 00

Iva. Full name of holder:
IVb. Date and place of birth:
V. Address of holder:
VI. Nationality of holder:
VII. Signature of holder:
III. Licence No:

VIII. CONDITIONS:

This licence shall be signed by the holder and be accompanied by an identity document containing a photograph of the licence holder.

Endorsement of any categories on the page(s) entitled 'Part-66 CATEGORIES' only, does not permit the holder to issue a certificate of release to service for an aircraft.

This licence, when endorsed with an aircraft rating, meets the intent of ICAO Annex 1.
The privileges of this licence holder are prescribed by Mauritius Civil Aviation Regulation and, in particular, MCAR Part-66 thereto.

IX. Part-66 CATEGORIES

VALIDITY	A	B1	B2	B2L	B3	L	C
Aeroplanes Turbine						n/a	
Aeroplanes Piston							
Helicopters Turbine							
Helicopters Piston							
Avionics							

This licence remains valid until the date specified on the limitation page unless previously suspended or revoked.

The privileges of this licence may not be exercised unless in the preceding two-year period, the holder had either six months of maintenance experience in accordance with the privileges granted by the licence, or met the provisions for the issue of the appropriate privileges.

Complex motor-powered aircraft							
Aircraft other than complex motor-powered aircraft							
Sailplanes, powered sailplanes, ELA1 aeroplanes, balloons and airships							
Piston engine non pressurised aeroplanes of 2 000 kg MTOM and below							

X. Signature of issuing officer & date:
XI. Seal or stamp of issuing authority:
III. Licence No:

XII. PART-66 RATINGS

Aircraft Rating/ System ratings	Category/ Subcategory	Stamp & Date

III. Licence No:

XIII. PART-66 LIMITATIONS

Valid until:

III. Licence No:

DCAFORM 26 XIV. NATIONAL PRIVILEGES outside the scope of Part-66, in accordance with [National Legislation
Official Stamp & Date
III. Licence No:

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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 Part-66.

Subcategories	Modules required for each subcategory (refer to the syllabus table below)
L1C: composite sailplanes	1L, 2L, 3L, 5L, 7L and 12L
L1: sailplanes	1L, 2L, 3L, 4L, 5L, 6L, 7L and 12L
L2C: composite powered sailplanes and composite ELA1 aeroplanes	1L, 2L, 3L, 5L, 7L, 8L and 12L
L2: powered sailplanes and ELA1 aeroplanes	1L, 2L, 3L, 4L, 5L, 6L, 7L, 8L and 12L
L3H: hot-air balloons	1L, 2L, 3L, 9L and 12L
L3G: gas balloons	1L, 2L, 3L, 10L and 12L
L4H: hot-air airships	1L, 2L, 3L, 8L, 9L, 11L and 12L
L4G: ELA2 gas airships	1L, 2L, 3L, 8L, 10L, 11L and 12L
L5: gas airships above ELA2	Basic knowledge requirements for any B1 subcategory plus 8L (for B1.1 and B1.3), 10L, 11L and 12L

TABLE OF CONTENTS:

MODULE 1L — BASIC KNOWLEDGE **MODULE 1L — BASIC KNOWLEDGE**	**Level**

1L.1 Mathematics 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. Algebra − Evaluating simple algebraic expressions: addition, subtraction, multiplication and division; − Use of brackets; − Simple algebraic fractions. Geometry − Simple geometrical constructions; − Graphical representation: nature and uses of graphs.	1
1L.2 Physics Matter − Nature of matter: the chemical elements; − Chemical compounds; − States: solid, liquid and gaseous; − Changes between states. Mechanics − Forces, moments and couples, representation as vectors; − Centre of gravity; − Tension, compression, shear and torsion; − Nature and properties of solids, fluids and gases. Temperature — Thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; — Heat definition.	1
1L.3 Electrics DC Circuits — Ohm's law, Kirchoff's voltage and current laws; — Significance of the internal resistance of a supply; — Resistance/resistor; — Resistor colour code, values and tolerances, preferred values, wattage ratings; — Resistors in series and parallel.	1
1L.4 Aerodynamics/aerostatics International Standard Atmosphere (ISA), application to aerodynamics and aerostatics. Aerodynamics — Airflow around a body; — Boundary layer, laminar and turbulent flow; — Thrust, weight, aerodynamic resultant; — Generation of lift and drag: angle of attack, polar curve, stall. Aerostatics Effect on envelopes, wind effect, altitude and temperature effects.	1
1L.5 Workplace safety and environmental protection — Safe working practices and precautions when working with electricity, gases (especially oxygen), oils and chemicals; — Labelling, storage and disposal of hazardous (to safety and environment) materials;	2

— Remedial action in the event of a fire or another accident with one or more hazards, including knowledge of extinguishing agents.	

