CAR – 66

LICENCING OF AIRCRAFT MAINTENANCE ENGINEERS

DRAFT

DIRECTORATE GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE, OPP SAFDARJUNG AIRPORT, NEW DELHI

Salient Features of the CAR-66

The CAR-66

- has been drafted in line with the current Rule 61 and to harmonise the aircraft maintenance personnel licensing system with EASA Part 66 (General).
- details, requirements for qualifying an individual to obtain an Aircraft MaintenanceEngineer's Licence and extension of such licence [CAR-66]
- eliminates the system of obtaining Airframe, Engine, Electrical, Instrument and Radio System Licences separately [66.A.03]
- redefines the syllabus for basic knowledge examination in modular pattern [66.A.25]
- provides for endorsement of an AME licence after successful completion of type training and the type training examination/type examination which shall consist ofboth theoretical and practical examinations [66.A.45 (c)]
- lists the details of practical tasks to qualify an individual to obtain a type rating [Appendix II to AMC]
- provides for acquiring group type rating of aircraft and certification privileges [66.A.45 (a)]
- has a provision to convert the existing AME licence to CAR 66 licence [66.A.70] withor without limitation.

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GENERAL

In order to harmonize Indian requirements for licensing of aircraft maintenance engineers with international requirements; CAR-66 Rev.0 dated 11th November 2011, was introduced.

This CAR is issued on the basis of amended Rule 61 of the Aircraft Rules, 1937 *(G.S.R. No. 289 (E) dated 08.04.2022).*

The CAR-66 is applicable to all personnel/ Organizations engaged in maintenance and/or certification of aircraft registered in India.

The Section A of CAR-66 establishes the requirements for the issue and extension of an aircraft maintenance engineer's license, conditions of its validity and use. It also has a provision for converting the aircraft maintenance engineer's (AME) license issued prior to the CAR-66 coming into force. The requirements are followed by Acceptable means of compliance (AMC) and Guidance Material (GM)

The AME licenses in CAR 66 pattern are available in two different ways:

a. After conversion of pre-CAR 66 AME licenses with applicable limitation.
b. Issue of fresh license after passing of applicable modules of Basic Knowledge Exam to be conducted by CEO.

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Record of Revisions

Initial Issue (Revision 0) 11th November 2011

This CAR 66 provides requirements for the issue of an aircraft maintenance engineer'slicence and conditions of its validity and use for aeroplanes and helicopters.

Revision 1, 23rd April 2015

The Revision-01 to CAR 66 was issued to revise conversion of licences issued prior toCAR-66 and examination credits. The revision also revises the License format.

CAR 66 Issue II, 4th April 2016

The CAR 66 Issue II is being issued to amend the training, examination, knowledge andexperience requirements for the issuance of aircraft maintenance licences

Salient features of the CAR 66 Issue II are:

1. The training, examination, knowledge and experience requirements for the issuance ofaircraft maintenance licences and to adapt these requirements to the complexity of the different categories of aircraft amended
2. The AMCs and GMs related to a point have been brought together for easy referencepurposes.
3. Provision for aircraft grouping added (66.A.5)
4. Requirements for completing all the module for basic knowledge within 10 year(66.A.25 (b)) added
5. Heading of (66.A.45) is changed from type /task training to Endorsement with aircraftrating. Related AMC and GM amended.
6. Point 66. A. 50 and related AMC added to make a provision for introducing or removal of limitation from the license
7. Existing AMCs and GMs are suitable amended.
8. Appendix -1- Basic knowledge requirements amended to revise the syllabus forknowledge examination
9. Appendix -2 -Basic examination standard have been revised
10. Appendix-3- Type examination standard have been amended, minimum standard and duration for type training, course curriculum have been introduced, practical elements requirements to be covered during type training added, type training examinations and assessment standard have been revised, relevant AMC and GM have been also amended/added.
11. Appendix-III to AMC of CAR 66 for competency assessment of assessors added.
12. Procedures for CAR -66 (Section –B) is removed from this CAR and shall be part of Airworthiness Procedures Manual (Chapter- 17)

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CAR Issue II Revision 1, 10th February 2017

The Revision-01 to CAR 66 Issue II is proposed to be issued to incorporate amendmentsmade in Rule 61 of the Aircraft Rules, 1937 published vide GSR 911 (E) dated 16-9-2016.Salient revision in the CAR as follows:-

1. CAR 66.A.3 In the existing AME licence category, category B3 is introduced forcertifying unpressurised piston engine aircraft below 2000kgs MTOW.
2. Provision has been made for issue of Category A licence without type rating
3. 66. A. 20 privileges of AME licence has been replaced with new one in line with rule61.
4. 66.A.30 Aircraft Maintenance Experience requirements of issue of Category A, B1.2and B 1.4 has been revised to 3 years.
5. Related paragraph in this CAR revised to include new category B3 where everrequired.
6. 66.A.45 endorsement on AME licence for aircraft ratings has been revised suitablyto include category B3 requirement.
7. Appendix –I Basic knowledge requirement has been revised to include syllabus forcategory B3.
8. Requirements for certifying staff engaged in certification of aircraft components aredetailed in Subpart C (Component).
9. Application and format are separated from the main CAR and published in the formsection on DGCA website.

CAR Issue II Revision 2, 4th September 2017

The salient features of this revision are as follows:

1. 66.A.35 amended to replace skill test requirement with demonstration of skill.
2. 66.A.215 (b) amended to include AME Course.
3. Appendix –II (Basic Examination Standard) para 1.5 amended to make provision forappearing in failed module related to limitation papers from 90 days to 30 days.
4. GM 66.A.35 (Skill Test Requirements) – Deleted.
5. Appendix-I (Appendices to AMC for CAR 66) amended to add a note on Type rating endorsement covering several models/ variant. Group 1 Helicopter Table amendedin line with EASA guidelines.

CAR Issue II Revision 3, 16th November 2018

The salient features of this revision are as follows:

1. Appendix 1 to AMC published separately.

CAR Issue II Revision 4, 5th February 2019

The salient features of this revision are as follows:

1. AMC 66.A.30(a) amended to incorporate amendment to Rule 61 of the Aircraft Rules, 1937 published vide GSR 1066(E) dated 25-10-2018.

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CAR Issue II Revision 5, 03rd December 2019

The salient features of this revision are as follows:

1. Appendix 1 to AMC published separately.

CAR Issue II Revision 6, 6th April 2021

The salient features of this revision are as follows:

1. Appendix 1 to AMC published separately.

CAR Issue II Revision 7, 7th February 2022

The salient features of this revision are as follows:

1. Reference of eGCA introduced at relevant places.
2. The requirements for endorsement of the full group 3 rating has been revised.
3. The requirements for endorsement of the rating 'piston-engine non-pressurised aeroplanes of 2000 kg MTOM and below' has been revised.
4. Appendix VI(a) - Aircraft Maintenance Engineer's Licence (PLASTIC CARD) format [issued through eGCA] has been added.
5. The definition of "designated assessors appropriately qualified" and its approval process has been revised as per AAC 04 of 2017.
6. Note added under 'DGCA application forms for licenses and examinations'.

CAR Issue II Revision 8, 20th April 2022

The salient features of this revision are as follows:

1. Appendix 1 to AMC published separately.

CAR Issue III, Revision 0, December 2023

The salient features of this issue are as follows:

1. Harmonize CAR 66 with the EASA Part 6 (Annex III dated 18-05-2021 and AMC/GM to Annex III dated 02-12-2022) and Rule 61 of Aircraft Rules 1937 (G.S.R. No. 289 (E) dated 08.04.2022).

2. Requirement of issue of licence in the category "B2L" and category "L" have been added.

3. The maintenance experience logbook format added.

4. The requirements, related AMCs and GMs have been brought together for easy reference purposes.

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SECTION A

Technical Requirements

SUBPART A

AIRCRAFT MAINTENANCE ENGINEER'S LICENCE AEROPLANES AND HELICOPTERS

66. A.01 Scope

This section defines the aircraft maintenance engineer's licence and establishes the requirements for application, issue and conditions of its validity

66. A.03 Licence categories

(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, applicable to all aircraft.

(d) Category B2L

- Category B2L shall be issued with the 'system rating' for aircraft other than those in Group 1 (66.A.05(1)) as specified below:
- Communication/Navigation (Com/Nav),
- Instruments,
- Autoflight,
- Surveillance,
- Airframe systems.

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

(e) Category B3

Category B3 licence is applicable to piston-engine non-pressurised aeroplanes of 2 000 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 Light Aircraft 1 (LA1) aeroplanes;
- L2: powered sailplanes and Light Aircraft 1 (LA1) aeroplanes;
- L3H: hot-air balloons;
- L3G: gas balloons;
- L4H: hot-air airships;
- L4G: Light Aircraft 2 (LA2) gas airships; and
- L5: gas airships other than Light Aircraft 2 (LA2).

(g) Category C, applicable to aeroplanes and helicopters.

GM 66.A.03 Licence categories

Individual aircraft maintenance licence holders need not be restricted to a single category. Provided that each qualification requirement is satisfied, any combination of categories may be granted.

1. Light aircraft 1 aircraft (LA1) means the following:
   (a) An aeroplane with a Maximum Take-off Mass (MTOM) of 1200 kg or less that is not classified as "complex motor-powered aircraft";
   (b) A sailplane or powered sailplane of 1200 kg MTOM or less;
   (c) A balloon with a maximum design lifting gas or hot air volume of not more than 3400 m^3 for hot air balloons, 1050 m^3 for gas balloons, 300 m^3 for tethered gas balloons;
   (d) An airship designed for not more than four occupants and a maximum design lifting gas or hot air volume of not more than 3400 m^3 for hot air airships and 1000 m^3 for gas airships;

2. Light Aircraft 2 aircraft (LA2) means the following:
   a. An aeroplane with a Maximum Take-off Mass (MTOM) of 2000 kg or less that is not classified as "complex motor-powered aircraft";
   b. A sailplane or powered sailplane of 2000 kg MTOM or less;
   c. A balloon;
   d. A hot airship;
   e. 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;
   f. A Very Light Rotorcraft.

NOTE: An aeroplane, meeting the MTOM requirements for LA 1 or LA 2 Category, is nevertheless classified as "complex motor-powered aircraft " when it is certificated for operation with a minimum crew of at least two pilots, or it is equipped with (a) turbojet engine(s) or more than one turboprop engine.

Note: The 'LA2 aircraft' category includes all 'LA1 aircraft'.

3. 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).

4. While the L1C subcategory only includes composite sailplanes, the L1 subcategory includes all sailplanes (composite, metal and wood).
5. While the L2C subcategory only includes composite powered sailplanes and composite LA1 aeroplanes, the L2 subcategory includes all powered sailplanes and LA1 aeroplanes (composite, metal and wood).
6. In the case of maintenance of mixed balloons (combination of gas and hot air), it is required to hold both L3G and L3H subcategories.
7. 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.
8. 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.03.

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.05 Aircraft groups

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

1. Group 1: complex motor-powered aircraft as well as multiple engine helicopters, aeroplanes with maximum certified operating altitude exceeding FL290, aircraftequipped with fly-by-wire systems and other aircraft requiring an aircraft type ratingwhen defined so by the DGCA
2. Group 2: aircraft other than those in Group 1 belonging to the following subgroups:
   - sub-group 2a: single turbo-propeller engine aeroplanes
   - sub-group 2b: single turbine engine helicopters
   - sub-group 2c: single piston engine helicopters.
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.05 Aircraft Groups

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

Category/subcategory **Groups/Sub-Groups**	**A, B1 and C**	**B2**	**B2L**	**B3**	**L**				
					L1C and L1	**L2C and L2**	**L3H and L3G**	**L4H and L4G**	**L5**
Group 1 - Complex motor-powered aircraft - Multi-engine helicopters - Aeroplanes above FL290 - Aircraft with fly-by-wire systems - Any other aircraft when defined by the Agency	X	X							
Group 1 — Gas airships other than LA2		X							X
Group 2 2a: Single turboprop aeroplanes 2b: Single turbine helicopters 2c: Single piston helicopters	X	X	X						
Group 3 — Piston engine aeroplanes	X	X	X						
Group 3 — Piston engine aeroplanes (non-pressurised of 2 000 kg MTOM and below)	X	X	X	X					
Group 3 — LA1 piston engine aeroplanes	X	X	X	X		X			
Group 4 Sailplanes Powered sailplanes Balloons Airships not in Group 1		X X X X	X X X X		X	X X	X	X	X

66. A.10. Application

a) An application for an aircraft maintenance engineer's licence or change to such licence shall be made on CA Form 19 (Refer Appendix-V) (through eGCA) with necessary documents and fees to DGCA.

b) *Reserved*.

c) In addition to the documents required in points 66.A.10 (a) as appropriate, the applicant for any change to an existing aircraft maintenance engineer's licence shall submit his/her current original aircraft maintenance engineer's licence to the DGCA together with application.

d) Reserved

e) Reserved

(f) Each application shall be supported by documentation to demonstrate compliance with the applicable theoretical knowledge, practical training and experiencerequirements at the time of application.