MODULE 2L — HUMAN FACTORS **MODULE 2L — HUMAN FACTORS**	**Level**
2L.1 General — The need to take human factors into account; — Incidents attributable to human factors/human error; — Murphy's Law.	1
2L.2 Human performance and limitations Vision, hearing, information processing, attention and perception, memory.	1
2L.3 Social psychology Responsibility, motivation, peer pressure, teamwork.	1
2L.4 Factors affecting performance Fitness/health, stress, sleep, fatigue, alcohol, medication, drug abuse.	1
2L.5 Physical environment Working environment (climate, noise, illumination)	1

MODULE 3L — AVIATION LEGISLATION **MODULE 3L — AVIATION LEGISLATION**	**Level**
3L.1 Regulatory framework — Role of the Department of Civil Aviation Mauritius; — Applicable parts of Part-M and Part-66.	1
3L.2 Repairs and modifications — Approval of changes (repairs and modifications); — Standard changes and standard repairs.	2
3L.3 Maintenance data — Airworthiness Directives (ADs), Instructions for Continuing Airworthiness (ICA) (AMM, IPC, etc.); — Flight Manual; — Maintenance records.	2

MODULE 4L — AIRFRAME WOODEN/METAL TUBE AND FABRIC **MODULE 4L — AIRFRAME WOODEN/METAL TUBE AND FABRIC**	**Level**
4L.1 Airframe wooden/combination of metal tube and fabric — Timber, plywood, adhesives, preservation, power line, properties, machining; — Covering (covering materials, adhesives and finishes, natural and synthetic covering materials and adhesives); — Paint, assembly and repair processes; — Recognition of damages from overstressing of wooden/metal-tube and fabric structures; — Deterioration of wood components and coverings; — Crack test (optical procedure, e.g., magnifying glass) of metal components. Corrosion and preventive methods. Health and fire safety protections.	2
4L.2 Material — Types of wood, stability, and machining properties; — Steel and light alloy tubes and fittings, fracture inspections of welded seams; — Plastics (overview, understanding of the properties); — Paints and paint removal; — Glues, adhesives; — Covering materials and technologies (natural and synthetic polymers).	2
4L.3 Identifying damage — Overstress of wood / metal-tubing and fabric structures; — Load transfers; — Fatigue strength and crack testing.	3
4L.4 Performance of practical activities — Locking of pins, screws, castellated nuts, turnbuckles; — Thimble splice; — Nicopress and Talurit repairs; — Repair of coverings; — Repair of transparencies; — Repair exercises (plywood, stringer, handrails, skins);	2

MODULE 4L — AIRFRAME WOODEN/METAL TUBE AND FABRIC **MODULE 4L — AIRFRAME WOODEN/METAL TUBE AND FABRIC**	**Level**
— Aircraft Rigging. Calculation of control surface mass balance and range of movement of the control surfaces, measurement of operating forces; — Performance of 100-hours/annual inspections on a wood or combination of metal-tube and fabric airframe.	

MODULE 5L — AIRFRAME COMPOSITE **MODULE 5L — AIRFRAME COMPOSITE**	**Level**
5L.1 Airframe fibre-reinforced plastic (FRP) — Basic principles of FRP construction; — Resins (Epoxy, polyester, phenolic resins, vinyl ester resins); — Reinforcement materials glass, aramide and carbon fibres, features; — Fillers; — Supporting cores (balsa, honeycombs, foamed plastics); — Constructions, load transfers (solid FRP shell, sandwiches); — Identification of damage during overstressing of components; — Procedure for FRP projects (according to Maintenance Organisation Manual) including storage conditions for material.	2
5L.2 Material — Thermosetting plastics, thermoplastic polymers, catalysts; — Understanding properties, machining technologies, detaching, bonding, welding; — Resins for FRP: epoxy resins, polyester resins, vinyl ester resins, phenolic resins; — Reinforcement materials; — From elementary fibre to filaments (release agent, finish), weaving patterns; — Properties of individual reinforcement materials (E-glass fibre, aramide fibre, carbon fibre); — Problem with multiple-material systems, matrix; — Adhesion/cohesion, various behaviours of fibre materials; — Filling materials and pigments; — Technical requirements for filling materials; — Property changes of the resin composition through the use of E-glass, micro balloon, aerosols, cotton, minerals, metal powder, organic substances; — Paint assembly and repair technologies; — Support materials; — Honeycombs (paper, FRP, metal), balsa wood, Divinely (Contizell), development trends.	2
5L.3 Assembly of Fibre-Reinforced Composite-Structure Airframes — Solid shell; — Sandwiches; — Assembly of aerofoils, fuselages, control surfaces.	2
5L.4 Identifying Damage — Behaviour of FRP components in the event of overstressing; — Identifying delamination, loose bonds; — Bending vibration frequency in aerofoils; — Load transfer; — Frictional connection and positive locking; — Fatigue strength and corrosion of metal parts; — Metal bonding, surface finishing of steel and aluminium components during bonding with FRP.	3
5L.5 Mold making — Plaster melds, Mold ceramics; — GFK melds, Gel-coat, reinforcement materials, rigidity problems; — Metal Molds; — Male and female Molds.	2

MODULE 5L — AIRFRAME COMPOSITE **MODULE 5L — AIRFRAME COMPOSITE**	**Level**
5L.6 Performance of practical activities — Locking of pin, screws, castellated nuts, turnbuckles; — Thimble splice; — Nicopress and Talurit repairs; — Repair of coverings; — Repair of solid FRP shells; — Mold fabrication/molding of a component (e.g. fuselage nose, landing gear fairing, wing tip and winglet); — Repair of sandwich shell where interior and exterior layer are damaged; — Repair of sandwich shell by pressing with a vacuum bag; — Transparency repair (PMMA) with one- and two-component adhesive; — Bonding of transparency with the canopy frame; — Tempering of transparencies and other components; — Performance of a repair on a sandwich shell (minor repair less than 20 cm); — Aircraft Rigging. Calculation of control surface mass balance and range of movement of the control surfaces, measurement of operating forces; — Performance of 100-hour/annual inspections on an FRP airframe.	2

MODULE 6L — AIRFRAME METAL **MODULE 6L — AIRFRAME METAL**	**Level**
6L.1 Airframe metal — Metallic materials and semi-finished products, machining methods; — Fatigue strength and crack test; — Assembly of metal-construction components, riveted joints, adhesive joints; — Identification of damage to overstressed components, effects of corrosion; — Health and fire protection.	2
6L.2 Material — Steel and its alloys; — Light metals and their light alloys; — Rivet materials; — Plastics; — Colours and paints; — Metal adhesives; — Types of corrosion; — Covering materials and technologies (natural and synthetic).	2
6L.3 Identifying damage — Overstressed metal airframes, levelling, measurement of symmetry; — Load transfers; — Fatigue strength and crack test; — Identifying loose riveted joints.	3
6L.4 Assembly of metal- and composite-construction airframes — Skins; — Frames; — Stringers and longerons; — Frame construction; — Problems in multiple-material systems.	2
6L.5 Fasteners — Classifications of fits and clearances; — Metric and imperial measuring systems; — Oversize bolt.	2
6L.6 Performance of practical activities — Locking of pins, screws, castellated nuts, turnbuckles; — Thimble splice; — Nicopress and Talurit repairs; — Repair of coverings, surface damage, stop drilling techniques; — Repair of transparencies; — Cutting out sheet metals (aluminiums and light alloys, steel and alloys); — Folding bending, edging, beating, smoothening, beading;	2

MODULE 6L — AIRFRAME METAL **MODULE 6L — AIRFRAME METAL**	**Level**
— Repair riveting of metal airframes according to repair instruction or drawings; — Evaluation of rivet errors; — Aircraft Rigging. Calculation of control surface mass balance and range of movement of the control surfaces, measurement of operating forces; — Performance of 100-hour/annual inspections on a metal airframe.	

MODULE 7L — AIRFRAME GENERAL **MODULE 7L — AIRFRAME GENERAL**	**Level**
7L.1 Flight control system — Cockpit controls: controls in cockpit, colour markings, knob shapes; — Flight controls surfaces, flaps, air brakes surfaces, controls, hinges, bearings, brackets, push-pull rods, bell cranks, horns, pulleys, cables, chains, tubes, rollers, tracks, jack screws, surfaces, movements, lubrication, stabilisers, balancing of controls; — Combination of controls: flap ailerons, flap air brakes; — Trim systems.	3
7L.2 Airframe — Landing gear: characteristics of landing gears and shock absorber strut, extension, brakes, drum, disks, wheel, tyre, retraction mechanism, electrical retraction, emergency; — Wing to fuselage mounting points, empennage (fin and tail plane) to fuselage mounting points, control surface mounting points; — Permissible maintenance measures; — Towing: towing/lifting equipment/mechanism; — Cabin: seats and safety harness, cabin arrangement, windshields, windows, placards, baggage compartment, cockpit controls, cabin air system, blower; — Water ballast: water reservoirs, lines, valves, drains, vents, tests; — Fuel system: tanks, lines, filters, vents, drains, filling, selector valve, pumps, indication, tests, bonding; — Hydraulics: system layout, accumulators, pressure and power distribution, indication; — Liquid and gas: hydraulic, other fluids, levels, reservoir, lines, valves, filter; — Protections: firewalls, fire protection, lightning strike bonding, turnbuckles, locking devices, dischargers.	2
7L.3 Fasteners — Reliability of pins, rivets, screws; — Control cables, turnbuckles; — Quick-release couplings (L'Hotellier, SZD, Poland).	2
7L.4 Locking equipment — Admissibility of locking methods, locking pins, spring steel pins, locking wire, stop nuts, paint; — Quick-release couplings.	2
7L.5 Weight and balance levelling	2
7L.6 Rescue systems	2
7L.7 On-board modules — Pitot-static system, vacuum/dynamic system, hydrostatic test; — Flight instruments: airspeed indicator, altimeter, vertical-speed indicator, connection and functioning, markings; — Arrangement and display, panel, electrical wires; — Gyroscopes, filters, indicating instruments; testing of function; — Magnetic compass: installation and compass swing; — Sailplanes: acoustic vertical-speed indicator, flight recorders, anticollision aid; — Oxygen system.	2
7L.8 On-board modules installation and connections — Flight instruments, mounting requirements (emergency landing conditions as per CS-22); — Electric wiring, power sources, types of storage batteries, electrical parameters, electric generator, circuit breaker, energy balance, earth/ground, connectors, terminals,	2