AMC 66.A.10 Application

1. Maintenance experience should be written in a manner that the reader has a reasonable understanding of where, when and what maintenance constitutes the experience. A blank statement "X year's maintenance experience completed" is not acceptable. A log book of maintenance experience is required to be maintained in the desired format given in this CAR.

2. Applicants claiming the maximum reduction in 66.A.30 (a) total experience based upon having successfully completed approved basic training should include the certificate of approval with its validity schedule of the training establishment.

3. Applicants claiming reduction in 66.A.30 (a) total experience based upon having successfully completed technical training in an organization or institute recognized by DGCA as a competent organization 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 CA Form 19 (through eGCA):

- 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 endorsement to add a new system rating, he/she needs to demonstrate the practical experience required by 66.A.30(a)(3) for the system ratingbut 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 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 relevant to the aircraft group/sub-group as described in Appendix IV.

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

66. A.15.Eligibility

a) The applicant must have passed 10+2 examination in Physics, Chemistry and Mathematics from a recognized board or university or its equivalent

b) An applicant for an aircraft maintenance engineer's licence shall be at least 18 yearsof age.

AMC 66.A.15 (a) Eligibility

Diploma in engineering recognizedby state technical education board where physics, chemistry and mathematics has been studied as subject, shall be considered as equivalent qualification**.**

To prove the equivalence to 10 +2, the applicant is required to submit a certificate from applicable board/University.

66.A.20 Privileges

a) The following privileges shall apply:

1. Category A licence holder to issue certificates for release to service after minor scheduled line maintenance and simple defect rectification within the limits of maintenance tasks specifically endorsed on the authorisation issued by a maintenance organisation approved under rule 133B for the broad category of aircraft endorsed on the licence and the certification privileges shall be restricted to the work carried out by the licence holder himself in the maintenance organization that issues the authorisation.
2. Category B1 licence holder to issue certificates for release to service and act as support staff following the maintenance performed on aircraft structure, power-plant, mechanical and electrical systems, work on avionics system requiring simple tests to prove their serviceability and not requiring trouble shooting, in respect of an aircraft type endorsed on the licence.

   NOTE: Category B1 shall include the appropriate sub-category of Category A;

3 Category B2 licence holder to issue —

(a) certificates of release to service after maintenance on avionic and electrical systems, avionics and electrical system within engine and mechanical systems requiring only simple tests to prove their serviceability of aircraft type endorsed on the licence;

(b) certificates of release to service after minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation issued by an approved maintenance organisation of aircraft type endorsed on the licence and 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 limitedto the rating already endorsed on the licence.

Note: The category B2 licence does not include any A sub-category.

4. Category B2L licence 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. Category B3 licence holder to issue certificates of release to service and to act as B3 support staff for the following:
   - maintenance performed on aeroplane structure, engine and mechanical and electrical systems; and
   - work on avionic systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.

6. Category L licence holder to issue certificates of release to service and to act as category L support staff following:
   - the 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.

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

   Note: Subcategory L2C includes subcategory L1C.

7. Category C licence holders to issue certificates of release to service following base maintenance in respect of an aircraft of the type endorsed on the licence. The privileges apply to the aircraft in its entirety including all systems.

NOTE—Simple test means a test described in approved maintenance data and suchin nature that aircraft system serviceability is verified through aircraft controls, switches, Built-in Test Equipment (BITE), Central Maintenance Computer (CMC) or external test equipment not requiring special training." ;

b) The holder of Aircraft Maintenance Engineer license may not exercise certification privileges unless:

1. in compliance with the applicable requirements of CAR M and/or CAR 145 ; and
2. in the preceding two year period he/she has either acquired six months of maintenance experience in accordance with the privileges granted by the AircraftMaintenance Engineer's Licence or met the provision for the issue of appropriate privileges; and
3. he/she has the adequate competence to certify maintenance on the correspondingaircraft; 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 relevantconnectors. Lighting systems are also included in this definition. When working on cables and connectors which are part of these electrical systems, the following typicalpractices 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 orother data transmission medium, and includes the system's components and connectors. Examples of avionics systems include the following:

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

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

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

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

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

Line maintenance: Refer to AMC 145.A.10

Base Maintenance: Refer to AMC 145.A.10

2. The category B3 licence does not include any A subcategory. Nevertheless, this does not prevent the B3 licence holder from releasing maintenance tasks typical of the A1.2subcategory for piston-engine non-pressurized aeroplanes of 2000 kg MTOM and below, within the limitations contained in the B3 licence.
3. The B1.2 and B3 licences do not include any L subcategory. Nevertheless, a holder of an aircraft maintenance licence in subcategory B1.2 endorsed with the Group 3 rating or in category B3 endorsed with the rating 'piston engine non-pressurised aeroplanes of 2 000 kg MTOM and below', shall be issue, upon application, a licence in subcategories L1 and L2, with the same limitations as the B1.2/B3 licence held.
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 scheduled 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 specialization. The principal function of the category C certifying staff is toensure that all required maintenance has been called up and signed off by the category B1, B2, B2L, B3 and L support staff, as appropriate, before issue of the certificate ofrelease 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 organization:

- 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 months period can be replaced by 100 days of maintenance experience in accordance with the privileges, whether these 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 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 DGCA. These circumstances consider the cases where the holder of a CAR-66 licence happens to be the owner of an aircraft and carries out maintenance on his own aircraft, or where a licence holder maintains an aircraft operated for low utilization, that does not allow the licence holder to accumulate the required experience. This reduction should not be combined with the 20% reduction permitted when carrying out technical support, or maintenance planning, continuing airworthiness management or engineering activities. To avoid a too long period without experience, the working days should be spread over the intended 6 months period.

2. Nature of the experience:

Depending on the category of the aircraft maintenance engineer's 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 holder, 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 type rating included in the authorization the experience should be on that particular aircraft or on a similar aircraft within the same licence (sub) category. Two aircraft can be considered 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):

(a) Propulsion systems (piston or turboprop or turbofan or turboshaft or jet-engineor push propellers); and

(b) Flight control systems (only mechanical controls or hydro-mechanically poweredcontrols or electro-mechanically powered controls); and

(c) Avionic systems (analog systems or digital systems); and

(d) Structure (manufactured of metal or composite or wood).For licenses endorsed with (sub) group ratings:

- In the case of B1 licence endorsed with (sub) group ratings (either manufacturer sub group 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 or B2L licence endorsed with (sub) group ratings (either manufacturer group 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-pressurizedaeroplanes of 2000kg MTOM and below' as defined in 66.A.45, the holder should show experience on at least one aircraft type per aircraft structure (metal, metal-tubing with fabric ,composite, 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:

(a) Date and time (24 Hrs IST format);

(b) Place;

(c) Aircraft & Engine type;

(d) Aircraft identification i.e. registration (VT- ….);

(e) ATA chapter;

(f) Work order number;

(g) Operation performed e.g. 100 FH check, MLG wheel change, engine oil check and complement, SB embodiment, trouble shooting, structural repair, STC embodiment…;

(h) Type of maintenance i.e. base(B), line(L);

(i) Type of activity i.e. perform(P), supervise(S), release(R);

(j) Category /Subcategory used (A1, A2, A3, A4, B1.1, B1.2, B1.3, B1.4, B2, B2L, B3, C or L1,

L1C, L2, L2C,L3G, L3H, L4G, L4H, L5);

(k) Duration in hours or days

(l) Signature and stamp of certifying staff.

Note: The above details may be printed on the first page of the individual logbook to guide the candidates to fill the required data in the format given below:

Work logbook format:

Date & Time (24 Hrs IST)	Place	Aircraft & Engine type	VT-….	ATA	Work order no.	Task performed	B/L	P/S/R	Cat/Sub-cat.	Duration (Hrs/ days)	Signature & stamp of certfying staff

Name……..…… AME licence no./BAMEL no./Computer no.....…..…….
Signature..…….…… Page no.……

Name of QM/LMM/BMM ……..AME Licence No. …… Signature & Stamp ……..

GM 66.A.20 (b) 2 Privileges

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

AMC 66.A.20 (b) 3 Privileges

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

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

- Type ratings which have been endorsed on a licence in accordance with AppendixI to AMC to CAR-66 "List of Type Ratings" after attending type training/on-the-jobtraining 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 CAR-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 CAR -66 not requiring reexamination 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 CAR-66 licence with limitations, obtained through conversion of pre-existing 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 without covering all the aircraft systems (because of the previous limitations) and there will be 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 CAR-66 aircraft maintenance licence may not exercise certification privileges unless they have a general knowledge of the language used within the maintenance environment including knowledge of common aeronautical terms in the language. The level of knowledge should be such that the licence holder is able to:
   - read and understand the instructions and technical manuals in use within the organisation;
   - make written technical entries and any maintenance documentation entries, which can be understood by those with whom they are normally required to communicate;
   - read and understand the maintenance organisation procedures;
   - communicate at such a level as to prevent any misunderstanding when exercising certification privileges.
2. In all cases, the level of understanding should be compatible with the level of certification privileges exercised.

66. A.25 Basic Knowledge requirements:

a) For licences other than category B2L and L, an applicant for an aircraft maintenance engineer's licence or the addition of a category or subcategory to such an aircraft maintenance engineer's licence shall demonstrate by examination, a level of knowledge in the appropriate subject modules in accordance with Appendix I to this CAR. The basic knowledge examination shall be conducted by Central Examination Organization of DGCA.

b) An applicant for an aircraft maintenance licence in category L within a given subcategory, or for

the addition of a different subcategory, shall demonstrate by examination a level of knowledge of the appropriate subject modules in accordance with Appendix VII to CAR 66. The basic knowledge examination shall be conducted by Central Examination Organisation of DGCA.

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

The basic knowledge requirements for subcategory L4H include the basic knowledge requirements for subcategory L3H.

The basic knowledge requirements for subcategory L4G include the basic knowledge requirements for subcategory L3G.

c) An applicant for an aircraft maintenance licence in category B2L for a particular 'system rating', or for the addition of another 'system rating', shall demonstrate by examination a level of knowledge of the appropriate subject modules in accordance with Appendix I to CAR 66. The basic knowledge examination shall be conducted by Central Examination Organisation of DGCA.

d) The training courses and examinations shall be passed within 10 years prior to the application for an aircraft maintenance licence or the addition of a category or subcategory to such aircraft maintenance licence. Should this not be the case, examination credits may however be obtained in accordance with point (c).

e) The applicant may apply to the DGCA for full or partial examination credit to the basicknowledge requirements for

1. basic knowledge examinations that do not meet the requirement described in point (d) above; and
2. any other technical qualification considered by the DGCA to be equivalent to the knowledge standard of CAR-66

Credits shall be granted in accordance with APM Chapter 17.

f) Credits expire 10 years after they were granted to the applicant by the DGCA. The applicant may apply for new credits after expiration.

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, B2L and B3 should demonstrate a complete level of knowledge in the appropriate subject module.

66. A.30 Basic Experience requirements:

a) An applicant for an aircraft maintenance engineer's licence shall have acquired:

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

(i) three years of practical aircraft maintenance experience on operating aircraft; or

(ii) two years of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having acquired a Degree in Aircraft Maintenance or Degree in Engineering from a recognised University; or

(iii) one year of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having successfully completed basic aircraft maintenance training conducted by a training organisation approved under rule 133B.

2. for category B2 and sub-categories B1.1 and B1.3:

(i) five years of practical aircraft maintenance experience on operating aircraft; or

(ii) three years of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having acquired a Degree in Aircraft Maintenance or Degree in Engineering from a recognised University; or

(iii) two year of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having successfully completed basic aircraft maintenance training conducted by a training organisation approved under rule 133B.

3. for category B2L:

(i) three years of practical maintenance experience in operating aircraft, covering the corresponding system rating, if the applicant has no previous relevant technical training; or

(ii) two years of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having acquired a Degree in Aircraft Maintenance or Degree in Engineering from a recognised University; or

(iii) one year of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having successfully completed basic aircraft maintenance training conducted by a training organisation approved under rule 133B.

Note: For the addition of 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.

4. for category L:

(i) two years of practical experience in operating aircraft covering a representative cross section of maintenance activities in the corresponding sub-category; or

(ii) one years of practical maintenance experience on operating aircraft, covering the corresponding system rating, and having acquired a Degree in Aircraft Maintenance or Degree in Engineering from a recognized University or successfully completed basic aircraft maintenance training conducted by a training organisation approved under rule 133B:

Note: 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.

5. for Category C with respect to large aircraft:

(i) three years of maintenance experience exercising privileges of Categories B1.1, B1.3 or B2 on large aircraft or as support staff in a base maintenance in an organisation approved under rule 133B or a combination thereof; or

(ii) five years of maintenance experience exercising the privileges of Categories B1.2 or B1.4 on large aircraft or as support staff in base maintenance in an organisation approved under rule 133B, or a combination thereof;

6. for category C with respect to aircraft other than large aircraft;

three years of maintenance experience of exercising privileges of category B1 or B2 or support staff in an organisation approved under rule 133B, or a combination thereof;

b) An applicant for the addition of a category or a sub-category to an existing licence shall have a minimum civil aircraft maintenance experience requirement appropriate to the additional category or sub-category of licence applied for as defined in Appendix IV to CAR 66.

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

d) 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.

e) At least one year of the required experience shall be recent maintenance experience on aircraft of the category/subcategory for which the initial aircraft maintenance engineer's licence is sought. For subsequent category /subcategory additions to an existing aircraft maintenance engineer's licence, the additional recent maintenance experience required may be less than one year, but shall be at least three months. The required experience shall be dependent upon the difference between the licence category/subcategory held and applied for. Such additional experience shall be typical of the new licence category/subcategory sought.

Note: 'Recent maintenance experience' shall be acquired on the type of aircraft for which the aircraft maintenance engineer's license is sought.

f) Notwithstanding para (a), the twelve years of practical aircraft maintenance experience acquired outside a civil aircraft maintenance environment in the relevant category supplemented by at least one year of recent experience in civil aircraft maintenance environment, shall be treated as equivalent to the requirements laid down in sub paras (1) to (4) of para (a) above.

g) Experience shall have been acquired within the 10 years preceding the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence. Notwithstanding to this, the aircraft maintenance experience gained in defense environment in the preceding fifteen years shall be acceptable.

AMC 66.A.30 (a) Basic Experience requirements

1. While an applicant to a Category C licence may be qualified by having 3 years' experience as category B1 or B2 certifying staff only in line maintenance, it is however recommended that any applicant for a category C holding a B1 or B2 licence demonstrate at least 12 months experience as a B1 or B2 base maintenance support staff.
2. A skilled worker is a person who has successfully completed a training acceptable to the DGCA and 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. 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 & group/subgroup;

   - 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 (CAR-145, M.A. Subpart F etc.) or under the supervision of independent certifying staff;
  May be combined with CAR-147 approved training (or other training approved by the DGCA) training so that periods of training canbe intermixed with periods of experience, similar to an apprenticeship.

Note: Maintenance experience gained on foreign registered aircraft maintained in a CAR 145 approved organization located in India shall be counted towards meeting the practical aircraft maintenance experience on operating aircraft.

- in the case of the L licence, it is acceptable that the 1 or 2 years of experience required by 66.A.30(a)4 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.

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

   - Application for a B1.1 (turbine aeroplanes) + B1.3 (turbine helicopters): The Regulation requires 5 years of experience for B1.1 and 5 years of experience for B1.3 for an applicant with no relevant previous technical training:
     - It is not acceptable to combine the experience in a single 5-year period where the applicant has been working for 3 years on turbine aeroplanes and 2 years on turbine helicopters.
     - However, it is acceptable to combine the experience in a single 5-year period if the applicant has been working for 5 years on turbine aeroplanes and turbine helicopters (for example, aeroplanes in the morning, helicopters in the afternoon, or a few days every week on aeroplanes and a few days every week on helicopters).
   - Application for a B1.1 (turbine aeroplanes) + B2 (avionics): The Regulation requires 5 years of experience for B1.1 and 5 years of experience for B2 for an applicant with no relevant previous technical training.
     - It is not acceptable to combine the experience in a single 5-year period where the applicant has been working for 3 years on turbine aeroplanes (with no avionics work) and 2 years on avionics systems.
     - However, it is acceptable to combine the experience in a single 5-year period if the applicant has been working for 5 years on structures, powerplant, mechanical and electrical systems and avionics (for B1.1 tasks in the morning, B2 tasks in the afternoon, or a few days every week for B1.1 tasks and a few days every week for B2 tasks).
   - Application for a B1.1, B1.2, B1.3, B1.4 and B2: The Regulation requires 5 years of experience for B1.1, B1.3 and B2 and 3 years of experience for B1.2 and B1.4 for an applicant with no relevant previous technical training.
     - In this case, it is very unlikely that the experience for each category/subcategory would be sufficient.

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.03). 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 experienceshould be gained within the 12 month period prior to the date of application for the CAR-66 aircraft maintenance license. The remainder of the experience should have been gained within the **7** year period prior to application. It must be noted that the rest of thebasic 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

1. For category A and L, the additional experience should be a minimum of 6 months in civil aircraft maintenance environment. For category B1, B2, B2L or B3, the additional experience should be a minimum of 12 months in civil aircraft maintenance environment.

2. Aircraft maintenance experience gained outside a civil aircraft maintenance environment can include aircraft maintenance experience gained in armed forces, coast guards, police etc. or in aircraft manufacturing.

66. A. 35 Demonstration of Skill

An applicant for grant or extension of Aircraft Maintenance Engineer's licence shall demonstrate his aircraft maintenance skill in respect of each category or sub-categoryof license or specific type of aircraft or systems in accordance with CAR 66.A.45 for which the application has been made to the Director General

66. A.40 Continued validity of the aircraft maintenance engineer's licence

(a) The aircraft maintenance engineer's licence becomes invalid after five years or ten years (under revised Aircraft Rule 61) after its last issue or renewal, unless the holder submits his/her aircraft maintenance engineer's licence to the DGCA, in order to verify the information contained in thelicence is the same as that contained in the DGCA records.

(b) The holder of an aircraft maintenance engineer's licence shall complete the CA Form 19-03 (Refer Appendix-V) (through eGCA) and submit it with the holder's copy of the licenceto the DGCA, unless the holder works in a maintenance organization approved in accordance with CAR 145 that has a procedure in its exposition where by such organisation may submit the necessary documentation on behalf of the aircraft maintenance engineer's licence holder.

(c) Any certification privileges based upon an aircraft maintenance engineer's licencebecomes invalid as soon as the aircraft maintenance engineer's licence is invalid.

(d) The aircraft maintenance engineer's licence is only valid when issued and/or changed by DGCA and when the holder has signed the document.

(e) An application to renew a licence that has expired will be accepted for up to four years after the date of expiry of the licence. The applicant is required to submit certified evidence of 6 months actual relevant aircraft experience within the 24 months prior to their application and that he has not exercised the privileges of his licence during this period.

In case, the privileges have been exercised, necessary enforcement action shall be initiated. Such licence shall be considered for renewal only after enforcement action is complete.

In case the applicant does not meet minimum 6 months experience criteria, he should be advised to apply for renewal after acquiring 6 month maintenance experience.

Licences expired for more than four years will not be renewed and applicants will need to meet all of the applicable requirements for the issue of a licence in accordance with this CAR.

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

Validity of the CAR-66 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

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

— For category B1, B2 or C the relevant aircraft ratings are the following:

(i) For group 1 aircraft, the appropriate aircraft type rating.

(ii) For group 2 aircraft, the appropriate aircraft type rating, manufacturer sub-grouprating 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 aeroplanesof 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 LA1

aeroplanes';

(iv) for subcategory L2, the rating 'powered sailplanes and LA1 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 'LA2 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 paragraph 145.A.35 of CAR-145.

(b) 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 of CAR66.
- in the case of gas airship type ratings on a B2 or L5 licence, a type training directly approved by DGCA.

(c) For other than category C licences ,in addition to the requirement of point (b), the endorsement of the first aircraft type rating within a given category/sub-category requires satisfactory completion of the corresponding On the Job Training, as described in Appendix III to CAR-66 except in the case of gas airships, where it shall be directly approved by DGCA.

Note: Additional endorsement in the same category/subcategory shall require OJT based on a training need analysis.

(d) By derogation from points (b) and (c), for group 2 and 3 aircraft, aircraft type ratings may also be granted after:

— satisfactory completion of the relevant category B1 and B2 or C aircraft type examination described in Appendix III to CAR 66 and

— in the case of B1 and B2 category, demonstration of practical experience on the aircraft type. In that case, the practical experience shall include a representative cross section of maintenance activities relevant to the licence category, and

— passing of skill test conducted by DGCA on completion of practical experience on the aircraft type.

— 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)(3) & (4), the first relevant aircraft type examination shall be at the category B1 or B2 level.

(e) For group 2 aircraft:

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

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

(iii) the endorsement of manufacturer sub-group~~s~~ and full sub-group ratings for category B2 and B2L licence holders requires demonstration of practical experience whichshall include a representative cross section of maintenance activities relevant to the licence category and to the applicable aircraft sub-group and, in the case of the B2L licence , relevant to the applicable system rating(s);

Note: By derogation from point (e)(iii), the holder of a B2 or B2L licence, endorsed with a full subgroup 2b, is entitled to be endorsed with a full subgroup 2c.

(f) For group 3 aircraft:

(i) the endorsement of the full group 3 rating for category B1 and C licence holdersrequires demonstration of practical experience, which shall include a representative cross section of maintenance activities relevant to the licence category/sub-category and to the group 3 and complying with the aircraft type rating endorsement of at least three aircraft types from different manufacturers which combined are representative of the applicable group.

(ii) for category B1, unless the applicant provides evidence of appropriate endorsement the 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) the endorsement of the full group 3 rating 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 group 3.

For Group 4 aircraft:

The endorsement of the full group 4 rating for category B2 and B2L licence holdersrequire demonstration of practical experience, which shall include a representative cross sectionof maintenance activities relevant to the licence category and to Group 4.

Note: 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.

(g) For the B3 licence:

(i) the endorsement of the rating 'piston-engine non-pressurised aeroplanes of 2000 kg MTOM and below' requires demonstration of practical experience which shall include a representative cross-section of maintenance activities relevant to the licence category and having passed type examination/ type training on at least one piston-engine non-pressurised aeroplane of 2000 kg MTOM and below.

(ii) Unless the applicant provides evidence of appropriate experience and having passed type examination/ type training on at least one piston-engine non-pressurised aeroplane of 2000 kg MTOM and below covering the relevant structure, the rating referred to in point 1 shall be subject to the following limitations, which shall be endorsed on the licence:

— wooden structure aeroplanes

— aeroplanes with metal tubing structure covered with fabric

— metal structure aeroplanes

— composite structure aeroplanes.

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

(i) the endorsement of ratings requires demonstration of practical experience which shall include a representative cross section of maintenance activities relevant to the licence subcategory;

(ii) unless the applicant provides evidence of appropriate experience, the ratings shall be subject to the following limitations, which shall be endorsed on the licence:

(1) for ratings 'sailplanes' and 'powered sailplanes and LA1 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 LA1 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)(2)(iii), the following limitation shall be endorsed on the licence:

"complex maintenance tasks provided for in Appendix VII to CAR-M".