MODULE 7L — AIRFRAME GENERAL **MODULE 7L — AIRFRAME GENERAL**	**Level**
warnings, fuses, lamps, lightings, switches, voltmeters, ampere meters, electrical gauges.	
7L.9 Piston engine propulsion Interface between power plant and airframe.	2
7L.10 Propeller — Inspection; — Replacement; — Balancing.	2
7L.11 Retraction system — Propeller position control; — Engine and/or propeller retraction system.	2
7L.12 Physical inspection procedures — Cleaning, use of lighting and mirrors; — Measuring tools; — Measure of controls deflection; — Torque of screws and bolts; — Wear of bearings; — Inspection equipment; — Calibration of measuring tools.	2

MODULE 8L — POWER PLANT **MODULE 8L — POWER PLANT**	**Level**
8L.1 Noise limits — Explanation of the concept of ‘noise level’; — Noise certificate; — Enhanced sound proofing; — Possible reduction of sound emissions.	1
8L.2 Piston engines — Four-stroke spark ignition engine, air-cooled engine, fluid-cooled engine; — Two-stroke engine; — Rotary-piston engine; — Efficiency and influencing factors (pressure–volume diagram, power curve); — Noise control devices.	2
8L.3 Propeller — Blade, spinner, backplate, accumulator pressure, hub; — Operation of propellers; — Variable-pitch propellers, ground and in-flight adjustable propellers, mechanically, electrically and hydraulically; — Balancing (static, dynamic); — Noise problems.	2
8L.4 Engine control devices — Mechanical control devices; — Electrical control devices; — Tank displays; — Functions, characteristics, typical errors and error indications.	2
8L.5 Hosepipes — Material and machining of fuel and oil hoses; — Control of life limit.	2
8L.6 Accessories — Operation of magneto ignition; — Control of maintenance limits; — Operation of carburettors; — Maintenance instructions on characteristic features; — Electric fuel pumps; — Operation of propeller controls; — Electrically operated propeller control; — Hydraulically operated propeller control.	2

MODULE 8L — POWER PLANT **MODULE 8L — POWER PLANT**	**Level**
8L.7 Ignition system — Constructions: coil ignition, magneto ignition, and thyristor ignition; — Efficiency of the ignition and preheat system; — Modules of the ignition and preheat system; — Inspection and testing of a spark plug.	2
8L.8 Induction and exhaust systems — Operation and assembly; — Silencers and heater installations; — Nacelles and cowlings; — Inspection and test; — CO emission test.	2
8L.9 Fuels and lubricants — Fuel characteristics; — Labelling, environmentally friendly storage; — Mineral and synthetic lubricating oils and their parameters: labelling and characteristics, application; — Environmentally friendly storage and proper disposal of used oil.	2
8L.10 Documentation — Manufacturer documents for the engine and propeller; — Instructions for Continuing Airworthiness (ICA); — Aircraft Flight Manuals (AFMs) and Aircraft Maintenance Manuals (AMMs); — Time Between Overhaul (TBO); — Airworthiness Directives (ADs), technical notes and service bulletins.	2
8L.11 Illustrative material — Cylinder unit with valve; — Carburettor; — High-tension magneto; — Differential-compression tester for cylinders; — Overheated/damaged pistons; — Spark plugs of engines that were operated differently.	2
8L.12 Practical experience — Work safety/accident prevention (handling of fuels and lubricants, start-up of engines); — Rigging-engine control rods and Bowden cables; — Setting of no-load speed; — Checking and setting the ignition point; — Operational test of magnetos; — Checking the ignition system; — Testing and cleaning of spark plugs; — Performance of the engine tasks contained in an aeroplane 100-hour/annual inspection; — Cylinder compression test; — Static test and evaluation of the engine run; — Documentation of maintenance work including replacement of components.	2
8L.13 Gas exchange in internal-combustion engines — Four-stroke reciprocating engine and control units; — Energy losses; — Ignition timing; — Direct flow behaviour of control units; — Wankel engine and control units; — Two-stroke engine and control units; — Scavenging; — Scavenging blower; — Idle range and power range.	2

MODULE 8L — POWER PLANT **MODULE 8L — POWER PLANT**	**Level**
8L.14 Ignition, combustion and carburation — Ignition; — Spark plugs; — Ignition system; — Combustion process; — Normal combustion; — Efficiency and medium pressure; — Engine knock and octane rating; — Combustion chamber shapes; — Fuel/air mix in the carburettor; — Carburettor principle, carburettor equation; — Simple carburettor; — Problems of the simple carburettor and their solutions; — Carburettor models; — Fuel/air mix during injection; — Mechanically controlled injection; — Electronically controlled injection; — Continuous injection; — Carburettor-injection comparison.	2
8L.15 Flight instruments in aircraft with injection engines — Special flight instruments (injection engine); — Interpretation of indications in a static test; — Interpretation of indications in flight at various flight levels.	2
8L.16 Maintenance of aircraft with injection engines — Documentation, manufacturer documents, etc.; — General maintenance instructions (hourly inspections); — Functional tests; — Ground test run; — Test flight; — Troubleshooting in the event of faults in the injection system and their correction.	2
8L.17 Workplace safety and safety provisions Work safety and safety provisions for work on injection systems.	2
8L.18 Visual aids: — Carburettor; — Components of injection system; — Aircraft with injection engine; — Tool for work on injection systems.	2
8L.19 Electrical propulsion — Energy system, accumulators, installation; — Electrical motor; — Heat, noise and vibration checks; — Testing windings; — Electrical wiring and control systems; — Pylon, extension and retraction systems; — Motor/propeller brake systems; — Motor ventilation systems; — Practical experience of 100-hour/annual inspections.	2
8L.20 Jet propulsion — Engine installation ; — Pylon, extension and retraction systems; — Fire protection; — Fuel systems including lubrication; — Engine starting systems, gas assist; — Engine damage assessment; — Engine servicing; — Engine removal / refit and test; — Practical experience of conditional / run time / annual inspections; — Conditional inspections.	2

MODULE 8L — POWER PLANT **MODULE 8L — POWER PLANT**	**Level**
8L.21 Full authority digital engine control (FADEC)	2

MODULE 9L — BALLOON/AIRSHIP HOT AIR **MODULE 9L — BALLOON/AIRSHIP HOT AIR**	**Level**
9L.1 Basic principles and assembly of hot-air balloons/airships — Assembly and individual parts; — Envelopes; — Envelope Materials; — Envelope Systems; — Conventional and special shapes; — Fuel System; — Burner, burner frame and burner support rods; — Compressed-gas cylinders and compressed-gas hoses; — Basket and alternative devices (seats); — Rigging accessories; — Maintenance and servicing tasks; — Annual/100-hour inspection; — Log Books; — Aircraft Flight Manuals (AFMs) and Aircraft Maintenance Manuals (AMMs); — Rigging and launch preparation (launch restraint); — Launch.	3
9L.2 Practical training Operating controls, maintenance and servicing jobs (according to flight manual).	3
9L.3 Envelope — Fabrics; — Seams; — Load tapes, rip stoppers; — Crown rings; — Parachute valve and fast-deflation systems; — Ripping panel; — Turning vent; — Diaphragms/catenaries (special shapes and airships); — Rollers, pulleys; — Control and shroud lines; — Knots; — Temperature indication label, temperature flag, envelope thermometer; — Flying wires; — Fittings, karabiners.	3
9L.4 Burner and fuel system — Burner coils; — Blast, liquid and pilot valves; — Burners/jets; — Pilot lights/vaporisers/jets; — Burner frame; — Fuel lines/hoses; — Fuel cylinders, valves and fittings.	3
9L.5 Basket and basket suspension (incl. alternative devices) — Types of baskets (incl. alternative devices); — Basket materials: cane and willow, hide, wood, trim materials, suspension cables; — Seats, roller bearings; — Karabiner, shackle and pins; — Burner support rods; — Fuel cylinder straps; — Accessories.	3
9L.6 Equipment — Fire extinguisher, fire blanket; — Instruments (single or combined).	3

MODULE 9L — BALLOON/AIRSHIP HOT AIR **MODULE 9L — BALLOON/AIRSHIP HOT AIR**	**Level**
9L.7 Minor repairs — Stitching; — Bonding; — Basket hide/trim repairs.	3
9L.8 Procedures for physical inspection — Cleaning, use of lighting and mirrors; — Measuring tools; — Measure of controls deflection (only airships); — Torque of screws and bolts; — Wear of bearings (only airships); — Inspection equipment; — Calibration of measuring tools; — Fabric Grab Test.	2