The holder of an aircraft maintenance licence in subcategory B1.2 endorsed with the Group 3 rating, or in category B3 endorsed with the rating 'piston engine non-pressurised aeroplanes of 2 000 kg MTOM and below', is deemed to meet the requirements for the issuance of a licence in subcategories L1 and L2 with the corresponding full ratings and with the same limitations as the B1.2/B3 licence held.

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 CAR-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 CAR-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

GM 66.A.45 Endorsement with aircraft ratings

The following table shows a summary of the aircraft rating requirements contained in66.A.45, 66.A.50 and Appendix III to CAR-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)
  - o Individual type ratings;
  - o 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 2000 kg MTOM and below) and the L licences, which are the possible limitations and ratings to be included in the licence if not sufficient experience can be demonstrated in those areas.

Aircraft rating requirements			
Aircraft	**B1/B3/L licence**	**B2/B2L licence**	**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 DGCA.	(For B1) **Individual TYPE RATING** Type training: - Theory + examination - Practical + assessment **PLUS** OJT	(For B2) **Individual TYPE RATING** Type training: - Theory + examination - Practical + assessment **PLUS** OJT	**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 B2) **Individual TYPE RATING** Type training: - Theory + examination - Practical + assessment **PLUS** OJT	Not applicable
Group 2 aircraft Subgroups: 2a: single turboprop aeroplanes (*)	(For B1.1, B1.3, B1.4) **Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience + skill test)	(For B2) **Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience + skill test)	**Individual TYPE RATING** type training **or** type examination
2b: single turbine engine helicopters (*) 2c: single piston engine helicopters (*) (*) Except those classified in Group 1.	**Full SUBGROUP RATING** (type training + OJT) **or** (type examination + practical experience + skill test) on at least 3 aircraft representative of that subgroup	(For B2 and B2L) **Full SUBGROUP RATING** based on demonstration of practical experience	**Full SUBGROUP RATING** type training **or** type examination on at least 3 aircraft representative of that subgroup
	Manufacturer SUBGROUP RATING (type training + OJT) **or** (type examination + practical experience + skill test) on at least 2 aircraft representative of that manufacturer subgroup	**Manufacturer SUBGROUP RATING** based on demonstration of practical experience	**Manufacturer SUBGROUP RATING** type training **or** type examination on at least 2 aircraft representative of that manufacturer subgroup

Aircraft rating requirements			
Aircraft	**B1/B3/L licence**	**B2/B2L licence**	**C licence**
Group 3 aircraft Piston engine aeroplanes (except those classified in Group 1)	(For B1.2) **Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience + skill test) **Full GROUP 3 RATING** based on demonstration of practical experience and complying with the aircraft type rating endorsement of atleast three aircraft types from different manufactures which combined are representative of the applicable group. **Limitations:** - Pressurized aeroplanes - Metal aeroplanes - Composite aeroplanes - Wooden aeroplanes - Metal tubing & fabric Aeroplanes	(For B2) **Individual TYPE RATING** (type training + OJT) **or** (type examination + practical experience + skill test) (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 and complying with the aircraft type rating endorsement of atleast three aircraft types from different manufactures which combined are representative of the applicable group.
Piston-engine non-pressurised aeroplanes of 2 000 kg MTOM andbelow	(For B3) **FULL RATING "Piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below"** based on demonstration of practical experience and having passed type examination and skill test / type training on at least one piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below. **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)

Aircraft rating requirements			
Aircraft	**B1/B3/L licence**	**B2/B2L licence**	**C licence**
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 LA1 aeroplanes' rating, − For L2: 'powered sailplanes and LA1 aeroplanes' rating, − For L3H: 'hot-air balloons' rating, − For L3G: 'gas balloons' rating, − For L4H: 'hot-air airships' rating, − For L4G: 'LA2 gas airships' rating, all based on demonstration of practical experience + skill test **Limitations:** see 66.A.45(h)	(For B2 and B2L) **Full GROUP 4 RATING** based on demonstration of practical experience	Not applicable

AMC 66.A.45 (d), (e) 3, (f) 1 and (g) 1 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 tasks contained in Appendix II to AMC relevant to the licence category and to the applicable aircraft type ratings or aircraft (sub) group ratings being endorsed.
- - for category L:
  - in the subcategories L1, L1C, L2 or L2C: 50 % as in the paragraph related to B1, B2, B2L or B3;
  - in the subcategories L3H and L3G for 'Balloons' or L4H, L4G and L5 for 'Airships', 80 % of the tasks should be demonstrated, and should include the tasks identified with an asterisk (*) in the Appendix;

  This experience should cover tasks from each paragraph of the Appendix II list. Other tasks than those in the Appendix II may be considered as a replacement when they are relevant. In the case of (sub)group ratings, this experience may be shown by covering one or several aircraft types of the applicable (sub)group and mayinclude 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 typesof each manufacturer (sub) group this should be reduced to 20 %.
3. Practical experience should be demonstrated by the submission of records or a logbook showing the Appendix II tasks performed by the applicant. Typical data to berecorded 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 manufacturerwhich combined are representative of the applicable manufacturer subgroup" meansthat the selected aircraft types should cover all the technologies relevant to the manufacturer subgroup in the following areas:

   - Flight control systems (mechanical controls/hydro mechanically 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 manufacturerclassified in Group 1 as long as the selected aircraft belong to the same licence sub category 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 manufacturersubgroup in the following areas:

   - Flight control systems (mechanical controls/hydro mechanically 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 CAR-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 ratingmade 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 threeaircraft from different manufacturers, this means from different combinations of manufacturers as applicable.

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

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

For subcategory L3G, it is possible to endorse the rating 'gas balloons' with a limitation to 'other than LA1 gas balloons' if the experience gained only covers LA1 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 representativeof 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 DGCA.

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 APM Chapter 17

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 DGCA, 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 that 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. An example could be the experience required to remove a limitation such as 'aircraft with metal tubing structure covered with fabric', which may be gained in ultralight aircraft (Annex I 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 themanufacturer after completion of the applicable theoretical and practical training.

66. A.55 Evidence of qualification

Personnel exercising certification privileges as well as support staff must produce their licence as evidence of qualification, if required by an authorized person of DGCA,within 24 hours.

66. A.70 Conversion provisions-

a) The holder of a valid Aircraft Maintenance Engineer's Licence on the date of coming into force of this CAR may continue to exercise the privileges of his licence and shall be issued, with or without limitation and without further examination, an Aircraft Maintenance Engineer's Licence in the appropriate category subject to such conditions specified in Airworthiness Procedures Manual Chapter 17.

b) A person undergoing a qualification process, prior to the GSR No. 1001(E) dated 22.12.2010 regarding the Rule 61 of the Aircraft Rules, 1937 shall continue to be qualified till date as specified by the Director General. The holder of a qualification gained following such qualification process may be issued an aircraft maintenance engineer's licence subject to the conditions specified in Airworthiness Procedures Manual Chapter 17.

c) Where necessary, the aircraft maintenance engineer's licence shall contain limitations in accordance with point 66. A.50 to reflect the differences between

i) the scope of the certifying staff qualification

(ii) the basic knowledge requirements and the basic examination standards laid down in Appendix I and II to this CAR 66.

d) Aircraft Maintenance Engineer's Licences issued prior to this CAR coming into force in category "A" to cover Gliders, Balloons and in category "B", "D" and "X" to cover Aircraft, Engine, propeller and items of equipment to carryout maintenance and issue 'Certificate of Release to Service' that could not be transferred to CAR-66 licence 'Type Rating' shall be transferred to the CAR-66 licence section XIV (a) without altering the privileges hitherto exercised by the holder.

GM 66.A.70 Conversion provisions

1. As described in point 66.A.70, the conversion provisions apply to the holder of an AME Licence prior to the date of entry into force of CAR-66.

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

- Holding a AME licence (or completed the process to obtain such a licence;)

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 thanwhat 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 fullscope of their qualification and the full privileges that they would be entitled to hold onthe 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 CAR-66.

4. Although only those certifying staff qualifications gained as 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 andcan also be converted to more than one licence (sub)category (with any applicable limitations). Thiscould be the case, for example, for 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 CAR-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 that there is no need to compare with the CAR-66 Appendix I, II and VII standard, introducing only those limitations required 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 CAR-66 Appendix I and II, all the modules/subjects corresponding to the B1 licence except for electrical power systems. This person would receive a CAR-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

In the case of aircraft not involved in commercial air transport other than large aircraft ,an example of limitations could be where a person holds a pre CAR-66 qualification which covered privileges to release work performed on aircraft structures, power plant,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 receive a CAR-66 aircraft maintenance licence in the B1.2 or B3 (sub) category with the following limitations (exclusions):

- Aircraft involved in commercial air transport (this limitation always exists);
- Aircraft above 2 000 kg MTOM;
- Pressurized aircraft;
- Aircraft equipped with retractable landing gear.

Another example of limitations could be where a pilot-owner holds a pre CAR-66 qualification which covered privileges to release work performed on aircraft structures, power plant, mechanical and electrical systems but limited to his/her own aircraft and to a particular aircraft type (for example, a Cessna 172). This pilot-owner would receivea CAR-66 aircraft maintenance licence in the B1.2 or B3 (sub) category with the following limitations (exclusions):

- Aircraft involved in commercial air transport (this limitation always exists);
- Aircraft other than a Cessna 172;
- Aircraft not owned by the licence holder.

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

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

SUBPART B

AIRCRAFT OTHER THAN AEROPLANES AND HELICOPTERS

66. A.100 General

Microlight, light sport aircraft, glider, balloon or an airship shall be certified by an aircraft maintenance engineer holding a licence in category L or Category A or Category B1 or Category B3 or an authorised person subject to meeting the requirements as specified in the relevant CAR.

SUBPART C
COMPONENTS

66. A. 200 General

This subpart lays down the minimum requirements in respect of knowledge, training, experience, examination and procedure for issue of authorisation by CAR -145 / CAR MSubpart-F approved organisations to certifying staff employed in their organisation for maintenance and certification of components /aircraft maintenance as per manufacturer maintenance data.

66.A.205 Requirements

Candidate for grant of authorization to carry out and certify overhaul, major repairs of aircraft, power plants, components and accessories thereof, shall meet the following requirements:

(a) He shall not be less than 21 years of age.

(b) Knowledge:- The applicant shall have passed 10+2 with Physics, Chemistry and Mathematics or equivalent and

(c) should hold CAR 66 licence in appropriate category or

i) passed 3 years basic AME training course/Diploma / Degree in Engineering in the appropriate branch and must have passed relevant portions of modules of CAR 66 knowledge examination approved by the DGCA for the purpose in the MOE and examination conducted by the approved organisation in association with DGCA or eligible for grant of suitable credit for particular module.

Note 1: Depending on the scope of authorization required, the CAR 145 / CAR M- SubPart F approved organization shall documents the module(s) of examination required to be passed by the applicant in the organisations expositions.

(d) Training:

The applicant must have undergone a training programme conducted by:Manufacturer of the equipment;

OR

An organization approved to impart such training;

OR

Trained by a person having specific approval covering the activity for a period of 2years.

(e) Experience: Applicants meeting the knowledge requirements shall have the following experience:

i) For persons holding CAR 66 Aircraft Engineers' License: one year experience inoverhaul, major repairs, modifications of the system components and accessories, including three months recent experience.

ii) For persons holding Diploma/ Degree in Engineering: two years' experience in overhaul, major repairs, modifications of the system components and accessories, including six months recent experience.

iii) Candidate for certification of structural repair/ modification should have minimum two years relevant field experience, and produce evidence that he has performed similar structural repairs at least twice under the supervision of an approved person in the preceding six months.

(f) Medical Fitness

The applicant should have been assessed medically fit by a registered medical practitioner to perform the scope of work applied for.

(g) Competency check :-

Before grant of authorization the competency of the candidate shall be assessed by the organization, following procedures documented in the organization exposition.