MODULES 10L — BALLOON/AIRSHIP GAS (FREE/TETHERED) **MODULES 10L — BALLOON/AIRSHIP GAS (FREE/TETHERED)**	**Level**
10L.1 Basic principles and assembly of gas balloons/airships — Assembly of individual parts; — Envelope and netting material; — Envelope, ripping panel, emergency opening, cords and belts; — Rigid gas valve; — Flexible gas valve (parachute); — Netting; — Load ring; — Basket and accessories (including alternative devices); — Electrostatic discharge paths; — Mooring line and drag rope; — Maintenance and servicing; — Annual inspection; — Flight papers; — Aircraft Flight Manuals (AFMs) and Aircraft Maintenance Manuals (AMMs); — Rigging and launch preparation; — Launch.	3
10L.3 Envelope — Fabrics; — Poles and reinforcement of pole; — Ripping panel and cord; — Parachute and shroud lines; — Valves and cords; — Filler neck, Poeschel-ring and cords; — Electrostatic discharge paths.	3
10L.4 Valve — Springs; — Gaskets; — Screwed joints; — Control lines; — Electrostatic discharge paths.	3
10L.5 Netting or rigging (without net) — Kinds of net and other lines; — Mesh sizes and angles; — Net ring; — Knotting methods; — Electrostatic discharge paths.	3
10L.6 Load ring	3
10L.7 Basket (incl. alternative devices) — Kinds of baskets (incl. alternative devices); — Strops and toggles; — Ballast system (bags and supports);	3

MODULES 10L — BALLOON/AIRSHIP GAS (FREE/TETHERED) **MODULES 10L — BALLOON/AIRSHIP GAS (FREE/TETHERED)**	**Level**
— Electrostatic discharge paths.	
10L.8 Ripping cord and valve cords	3
10L.9 Mooring line and drag rope	3
10L.10 Minor repairs — Bonding; — Splicing hemp ropes.	3
10L.11 Equipment Instruments (single or combined).	3
10L.12 Tether cable (tethered gas balloons (TGB) only) — Kinds of cables; — Acceptable damage of cable; — Cable swivel; — Cable clamps.	3
10L.13 Winch (tethered gas balloons only) — Kinds of winches; — Mechanical system; — Electrical system; — Emergency system; — Grounding/ballasting of winch.	3
10L.14 Procedures for physical inspection — Cleaning, use of lighting and mirrors; — Measuring tools; — Measure of controls deflection (only airships); — Torque of screws and bolts; — Wear of bearings (only airships); — Inspection equipment; — Calibration of measuring tools; — Fabric grab test.	2

MODULES 11L — AIRSHIPS HOT AIR/GAS **MODULES 11L — AIRSHIPS HOT AIR/GAS**	**Level**
11L.1 Basic principles and assembly of small airships — Envelope, ballonets; — Valves, openings; — Gondola; — Propulsion; — Aircraft Flight Manuals (AFMs) and Aircraft Maintenance Manuals (AMMs); — Rigging and launch preparation.	3
11L.2 Practical training — Operating controls; — Maintenance and servicing jobs (according to AMM and AFM).	3
11L.3 Envelope — Fabrics; — Ripping panel and cords; — Valves; — Catenary system.	3
11L.4 Gondola (incl. alternative devices) — Kinds of gondolas (incl. alternative devices); — Airframe types and materials; — Identification of damage.	3
11L.5 Electrical system — Basics about on-board electrical circuits; — Electrical sources (accumulators, fixation, ventilation, corrosion); — Lead, nickel-cadmium (NiCd) or other accumulators, dry batteries; — Generators; — Wiring, electrical connections; — Fuses; — External power source; — Energy balance.	3
11L.6 Propulsion — Fuel system: tanks, lines, filters, vents, drains, filling, selector valve, pumps, indication, tests, bonding; — Propulsion instruments; — Basics about measuring and instruments; — Revolution measuring; — Pressure measuring; — Temperature measuring; — Available fuel/power measuring.	3
11L.7 Equipment — Fire extinguisher, fire blanket; — Instruments (single or combined).	3

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS **MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS**	**Level**
12L.1 Radio Com/ELT — Channel spacing; — Basic functional test; — Batteries; — Testing and maintenance requirements.	2
12L.2 Transponder — Basic operation; — Typical portable configuration including antenna; — Explanation of Modes A, C, S;	2

MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS **MODULE 12L — RADIO COM/ELT/TRANSPONDER/INSTRUMENTS**	**Level**
— Testing and maintenance requirements.	
12L.3 Instruments — Handheld altimeter/variometers; — Batteries; — Basic functional test.	2

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.

(b) The Number of questions per modules shall be as follows:

(i) module 1L ‘Basic knowledge’: 12 questions. Time allowed: 15 minutes;

(ii) module 2L ‘Human factors’: 8 questions. Time allowed: 10 minutes;

(iii) module 3L ‘Aviation legislation’: 24 questions. Time allowed: 30 minutes;

(iv) module 4L ‘Airframe wooden/metal tube and fabric’: 32 questions. Time allowed: 40 minutes;

(v) Module 5L ‘Air frame composite’ : 32 questions. Time allowed: 40 minutes

(vi) module 6L ‘Airframe metal’: 32 questions. Time allowed: 40 minutes

(vii) module 7L ‘Airframe general’: 64 questions: Time allowed: 80 minutes

(viii) module 8L ‘Power plant’: 48 questions. Time allowed: 60 minutes

(ix) module 9L ‘Balloon/Airship hot air’: 36 questions. Time allowed: 45 minutes;

(x) mod8ule 10L ‘Balloon/Airship gas (free/tethered)’: 40 questions. Time allowed: 50 minutes

(xi) module 11L ‘Airship hot air/gas’: 36 questions. Time allowed: 45 minutes;

(xii) module 12L ‘Radio Com/ELT/transponder/instruments’: 16 questions. Time allowed 20 minutes.

APPENDICES TO AMCS TO MCAR PART-66

Appendix I Aircraft Type Ratings for Part-66 Aircraft Maintenance Licences

The following aircraft type ratings should be used to ensure a common standard throughout countries.

Notes on TR endorsement covering several models/variants:

The endorsement of a type rating (TR) on the aircraft maintenance license (AML), covering several models/variants, does not automatically imply that the AML holder has acquired the appropriate knowledge on each model/variant. The TR course received or the experience the AML holder has gained, may have been limited to one or several model(s)/variant(s) but not to all models/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, are responsible to verify whether the model/variant has been adequately covered by the TR course or gained experience.

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

Notes on when the licences should be modified:

When a modification is introduced by this Decision to an aircraft type rating or to an engine designation in the rating which affect licences already issued, the ratings on the AMLs may be modified at the next renewal or when the licence is reissued, unless there is an urgent reason to modify the licence.

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

- This Appendix I intends to include the type ratings of aircraft resulting from STCs for installation of another engine. These STCs are those approved by EASA and equivalent Authorities.

- Example: The STC from JET AVIATION AG, approved by the LBA for replacement of GE CF 700 by Honeywell TFE731 on Fan Jet Falcon Series E, results in a new rating called Falcon 20E (Honeywell TFE731).

- However, the ratings from STCs for installation of an engine:

    - on part of the original airframe models, or

- from the same manufacturer, but of a type very similar to the original one, have not been added because they would have resulted in an already existing rating.

Examples:

- The STC from SILVERHAWK CONVERSIONS approved by EASA for installation of PT6A135A on Beech C90, C90A and E90 would result in the Beech C90/C90A/E90 (PWC PT6) rating, but this is not listed because it is already included in the original Beech 90 Series (PWC PT6) rating.

- The STC from Air-Service Wildgruber GmbH approved by LBA for replacement of PWC PT6A-20 by PWC PT6A-27 would result in the De Havilland DHC-6-100 (PWC PT6) rating, but this is not listed because it is already included in the De Havilland DHC-6 (PWC PT6) rating in the table

- When the STC concerns the installation of an engine that falls under a different subcategory, e.g. replacement of a piston engine by a turbo-prop (a turbine engine), then the new type rating needs to be listed in the new subcategory.

- In case a type rating resulting from an STC has not been yet defined, the latter shall be contacted by the Authority to agree on a new type rating to be used

In the following tables:

- TC Holder he TC holder as defined in the type certificate data sheets (TCDS) (EASA, FAA or other) or the Specific Airworthiness Specifications (SAS).

- The column ‘TC Holder’ includes the TC holder as defined in the type certificate data sheets (STCDS) (EASA, FAA or other).

- Some TC holders’ designations have been corrected to add the information: “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 the Authority in identifying the experience required for this type with a view on removing existing limitations on the licence.

- 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 experiences ‘metal tube covered with fabric’ and ‘wooden structure’ are required.

- In Group 3, intends to assist the Authority in identifying the aeroplanes types where the maximum take-off mass (MTOM) is:

- above 2T and is subject to a B1.2 licence, or

- 2T and below and is subject to a B1.2 or B3 licence.

– The column ‘NOTE’ in every table includes some necessary information, when relevant, e.g.

  – ‘TC no longer valid’ means that the type certificate has been either revoked or surrender. TR endorsement should be removed from the AML at the next renewal, or can be kept in the AML at the discretion of the Authority.

Appendix II Aircraft Type Practical Experience and On-the-Job Training - List of Tasks

Tasks are divided in categories of aircraft:

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

A. SPECIFIC TASKS FOR AEROPLANES

Time limits/Maintenance checks

100-hour check (general aviation aircraft).
'B' or 'C' check (transport category aircraft).
Assist carrying out a schedule's maintenance check i.e. 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 lighting strike.

Dimensions/Areas

Locate component(s) by zone/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/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 pressurisation 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 coaxial 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 flat 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.
Replace FDR.
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.
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.
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 carburettor/injector.
Adjust carburettor/injector.
Clean injector nozzles.
Replace primer line.
Check carburettor 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/ignitors.
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 direction of movement.
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 test.
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
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

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 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'	x
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

Tasks	Balloon			Airship	
	Hot air	Gas	Tethered gas	Hot air	Gas
General activities:					
Functionality test of aircraft (*)	x	x	x	x	x
Placards check or replace	x	x	x	x	x