(h) Organizations desirous of using the provisions of this CAR shall detail their training programme, activities requiring certification authorisation, education, experience, on job training requirements and assessment procedure in their Maintenance Organization Exposition.

AMC 66.A.205 (c) Requirements

Must have passed relevant modules of CAR 66 approved by the DGCA means modules appropriate for the knowledge required for the maintenance of class of components for which certification authorization is required.

AMC 66.A.205 (g) Requirements.

For the grant of certification authorization the competency of the candidate shall be assessed by the organization, following procedures documented in the organization exposition. Guidelines for competency check is detailed in AMC and GM of CAR 145- 30(e).

66.A.210 Extension to Scope of Authorization

Candidate seeking extension to their scope of authorization of a particular stream (Mechanical or Avionics), in addition to meeting the training requirements of para 66.A.205 (c) of this CAR, shall have additional six months experience on the type of components for which certification authorisation is required. When the authorization is required to be granted for additional stream, the applicant shall have 24 months maintenance experience out of which 6 months must be recent experience.

Before grant of extension of authorization, the competency of the candidate shall be assessed by the organization, following procedures as mentioned in 66.A.205 (g).

66.A.215 Privileges

The privileges of component certifying staff shall cover:-

a) Holder of certification authorization on the basis of CAR 66 AME Licence: Issuance of Certificate of Maintenance (CRS) for shops and systems of aircraft/ engine (when at shop level and not fitted on the aircraft)

Note: CRS on aircraft and/ or engine shall be done provided the Approval holder has AME licence in relevant Category.

b) Holder of certification authorization on the basis of AME Course/Diploma in Engineering/ Degree in Engineering: Certify work carried out as endorsed on the certification authorization

Note 1: Such a certification authorization *shall be limited only to shop level work and shall not include major maintenance of aircraft and/or engine*

Note 2: Persons already holding approvals with CRS privileges may continue to be permitted to issue CRS on being permitted under the CAR 145 / CAR M Subpart F approval even if they are not meeting the requirement of this CAR. Such persons may also be considered for grant of additional certification authorization subject to meeting the requirements.

66. A.220 Validity of Certification Authorization

a) The Certification Authorization shall be valid for a period of one year and may be renewed by the Quality Manager subject to the condition that the person

i) Has exercised the privileges of the authorization for a minimum period of three months in the preceding 12 months;

ii) Has undergone refresher course in the preceding 24 months;

iii) Has been assessed medically fit; and

iv) Continues to remain in the employment or employment contract of theorganization.

66.A.225 Suspensions, Cancellation and Return of Certification Authorization

(a) A Certification Authorization may be withdrawn where an enquiry conducted by the approved organization or DGCA establishes that:-

i) the holder of such an authorization has performed work or granted a certificate in respect of work which has not been performed in a careful and competent manner, or

ii) the holder of such an authorization has signed a certificate in respect of any matter which he is not authorized to deal with, or

iii) it is undesirable for any other reason that the holder of such authorizationshould continue to exercise the functions of an approval holder.

iv) Authorization of a person withdrawn as a result of an enquiry shall not berestored without approval of the DGCA (Regional Airworthiness Office). Such person shall also not be granted other Authorization without the concurrence of the DGCA (Regional Airworthiness Office).

v) All disciplinary actions taken against approved persons shall be immediately intimated to the DGCA (Regional Airworthiness Office). Copies of warnings/ memoranda issued to the approved persons shall alsobe forwarded to the DGCA (Regional Airworthiness Office).

(Vikram Dev Dutt)

Director General of Civil Aviation

APPENDICES TO CAR-66

Appendix I - Basic Knowledge Requirements (except for Category L Licence)

1. KNOWLEDGE LEVELS - CATEGORY A, B1, B2, B3,B2L AND C AIRCRAFT MAINTENANCE ENGINEER's LICENCE

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

The knowledge level indicators are defined on defined on 3 levels as follows:

LEVEL 1

Familiarization 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 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 interrelation ship 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 formulaerelated 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 mannerusing manufacturer's instructions.

(f) The applicant should be able to interpret results from various sources andmeasurements and apply corrective action where appropriate.

2. MODULARISATION

Qualification on basic subjects for each CAR 66 aircraft maintenance engineer's licence category or subcategory should be in accordance with the following matrix. Applicable subjects are indicated by an 'X':

For categories A, B1 and B3:

Subject module	A or B1 aeroplane with:		A or B1 helicopter with:		B3
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Piston engine non-pressurisedaeroplanes 2 000 kg MTOM and below
1	Not Aplicable				
2	Not Aplicable				
3	X	X	X	X	X
4	X	X	X	X	X
5	X	X	X	X	X
6	X	X	X	X	X
7A	X	X	X	X	
7B					X
8	X	X	X	X	X
9A	X	X	X	X	
9B					X
10	X	X	X	X	X
11A	X				
11B		X			
11C					X
12			X	X	
13					
14					
15	X		X		
16		X		X	X
17A	X	X			
17B					X

For categories B2 and B2L:

Subject module/submodules	B2	B2L
1	Not Applicable	
2	Not Applicable	
3	X	X
4	X	X
5	X	X
6	X	X
7A	X	X
7B		
8	X	X
9A	X	X
9B		
10	X	X
11A		
11B		
11C		
12		
13.1 and 13.2	X	X
13.3(a)	X	X (for system rating ‘Autoflight’)
13.3(b)	X	
13.4(a)	X	X (for system rating ‘Com/Nav’)
13.4(b)	X	X (for system rating ‘Surveillance’)
13.4(c)	X	
13.5	X	X
13.6	X	
13.7	X	X (for system rating ‘Autoflight’)
13.8	X	X (for system rating ‘Instruments’)
13.9	X	X
13.10	X	
13.11 to 13.18	X	X (for system rating ‘Airframe systems’)
13.19 to 13.22	X	
14	X	X (for system rating ‘Instruments’ and ‘Airframe systems’)
15		
16		
17A		
17B		

MODULES & SYLLABUS	LEVEL			
	A	B1	B2 B2L	B3
MODULE 1- Reserved	-	-	-	
MODULE 2- Reserved	-	-	-	

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: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	1	2	2	1
3.4 Generation of Electricity Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	1	1	1	1
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
3.7 Resistance/Resistor (a) Resistance and affecting factors; Specific resistance; Resistor colour code, values and tolerances, preferred values, wattage ratings;	-	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
Resistors in series and parallel; Calculation of total resistance using series, parallel and series parallelcombinations; Operation and use of potentiometers and rheostats; Operation of Wheatstone Bridge.				
(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 Power, work and energy (kinetic and potential); Dissipation of power by a resistor; Power formula; Calculations involving power, work and energy.	**-**	**2**	**2**	**1**
3.9 Capacitance/Capacitor Operation and function of a capacitor; Factors affecting capacitance area of plates, distance between plates, numberof 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 carryingconductor.	-	2	2	1
(b) Magnetomotive force, field strength, magnetic flux density, permeability,hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	-	2	2	1

MODULE 3. ELECTRICAL FUNDAMENTALS	LEVEL			
	A	B1	B2 B2L	B3
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 DC motors; Series wound, shunt wound and compound motors; Starter Generator construction.	-	2	2	1
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 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;	**-**	**2**	**2**	**1**
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.				
3.16 Filters Operation, application and uses of the following filters: low pass, high pass,band pass, band stop.	**-**	**1**	**1**	**-**
3.17 AC Generators Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type ACgenerators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.	**-**	**2**	**2**	**1**
3.18 AC Motors Construction, principles of operation and characteristics of: AC synchronousand induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or splitpole.	**-**	**2**	**2**	**1**

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), lightemitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes.	-	2	2	1
(b) Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority andminority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions Operation and function of diodes in the following circuits: clippers, clampers,full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers	-	-	2	-

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
	A	**B1**	**B2 B2L**	**B3**
Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Shottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.				
4.1.2 Transistors				
(a)	-	1	2	1
Transistor symbols;				
Component description and orientation;				
Transistor characteristics and properties.				
(b)	-	-	2	-
Construction and operation of PNP and NPN transistors;				
Base, collector and emitter configurations;				
Testing of transistors.				
Basic appreciation of other 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.				
4.1.3 Integrated Circuits				
(a)	-	1	-	1
Description and operation of logic circuits and linear circuits/operational amplifiers.				
(b)	-	-	2	-
Description and operation of logic circuits and linear circuits;				
Introduction to operation and function of an operational amplifier used as: integrator, differentiator, 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 Boards	**-**	**1**	**2**	**-**
Description and use of printed circuit boards.				
4.3 Servomechanisms				
(a)	-	1	-	-
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.				

MODULE 4. ELECTRONIC FUNDAMENTALS	LEVEL			
	A	**B1**	**B2 B2L**	**B3**
(b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, 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 INSTRUMENTSYSTEMS	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; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	**-**	**1**	**-**	**2**	**-**
5.3 Data Conversion Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	**-**	**1**	**-**	**2**	**-**
5.4 Data Buses Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.	**-**	**2**	**-**	**2**	**-**
5.5 Logic Circuits (a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.	-	2	-	2	~~1~~ -
(b)Interpretation of logic diagrams.	-	-	-	2	-
5.6 Basic Computer Structure (a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).	1	2	-	-	-
(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 multi address instruction words;	-	-	-	2	-

MODULE 5. DIGITAL TECHNIQUES ELECTRONIC INSTRUMENTSYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.					
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	-
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

MODULE 5. DIGITAL TECHNIQUES ELECTRONIC INSTRUMENTSYSTEMS	LEVEL				
	A	B1.1 B1.3	B1.2 B1.4	B2 B2L	B3
5.14 Electromagnetic Environment	-	2	2	2	1
Influence of the following phenomena on maintenance practices forelectronic system:					
EMC-Electromagnetic Compatibility					
EMI-Electromagnetic Interference					
HIRF-High Intensity Radiated Field					
Lightning/lightning protection					
5.15 Typical Electronic/Digital Aircraft Systems	-	2	2	2	1
General arrangement of typical electronic/digital aircraft systems andassociated BITE(Built In Test Equipment) testing 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 MonitoringEFIS-Electronic Flight Instrument System					
GPS-Global Positioning System					
TCAS-Traffic Collission Avoidance system					
Integrated modular Avionica					
Cabin System					
Information system					

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

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
6.3 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.	1	2	2	2
(b) The detection of defects/deterioration in composite and non-metallic material. Repair of composite and non-metallic material.	1	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; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.	**1**	**2**	**-**	**2**
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**

MODULE 6. MATERIALS AND HARDWARE	LEVEL			
	A	B1	B2 B2L	B3
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, palnuts, wire locking, quick release fasteners, keys, circlips, cotter pins.	**2**	**2**	**2**	**2**
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**
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.	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 Care of tools, control of tools, use of workshop materials; Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.	**3**	**3**	**3**
7.3 Tools Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment;	**3**	**3**	**3**
7.4 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;	**1**	**2**	**1**

MODULE 7A. MAINTENANCE PRACTICES *Note:* This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 7B.	LEVEL		
	A	B1	B2 B2L
Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.			
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 Inspection of gears, backlash; Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push-pull rod systems.	**1**	**2**	**-**
7.13 Control Cables 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	**-**	**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.	LEVEL		
	A	**B1**	**B2 B2L**
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	-
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/defuelling 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;	-	2	-
(c) Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.	-	2	1

MODULE 7A. MAINTENANCE PRACTICES *Note:* This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 7B.	LEVEL		
	A	**B1**	**B2** **B2L**
(d) Disassembly and re-assembly techniques.	2	2	2
(e) Trouble shooting techniques	-	2	2
7.19 Abnormal Events			
(a) Inspections following lightning strikes and HIRF penetration.	2	2	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	-
7.20 Maintenance Procedures 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.	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 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**

MODULE 7B. MAINTENANCE PRACTICES Note: The scope of this module shall reflect the technology of aeroplanes relevant to the B3 category.	LEVEL B3
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
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.	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;	2

MODULE 7B. MAINTENANCE PRACTICES Note: The scope of this module shall reflect the technology of aeroplanes relevant to the B3 category.	LEVEL B3
Lubrication requirements of bearings; Defects in bearings and their causes.	
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 Bonding practices; Environmental conditions Inspection methods	2
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/defuelling procedures; De-icing/anti-icing procedures; Electrical, hydraulic and pneumatic ground supplies.	2

MODULE 7B. MAINTENANCE PRACTICES Note: The scope of this module shall reflect the technology of aeroplanes relevant to the B3 category.	LEVEL B3
Effects of environmental conditions on aircraft handling and operation.	
7.18 Disassembly, Inspection, Repair and Assembly Techniques	
(a) Types of defects and visual inspection techniques. Corrosion removal, assessment and reprotection.	3
(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes;	2
(c) Non destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods.	2
(d) Disassembly and re-assembly techniques.	2
(e) Trouble shooting techniques	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	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 (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio; Thrust, Weight, Aerodynamic Resultant; Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; Aerofoil contamination including ice, snow, frost.	1	2	2	1
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.	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 Vision; Hearing; Information processing; Attention and perception; Memory; Claustrophobia and physical access.	1	2	2
9.3 Social Psychology Responsibility: individual and group;Motivation and de- motivation;	1	1	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.	LEVEL		
	A	B1	B2 B2L
Peer pressure; 'Culture' issues; Team working; Management, supervision and leadership			
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.	**2**	**2**	**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.	**1**	**2**	**2**
9.9 Hazards in the Workplace Recognising and avoiding hazards; Dealing with emergencies.	**1**	**2**	**2**

MODULE 9B. HUMAN FACTORS Note: The scope of this module shall reflect the less demanding environment of maintenance for B3 licence holders.	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; Workload: overload and underload; Sleep and fatigue, shiftwork; Alcohol, medication, drug abuse.	**2**
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;	**2**

MODULE 9B. HUMAN FACTORS Note: The scope of this module shall reflect the less demanding environment of maintenance for B3 licence holders.	LEVEL B3
Keeping up to date, currency; Dissemination of information.	
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	LEVEL			
	A	**B1**	**B2 B2 L**	**B3**
10.1 Regulatory Framework Role of International Civil Aviation Organisation; The Aircraft Act and Rules made there under Role of the DGCA; Relationship between CAR-21, CAR-M, CAR-145, CAR-66, CAR 147 The Aircraft Rules (Applicable to Aircraft Maintenance and Release) Aeronautical Information Circulars (Applicable to Aircraft Maintenance andRelease) CAR Sections 1 and 2	**1**	**1**	**1**	**1**
10.2 CAR-66 Certifying Staff - Maintenance Detailed understanding of CAR-66.	**2**	**2**	**2**	**2**
10.3 CAR-145 — Approved Maintenance Organisations Detailed understanding of CAR-145 and CAR M Subpart F	**2**	**2**	**2**	**2**
10.4 Aircraft Operations Commercial Air Transport/Commercial Operations Air Operators Certificates; Operators Responsibilities, in particular regarding continuing airworthinessand maintenance; Documents to be carried on board; Aircraft Placarding (Markings);	**1**	**1**	**1**	**1**
10.5 Aircraft Certification (a) General Certification rules: such as FAA & EACS 23/25/27/29; Type Certification; Supplemental Type Certification;	-	1	1	1

MODULE 10. AVIATION LEGISLATION	LEVEL			
	A	B1	B2 B2L	B3
CAR-21 Design/Production Organisation Approvals. Aircraft Modifications and repairs approval and certification Permit to fly requirements				
(b) Documents Certificate of Airworthiness; Certificate of Registration; Noise Certificate; Weight Schedule; Radio Station Licence and Approval.	-	2	2	2
10.6 Continuing Airworthiness Detail understanding of CAR 21 provisions related to Continuing Airworthiness Detailed understanding of CAR-M.	**2**	**2**	**2**	**2**
10.7 Applicable National and International Requirements				
(a) Maintenance Programme, Maintenance checks and inspections; Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.;	1	2	2	2
(b) Continuing airworthiness; Test flights; ETOPS /EDTO , maintenance and dispatch requirements; RVSM, maintenance and dispatch requirements RNP, MNPS Operations All Weather Operations, Category 2/3 operations and minimum equipment requirements.	-	1	1	1
10.8 Safety Management System State Safety Programme Basic Safety Concepts Hazards & Safety Risks SMS Operation SMS Safety performance Safety Assurance	**2**	**2**	**2**	
10.9 Fuel Tank Safety Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of the FAA and of JAA TGL 47 Concept of CDCCL, Airworthiness Limitations Items (ALI)	2	2	2	

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A1	B1.1
11.1 Theory of Flight		
11.1.1 Aeroplane Aerodynamics and Flight Controls	1	2
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;		
11.1.2 High Speed Flight	1	2
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.		
11.2 Airframe Structures — General Concepts		
(a)	2	2
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)	1	2
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.		

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A1	B1.1
11.3 Airframe Structures — Aeroplanes		
11.3.1 Fuselage (ATA 52/53/56) Construction and pressurisation sealing; Wing, stabiliser, pylon and undercarriage attachments; Seat installation and cargo loading system; Doors and emergency exits: construction, mechanisms, operation and safety devices; Windows and windscreen construction and mechanisms.	1	2
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) Construction; Firewalls; Engine mounts.	1	2
11.4 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 Air conditioning systems; Air cycle and vapour cycle machines Distribution systems; Flow, temperature and humidity control system.	1	3
11.4.3 Pressurisation Pressurisation systems; Control and indication including control and safety valves; Cabin pressure controllers.	1	3
11.4.4 Safety and warning devices	1	3

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A1	B1.1
Protection and warning devices.		
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	2
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; AC power generation; Emergency power generation; Voltage regulation; Power distribution; Inverters, transformers, rectifiers; Circuit protection. External/Ground power;	1	3
11.7 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
11.8 Fire Protection (ATA 26)		

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A1	B1.1
(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, 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 locks systems; Balancing and rigging; Stall protection/warning system.	1	3
11.10 Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.	1	3
11.11 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
11.12 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 repellant;	1	3

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A1	B1.1
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. 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; Sources: engine/APU, compressors, reservoirs, ground supply; Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	1	3
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
11.18 On Board Maintenance Systems (ATA 45) Central maintenance computers; Data loading system; Electronic library system; Printing; Structure monitoring (damage tolerance monitoring).	1	2
11.19 Integrated Modular Avionics (ATA42)	1	2

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A1	B1.1
Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others: Bleed Management, Air Pressure Control, Air Ventilationand 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.		
11.20 Cabin Systems (ATA44)	1	2
The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service).Includes voice, data, music and video transmissions. The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels. The Cabin Network Service typically consists on a server, typically interfacing with,among others, the following systems: — Data/Radio Communication, In-Flight Entertainment System. The Cabin Network Service may host functions such as: — Access to pre-departure/departure reports, — E-mail/intranet/Internet access, — Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.		
11.21 Information Systems (ATA46)	1	2
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 andNetwork Server Systems Aircraft General Information System; Flight Deck Information System; Maintenance Information System; Passenger Cabin Information System; Miscellaneous Information System;		

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A2	B1.2
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 should reflect the technology of aeroplanes pertinent to the A2 and B1.2 subcategory.		
11.1 Theory of Flight		
11.1.1 Aeroplane Aerodynamics and Flight Controls	**1**	**2**
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;		
11.1.2 High Speed Flight — N/A —	-	-
11.2 Airframe Structures — General Concepts		
(a)	2	2
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)	1	2

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A2	B1.2
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.		
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 exits: construction and operation; Window and windscreen attachment.	**1**	**2**
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
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		

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A2	B1.2
11.5.1 Instrument Systems (ATA 31)	**1**	**2**
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.		
11.5.2 Avionic Systems	**1**	**1**
Fundamentals of system lay-outs and operation of: — Auto Flight (ATA 22); — Communications (ATA 23); — Navigation Systems (ATA 34).		
11.6 Electrical Power (ATA 24)	**1**	**3**
Batteries Installation and Operation; DC power generation; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.		
11.7 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 (level 2); Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1
11.8 Fire Protection (ATA 26)		
(a) Fire extinguishing systems; Fire and smoke detection and warning systems; System tests.	1	3
(b) Portable fire extinguisher.	1	~~3~~ 2
11.9 Flight Controls (ATA 27)	**1**	**3**

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A2	B1.2
Primary controls: aileron, elevator, rudder; Trim tabs; High lift devices; System operation: manual; Gust locks; Balancing and rigging; Stall warning system.		
11.10 Fuel Systems (ATA 28) System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.	**1**	**3**
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.	**1**	**3**
11.12 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; De-icing systems: electrical, hot air, pneumatic 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 auto braking; 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**

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A2	B1.2
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; Sources: engine/APU, compressors, reservoirs, ground supply;Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	**1**	**3**
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.	LEVEL B3
11.1 Theory of Flight	
11.1.1 Aeroplane Aerodynamics and Flight Controls Operation and effect of: — roll control: ailerons and spoilers;	**1**
— 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 edgedevices; Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs,spring tabs, mass balance, control surface bias, aerodynamic balance panels;	
11.2 Airframe Structures — General Concepts	
(a)	2

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B3
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)	2
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.	
11.3 Airframe Structures — Aeroplanes	
11.3.1 Fuselage (ATA 52/53/56)	**1**
Construction and pressurisation sealing; Wing, tail-plane pylon and undercarriage attachments; Seat installation; Doors and emergency exits: construction and operation; Window and windscreen attachment.	
11.3.2 Wings (ATA 57)	**1**
Construction; Fuel storage; Landing gear, pylon, control surface and high lift/drag attachments.	
11.3.3 Stabilisers (ATA 55)	**1**
Construction; Control surface attachment.	
11.3.4 Flight Control Surfaces (ATA 55/57)	**1**
Construction and attachment; Balancing — mass and aerodynamic.	
11.3.5 Nacelles/Pylons (ATA 54)	
	1
Nacelles/Pylons:	

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B3
— Construction; — Firewalls; — Engine mounts.	
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; Voltage regulation; Power distribution; Circuit protection; Inverters, transformers.	**2**
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;	**3**

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B3
Stall warning system.	
11.10 Fuel Systems (ATA 28)	**2**
System lay-out; Fuel tanks; Supply systems; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling.	
11.11 Hydraulic Power (ATA 29)	**2**
System lay-out; Hydraulic fluids; 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)	**1**
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)	**2**
Construction, shock absorbing; Extension and retraction systems: normal and emergency; Indications and warning; Wheels, brakes, antiskid and auto braking; Tyres; Steering.	
11.14 Lights (ATA 33)	**2**
External: navigation, anti collision, landing, taxiing, ice; Internal: cabin, cockpit, cargo; Emergency.	
11.15 Oxygen (ATA 35)	**2**
System lay-out: cockpit, cabin; Sources, storage, charging and distribution; Supply regulation; Indications and warnings;	

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B3
11.16 Pneumatic/Vacuum (ATA 36) System lay-out; Sources: engine/APU, compressors, reservoirs, ground supply;Pressure and vaccum pumps Pressure control; Distribution; Indications and warnings; Interfaces with other systems.	**2**

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 flyby-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 Transmissions	**1**	**3**

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A3 A4	B1.3 B1.4
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		
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**
12.6.2 Air Conditioning Air conditioning systems; Distribution systems; Flow and temperature control systems; Protection and warning devices.	**1**	**3**
12.7 Instruments/Avionic Systems		
12.7.1 Instrument Systems (ATA 31) Pitot static: altimeter, air speed indicator, vertical speed indicator;	**1**	**2**

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A3 A4	B1.3 B1.4
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.		
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) 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**	**3**
12.9 Equipment and Furnishings (ATA 25)		
(a) Emergency equipment requirements; Seats, harnesses and belts; Lifting systems.	2	2
(b) Emergency flotation systems; Cabin 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;	**1**	**3**

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL	
	A3 A4	B1.3 B1.4
Refuelling and defuelling.		
12.12 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
12.13 Ice and Rain Protection (ATA 30) Ice formation, classification and detection; Anti-icing and de-icing systems: electrical, hot air and chemical; Rain repellant and removal; Probe and drain heating. Wiper system	**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, compressors, reservoirs, ground supply.; 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, OleoPressure 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 theelectronic library mass storage and controller. Does not include units or componentsinstalled for other uses and shared with other systems, such as flight deck printer orgeneral 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	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, — yaw control, rudder limiters; Control using elevons, ruddervators; High lift devices: slots, slats, flaps;	**1**