Tasks	Balloon			Airship	
	Hot air	Gas	Tethered gas	Hot air	Gas
Documentation annual inspection, repair, ADs, equipment (*)	x	x	x	x	x
Classification repair (*)	x	x	x	x	x
Weighing:					
Weighing and weighing report (*)	x	x	x	x	x
Servicing:					
Lubrication of controls when applicable			x	x	x
Cleaning envelope, basket, burner	x	x	x	x	x
Inspections:					
Eight annual inspections (covering at least 3 different types) (*)	x				
Five annual inspections (covering at least 2 different types) (*)		x			
Three annual inspections (covering at least 2 different types) (*)			x	x	
Two annual inspections (*)					x
Strength test of envelope fabric (*)	x	x	x	x	x
Flight control systems — Removal — Inspection — Reinstallation					
Control surface cable					x
Trim system					x
Safeguarding of pins, screws, castellated nuts (*)			x	x	x
Stick and pedals					x
Hydromechanical control systems			x		x
Ballonet control systems (*)			x	x	x
Electrical control systems			x		x
Valves (gas valve, turning vent, parachute or rip panel) (*)	x	x	x	x	x
Control and shroud lines and pulleys	x	x	x	x	x

Tasks	Balloon			Airship	
	Hot air	Gas	Tethered gas	Hot air	Gas
Elevator – stabilizer (incl. balancing if applicable)					x
Rudder (incl. balancing if applicable)					x
Drag rope		x			
Electrical system:					
Removal – installation of electrical wires			x	x	x
Removal – installation of electrical components			x	x	x
Servicing of batteries	x	x	x	x	x
Communication system – Transponder:					
Removal – installation of COM	x	x	x	x	x
Removal – installation of NAV					x
Removal – installation of XPDR	x	x	x	x	x
Installation of antenna	x	x	x	x	x
Replacement of antenna cable	x	x	x	x	x
Cabin – Equipments:					
Pitot / static systems – tubes removal - installation - replacement					x
Flight instruments removal - installation - replacement	x	x	x	x	x
Installation of an approved system	x	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		x
Valves - inspection and rigging of valves					x
Envelope:					
Inspection and repair of envelope panels/gores/seams	x	x	x	x	x

Tasks	Balloon			Airship	
	Hot air	Gas	Tethered gas	Hot air	Gas
Inspection and repair of load tapes and attachment points	x	x	x	x	x
Inspection and repair of deflation system	x	x		x	
Inspection and repair of net		x	x		
Inspection and repair of mooring system			x		
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	x
Inspection and fabrication of a catena				x	x
Load ring/frame:					
Crack detection (welded and machined parts) (*)	x	x	x	x	
Heater system:					
Removal, inspection and re-installation	x			x	
Inspection and cleaning of vaporizer and filter (*)	x			x	
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 an assembly of fuel cell (*)	x			x	
10-year inspection of fuel cell	x			x	
Basket/gondola:					

Tasks	Balloon			Airship	
	Hot air	Gas	Tethered gas	Hot air	Gas
Removal, inspection and re-installation (as applicable)	x	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	x
Inspection and fabrication of a basket wire	x	x	x		
Inspection of operational equipment and its fixation points	x	x	x	x	x
Crack detection and repair (welded parts and frames)	x	x	x	x	x
Landing gear:					
Removal, inspection and re-installation of wheels			x	x	x
Removal, inspection and re-installation of brakes					x
Removal, inspection and re-installation of shock absorber					x
Fuel – Engine – Propeller – Engine instruments systems:					
Refer to tasks in blocks for aeroplanes				x	x
Wood structure:					
Structure repair	x	x	x		
Protective coating					
Composite structure:					
Laminate repair			x		x
Sandwich structure repair			x		x
Metal structures:					
Crack detection (welded and machined parts)	x	x	x	x	x
Riveting jobs				x	x

Tasks	Balloon			Airship	
	Hot air	Gas	Tethered gas	Hot air	Gas
Bonding of structures		x	x	x	x
Anti-corrosion treatment			x	x	x
Repair of fairings			x		x
Engine:					
Tasks for aeroplanes of comparable certification level				x	x
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		

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 Part-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 judgement 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 organization'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 organization 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 procedures are met for both functions. Wherever possible (depending on the size of the organization), 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.

APPENDIX TO SUBPART C

Requirements and Procedures for Grant of Approvals

Approval to persons employed in an organization approved by the Authority to carry out maintenance work on aircraft, engine or components and issue certification thereof, shall be granted in accordance with, requirements and procedures specified in the Civil Aviation Regulations and procedures approved in the Maintenance Organization's Exposition until publication of specific requirements under MCAR-Part 66.

APPENDIX TO SUBPART D

Requirements and Procedures for Grant of Authorisations

Authorisation to aircraft maintenance personnel by the Authority to certify maintenance work carried out on an aircraft shall be granted in accordance with, requirements and procedures specified in the Civil Aviation Regulations until publication of specific requirements under MCAR- Part 66.

APPENDIX TO SUBPART E

Requirements and Procedures for Grant of Certificate of Competency

Certificate of Competency to persons employed in an organisation approved by the Authority to carry out and certify specialized processes and non-destructive inspections shall be granted in accordance with, requirements and procedures specified in MCAR Chapter 6.1.