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B2 B2L
Drag inducing devices: spoilers, lift dumpers, speed brakes; Operation and effect of trim tabs, servo tabs, control surface bias;	
(b) High Speed Flight	1
Speed of sound, subsonic flight, transonic flight, supersonic flight; Mach number, critical Mach number;	
(c) Rotary Wing Aerodynamics Terminology; Operation and effect of cyclic, collective and anti-torque controls.	1
13.2 Structures — General Concepts	
(a) Fundamentals of structural systems;	1
(b) Zonal and station identification systems;	2
Electrical bonding;	2
Lightning strike protection provision.	2
13.3 Autoflight (ATA 22) 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; 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) 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, — Cockpit Voice Recorder, — Very High Frequency omnidirectional range (VOR), — Automatic Direction Finding (ADF), — Instrument Landing System (ILS), — Microwave Landing System (MLS),	3

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B2 B2L
— Flight Director systems, Distance Measuring Equipment (DME), — Very Low Frequency and hyperbolic navigation (VLF/Omega), — Doppler navigation, — Area navigation, RNAV systems, — Flight Management Systems, — Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS), — Inertial Navigation System, — Air Traffic Control transponder, secondary surveillance radar, — Traffic Alert and Collision Avoidance System (TCAS), — Weather avoidance radar, — Radio altimeter, — ARINC communication and reporting.	
13.5 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.	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;	2
(b) System operation: electrical, fly-by-wire.	3
13.8 Instruments (ATA 31) Classification; Atmosphere; Terminology; Pressure measuring devices and systems; Pitot static systems;	3

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B2 B2L
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; Compass systems; Flight Data Recording systems; Electronic Flight Instrument Systems; 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; Structure monitoring (damage tolerance monitoring).	3
13.11 Air Conditioning and Cabin Pressurisation (ATA21)	
1) Air supply Sources of air supply including engine bleed, APU and ground cart;	2
2) Air Conditioning Air conditioning systems; Air cycle and vapour cycle machines; Distribution systems; Flow, temperature and humidity control system.	 2 3 1 3
3) Pressurisation Pressurisation systems;	3

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B2 B2L
Control and indication including control and safety valves; Cabin pressure controllers.	
4) Safety and warning devices Protection and warning devices.	3
13.12 Fire Protection (ATA 26)	**3**
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;	
(b) Portable fire extinguisher	1
13.13 Fuel Systems (ATA 28)	
System lay-out;	1
Fuel tanks;	1
Supply systems;	1
Dumping, venting and draining;	1
Cross-feed and transfer;	2
Indications and warnings;	3
Refuelling and defuelling;	2
Longitudinal balance fuel systems.	3
13.14 Hydraulic Power (ATA 29)	
System lay-out;	1
Hydraulic fluids;	1
Hydraulic reservoirs and accumulators;	1
Pressure generation: electrical, mechanical, pneumatic;	3
Emergency pressure generation;	3
Filters;	1
Pressure control;	3
Power distribution;	1
Indication and warning systems;	3
Interface with other systems.	3
13.15 Ice and Rain Protection (ATA 30)	2
Ice formation, classification and detection;	2
Anti-icing systems: electrical, hot air and chemical;	3
De-icing systems: electrical, hot air, pneumatic, chemical;Rain repellent;	1 3
Probe and drain heating; 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 autobraking;	3

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B2 B2L
Tyres;	1
Steering;	3
Air-ground sensing.	3
13.17 Oxygen (ATA 35)	
System lay-out: cockpit, cabin;	3
Sources, storage, charging and distribution;	3
Supply regulation;	3
Indications and warnings.	3
13.18 Pneumatic/Vacuum (ATA 36)	
System lay-out;	2
Sources: engine/APU, compressors, reservoirs, ground supply;	2
Pressure control;	3
Distribution;	1
Indications and warnings;	3
Interfaces with other systems.	3
13.19 Water/Waste (ATA 38) Water system lay-out, supply, distribution, servicing and draining; Toilet system lay-out, flushing and servicing.	**2**
13.20 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.	3
13.21 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 Includes voice, data, music and video transmissions. The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels(FAPs). The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems: — Data/Radio Communication, In-Flight Entertainment System The Cabin Network Service may host functions such as:	3

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS	LEVEL
	B2
— Access to pre-departure/departure reports, — E-mail/intranet/Internet access, — Passenger database; Cabin Core System; In-flight Entertainment System; External Communication System; Cabin Mass Memory System; Cabin Monitoring System; Miscellaneous Cabin System.	3
13.22 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. Doesnot 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 andNetwork Server Systems. – Aircraft General Information System; – Flight Deck Information System; – Maintenance Information System; – Passenger Cabin Information System; – Miscellaneous Information System.	

MODULE 14. PROPULSION	LEVEL
	B2 B2L
14.1 Turbine Engines	
(a) Constructional arrangement and operation of turbojet, turbofan, turbo shaft 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** 2

14.3 Starting and Ignition Systems
Operation of engine start systems and components;Ignition systems and components;
Maintenance safety requirements

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 arrangement and operation of turbojet, turbofan, turbo shaft, turboprop.	**1**	**2**
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	**1**	**2**

MODULE 15. GAS TURBINE ENGINE	LEVEL	
	A	B1
Constructional features and principles of operation; Convergent, divergent and variable area nozzles; Engine noise reduction; Thrust reversers.		
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; Afterburner systems.	-	1

MODULE 15. GAS TURBINE ENGINE	LEVEL	
	A	B1
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 Power plant 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.	-	2

MODULE 16. PISTON ENGINE	LEVEL		
	A	B1	B3
16.1 Fundamentals Mechanical, thermal and volumetric efficiencies; Operating principles — 2 stroke, 4 stroke, Otto and Diesel; Piston displacement and compression ratio; Engine configuration and firing order.	1	2	2
16.2 Engine Performance Power calculation and measurement;	1	2	2

MODULE 16. PISTON ENGINE	LEVEL		
	A	B1	B3
Factors affecting engine power; Mixtures/leaning, pre-ignition.			
16.3 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**
16.4 Engine Fuel Systems			
16.4.1 Carburetors 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**
16.4.3 Electronic engine control Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	**1**	**2**	**2**
16.5 Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	**1**	**2**	**2**
16.6 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**
16.7 Supercharging/Turbocharging Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection.	**1**	**2**	**2**
16.8 Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions.	**1**	**2**	**2**

MODULE 16. PISTON ENGINE	LEVEL		
	A	B1	B3
16.9 Lubrication Systems System operation/lay-out and components.	1	2	2
16.10 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
16.11 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
16.12 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 enginemanufacturer.	1	3	2
16.13 Engine Storage and Preservation Preservation and depreservation for the engine and accessories/ systems	-	2	1

MODULE 17A. PROPELLER Note: This module does not apply to category B3. Relevant subject matters for category B3 are defined in module 17B.	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 metalpropellers; 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**
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.	**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 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.	**2**
17.3 Propeller Pitch Control Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Overspeed protection.	**2**
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 examinations must be carried out using the multiple choice question.

1.2 Each multiple choice questions must have more than two alternative answers of which only one must be the correct answer and the candidate shall be allowed a time per module which is based upon a nominal average of 75 seconds per question.

1.3 The pass mark for CAR-66 module and sub-module multiple choice part of the examination is 75%.

1.4 Penalty marking systems is not used to determine whether a candidate has passed.

1.5 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 an approved maintenance training organisation which conducts a course of retraining tailored to the failed subjects in the particular module. In such case, the failed module may be retaken after 30 days. Further, in case of failed module related to limitation papers, such modules may be retaken after 30 days.

1.6 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

1.7 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.

1.8 The applicant shall confirm in writing to the DGCA for an examination, the number and dates of attempts during the last year where these attempts took place.

2. Number of Questions and Examination Duration for the CAR-66 Appendix I Modules

Module		Category	Multiple choice Questions	Time allowed (Minutes)
No.	Subject			
1	Mathematics	All Categories	Not Applicable	
2	Physics	All Categories	Not Applicable	
3	Electrical Fundamentals	A	20	25
		B1	52	65
		B2 and B2L	52	65
		B3	24	30
4	Electronic Fundamentals	A	Not Applicable	
		B1	20	25
		B2 and B2L	40	50
		B3	8	10
5	Digital Techniques/Electronic Instrument Systems	A	16	20
		B1.1, B1.3	40	50
		B1.2,B1.4	20	25
		B2 and B2L	72	90
		B3	16	20
6	Materials and Hardware	A	52	65
		B1	72	90
		B2 and B2L	60	75
		B3	60	75
7A	Maintenance Practices	A	72	90
		B1	80	100
		B2 and B2L	60	75
7B	Maintenance Practices	B3	60	75

Module		Category	Multiple choice Questions	Time allowed (Minutes)
No.	Subject			
8	Basic Aerodynamics	A	20	25
		B1	20	25
		B2 and B2L	20	25
		B3	20	25
9A	Human factors	A	20	25
		B1	20	25
		B2 and B2L	20	25
9B	Human factors	B3	16	20
10	Aviation Legislation	A	32	40
		B1	40	50
		B2 and B2L	40	50
		B3	32	40
11A	Turbine Aeroplane Aerodynamics, Structures and Systems	A	108	135
		B1	140	175
		B2	0	0
11B	Piston Aeroplane Aerodynamics, Structures and Systems	A	72	90
		B1	100	125
		B2	0	0
11C	Piston Aeroplane Aerodynamics, Structures and Systems	B3	60	75
12	Helicopter Aerodynamics, Structures and Systems	A	100	125
		B1	128	160
		B2	0	0
13	Aircraft Aerodynamics, Structures and Systems	A	0	0
		B1	0	0
		B2	180	225
14	Propulsion	A	0	0
		B1	0	0
		B2 and B2L	24	30

Module		Category	Multiple choice Questions	Time allowed (Minutes)
No.	Subject			
15	Gas Turbine Engine	A	60	75
		B1	92	115
		B2	0	0
16	Piston Engine	A	52	65
		B1	72	90
		B2	0	0
		B3	68	85
17A	Propeller	A	20	25
		B1	32	40
		B2	0	0
17B	Propeller	B3	28	35

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

MODULE 14 — PROPULSION

Category B2L: 24 multiple-choice questions and time allowed is 30 minutes.

NOTE: The B2L examination for module 14 is only applicable to the ‘Instruments’ and ‘AirframeSystems’ ratings.

Appendix III - Type training and Examination Standard

On the job training

1. General

Aircraft type training shall consist of theoretical training and examination, and, exceptfor 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 CAR-147 or, when conducted by other organisations,as directly approved by the DGCA.

(ii) Shall comply, except as permitted by the differences training described in point (c), with:

- the relevant elements defined in the mandatory part of the operational suitability data established in accordance with CAR 66 or the standard described in point 3.1 of this Appendix, and

- the type training examination standard described in point 4.1 of this Appendix.

(iii) Reserved

(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 CAR- 147 or, when conducted by other organisations,as directly approved by the DGCA.

(ii) Shall comply, except as permitted by the differences training described in point (c), with:

- the relevant elements defined in the mandatory part of the operational suitability data established or, the standard described in point 3.2 of this Appendix, and

- the type training assessment standard described in point 4.2 of this Appendix.

(iii) Shall include a representative cross section of maintenance activities relevant tothe 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 DGCA.

(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 level of knowledge that training is intended to achieve.

Level 1

A brief overview of the airframe, systems and powerplants as outlined in the Systems Description Section of the Aircraft Maintenance Manual / Instructions for Continued Airworthiness.

Course objectives: Upon completion of the course, 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 this 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 III, 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, power plant, component and functional checks as specified in the maintenance manual.
(c) demonstrate the use, interpret and apply appropriate documentation includingstructural repair manual, troubleshooting manual, etc.;
(d) Correlate information for the purpose of making decisions in respect of faultdiagnosis and rectification to maintenance manual level.
(e) Describe procedures for replacement of components unique to aircraft typ

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 ofboth.

3.1Theoretical element

(a) Objective

On completion of a theoretical training course the student shall be able to demonstrate, tothe levels identified in the Appendix III syllabus, the detailed theoretical knowledge of theaircraft'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 3theoretical training, level 1 and 2 training material may be used to teach the full scope ofthe 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 30 000 kg:	
B1.1	150
B1.2	120
B2	100
C	30
Aeroplanes with a maximum take-off mass equal or less than 30 000 kg and above 5 700 kg:	
B1.1	120
B1.2	100
B2	100
C	25
Aeroplanes with a maximum take-off mass of 5 700 kg and below[(1)]	
B1.1	80
B1.2	60
B2	60
C	15
Helicopters[(2)]	
B1.3	120
B1.4	100
B2	100
C	25

(1) For non-pressurised piston engine aeroplanes below 2 000 kg MTOM the minimum duration can be reduced by 50 %. (2) For helicopters in group 2 (as defined in point 66.A.05) the minimum duration can be reduced by 30 %.

For the purpose of the table above, a tuition hour means 60 minutes of teaching and exclude any breaks, examination, revision, preparation and aircraft visit. These hours apply only to theoretical courses for complete aircraft/engine combinations according to the type rating as defined by the DGCA.

(d) Justification of course duration:

Training courses carried out in a maintenance training organisation approved in accordance with CAR-147 and courses directly approved by the DGCA 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 DGCA 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		Aeroplane Piston		Helicopter turbine		Helicopter Piston		Avio nics
	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
06Dimensions/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

Level Chapters	Aeroplanes Turbine		Aeroplane Piston		Helicopter turbine		Helicopter Piston		Avionics
	B1	C	B1	C	B1	C	B1	C	B2
Helicopters									
18. Vibration and Noise Analysis(Blade tracking)	–	--	–	–	3	1	3	1	–
60 Standard Practices Rotor	-	-	-	-	3	1	3	1	-
62 Rotors	–	–	–	–	3	1	3	1	1
62A Rotors — Monitoring and indicating	–	–	–	–	3	1	3	1	3
63 Rotor Drives	--	--	--	--	3	1	3	1	1
63A Rotor Drives — Monitoring and indicating	--	--	--	--	3	1	3	1	3
64 Tail Rotor	–	–	–	–	3	1	3	1	1
64A Tail rotor — Monitoring and indicating	--	--	--	--	3	1	3	1	3
65 Tail Rotor Drive	--	–	–	–	3	1	3	1	1
65A Tail Rotor Drive — Monitoring and indicating	--	--	--	--	3	1	3	1	3
66 Folding Blades/Pylon	–	–	–	–	3	1	3	1	–
67 Rotors Flight Control	--	--	--	--	3	1	3	1	--
53 Airframe Structure (Helicopter)	--	--	--	--	3	1	3	1	--
25 Emergency Flotation Equipment	--	--	--	--	3	1	3	1	1
Airframe Structure									
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 Stabilizers	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
52 Doors	3	1	3	1	–	–	–	–	1
Zonal & Station Identification Systems	1	1	1	1	1	1	1	1	1

Level Chapters	Aeroplanes Turbine		Aeroplane Piston		Helicopter turbine		Helicopter Piston		Avionics
	B1	C	B1	C	B1	C	B1	C	B2
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 Pressurization	3	1	3	1	3	1	3	1	3
21C Safety & Warning Devices	3	1	3	1	3	1	3	1	3
22 Autoflights	2	1	2	1	2	1	2	1	3
23 Communication	2	1	2	1	2	1	2	1	3
24 Electrical Power	3	1	3	1	3	1	3	1	3
25 Equipment & Furnishings	3	1	3	1	3	1	3	1	1
25A Electronic Emergency Equip. & Cabin Entertainment 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 indication	3	1	3	1	3	1	3	1	3
29 Hydraulic Power	3	1	3	1	3	1	3	1	2
29A Hydraulic Power — Monitoring and indicating	3	1	3	1	3	1	3	1	3
30 Ice & Rain Protection	3	1	3	1	3	1	3	1	3
31 Indicating/Recording Systems	3	1	3	1	3	1	3	1	3
31A Instrument Systems	3	1	3	1	3	1	3	1	3
32 Landing Gear	3	1	3	1	3	1	3	1	2
32A Landing Gear — Monitoring and indicating	3	1	3	1	3	1	3	1	3
33 Lights	3	1	3	1	3	1	3	1	3
34 Navigation	2	1	2	1	2	1	2	1	3
35 Oxygen	3	1	3	1	–	–	–	–	2
36 Pneumatic	3	1	3	1	3	1	3	1	2
36A Pneumatic — Monitoring and indicating	3	1	3	1	3	1	3	1	3
37 Vacuum	3	1	3	1	3	1	3	1	2
38 Water/Waste	3	1	3	1	--	--	--	--	2
41 Water Ballast	3	1	3	1	--	--	--	--	1

Level Chapters	Aeroplanes Turbine		Aeroplane Piston		Helicopter turbine		Helicopter Piston		Avionics
	B1	C	B1	C	B1	C	B1	C	B2
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 Systems	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 Engines:									
70 Standard Practices — Engines,	3	1	–	–	3	1	–	–	1
70A constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems).	3	1	--	--	3	1	--	--	1
70B Engine Performance	3	1	–	–	3	1	–	–	1
71 Powerplant	3	1	–	–	3	1	–	–	1
72 Engine Turbine/Turbo Prop/Ducted Fan/Unducted fan	3	1	--	--	3	1	--	--	1
73 Engine Fuel and Control	3	1	–	–	3	1	–	–	1
75 Air	3	1	–	–	3	1	–	–	1
76 Engine controls	3	1	–	–	3	1	–	–	1
78 Exhaust	3	1	–	–	3	1	–	–	1
79 Oil	3	1	–	–	3	1	–	–	1
80 Starting	3	1	–	–	3	1	–	–	1
82 water injection	3	1	–	–	3	1	–	–	1
83 Accessory Gear Boxes	3	1	–	–	3	1	–	–	1
84 Propulsion Augmentation	3	1	–	–	3	1	–	–	1
73A FADEC	2	1	–	–	2	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 Engines:									
Level Chapters	**Aeroplanes Turbine**		**Aeroplane Piston**		**Helicopter turbine**		**Helicopter Piston**		**Avionics**
	B1	C	B1	C	B1	C	B1	C	B2
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 Turbine	--	--	3	1	--	--	3	1	1
82 Water Injections	–	–	3	1	–	–	3	1	1
83 Accessory Gear Boxes	–	–	3	1	–	–	3	1	1
84 Propulsion Augmentation	–	–	3	1	–	–	3	1	1
73A FADEC	–	–	3	1	–	–	3	1	3
74 Ignition	–	–	3	1	–	–	3	1	3
77 Engine Indication Systems	–	–	3	1	–	–	3	1	3
Propellers:									
60A Standard Practices — Propeller	3	1	3	1	–	–	–	–	1
61 Propellers/Propulsion	3	1	3	1	–	–	–	–	1
61A Propeller Construction	3	1	3	1	--	--	--	--	1
61B Propeller Pitch Control	3	1	3	1	–	–	–	–	–
61C Propeller Synchronizing	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 tothe acceptance of the DGCA approving the training course.

3.2Practical 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 exampletroubleshooting, 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 removaland 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 particularaircraft type, shall be completed as part of the practical training.

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

Glossary of table: LOC: Location; FOT: Functional / Operation Test; SGH: Service and Ground; Handling; R/I: Removal / Installation; MEL: Minimum Equipment List; TS: Trouble Shooting

Chapters	**B1/B2**	**B1**					**B2**				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
Introduction module:											
05 Time limits/maintenance checks	X/X	--	--	--	--	--	--	--	--	--	-
06 Dimensions/Areas (MTOM, etc.)	X/X	--	--	--	--	--	--	--	--	--	-
07 Lifting and Shoring	X/X	--	--	--	--	--	--	--	--	--	-
08 Levelling and weighing	X/X	--	X	--	--	--	--	X	--	--	-
09 Towing and Taxing	X/X	--	X	--	--	--	--	X	--	--	-
10 Parking/Mooring storing and return to service	X/X	--	X	--	--	--	--	X	--	--	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
11 Placard and marking	X/X	--	--	--	--	--	--	--	--	--	-
12 Servicing	X/X	--	X	--	--	--	--	X	--	--	-
20 Standard practices –only type particular	X/X	--	X	--	--	--	--	X	--	--	-
Helicopters:											
18 Vibration and Noise Analysis (Blade tracking)	X/--	--	--	--	--	X	--	--	--	--	-
60 Standard Practices Rotor — only type 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 andindicating	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 Autoflight	X/X	--	--	--	X	--	X	X	X	X	X
23 Communications	X/X	--	X	--	X	--	X	X	X	X	X
24 Electrical Power	X/X	X	X	X	X	X	X	X	X	X	X
25 Equipment and Furnishings	X/X	X	X	X	--	--	X	X	X	--	-
25A Electronic Equipment includingemergency 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 andindicating	X/X	X	--	--	--	--	X	--	X	--	X
29 Hydraulic Power	X/X	X	X	X	X	X	X	X	--	X	-
29A Hydraulic Power — Monitoring andindicating	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	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 andindicating	X/X	X	--	X	X	X	X	--	X	X	X

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
33 Lights	X/X	X	X	--	X	--	X	X	X	X	-
34 Navigation	X/X	--	X	--	X	--	X	X	X	X	X
35 Oxygen	X/--	X	X	X	--	--	X	X	--	--	-
36 Pneumatic	X/--	X	--	X	X	X	X	--	X	X	X
36A Pneumatic — Monitoring and indicating	X/X	X	X	X	X	X	X	X	X	X	X
37 Vacuum	X/--	X	--	X	X	X	--	--	--	--	-
38 Water/Waste	X/--	X	X	--	--	--	X	X	--	--	-
41 Water Ballast	X/--	--	--	--	--	--	--	--	--	--	-
42 Integrated modular avionics	X/X	--	--	--	--	--	X	X	X	X	X
44 Cabin Systems	X/X	--	--	--	--	--	X	X	X	X	X
45 On-Board Maintenance System (orcovered 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 andoperation(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	--	--	--	-
75 Air	X/--	--	--	X	--	X	--	--	--	--	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
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 — type particular only	--	--	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	--	--	--	--	-
82 Water Injection	X/--	X	--	--	--	--	--	--	--	--	-

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
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	--	--	--	--	--	--	--	-
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 writtenexamination shall be performed, which shall comply with the following:

(a) Format of the examination is of the multi-choice type. Each multi-choice question shallhave 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 errorssuch as the use of incorrect sense (+ versus -) or incorrect measurement units. Theyshall not be mere random numbers.

(d) The level of examination for each chapter (1) 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 tointerpret 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.

DGCA 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 issplit 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, anassessment must be performed, which must comply with the following:

(a) The assessment shall be performed by practical assessors appropriately qualified.

(b) The assessment shall evaluate the knowledge and skills of the trainee.

5. Type examination standard

Type examination shall be conducted by training organisations appropriately approved under CAR-147 or by the DGCA.The examination shall be oral, written and or practical assessment based, or acombination thereof and it shall comply with the following requirements:

(a) Oral examination questions shall be open.

(b) Written examination questions shall be essay 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 chapters (1) 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 shallnot 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 attemptsare allowed with a 1 year waiting period between sets. A waiting period of 30 days isrequired after the first failed attempt within one set, and a waiting period of 60 days isrequired after the second failed attempt.

The applicant shall confirm in writing to the DGCA the number and dates of attemptsduring the last year.. DGCA is responsible for checking the number of attempts within the applicable timeframes.

2. 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.

3. Type examination shall be performed with at least one examiner present. Theexaminer(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 thecandidate has passed or failed.

6. On the Job Training

On the Job Training (OJT) shall be approved by the DGCA.

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 fora 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 DGCA. The OJT tasks to be completed shall be representative of the aircraft and systems both in complexity and inthe technical input required to complete that task. While relatively simple tasks may beincluded, 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. Place;
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. Applicability (B1 or B2);
9. Aircraft type and aircraft registration;
10. Aircraft rating applied for;
11. Trainee's signature;
12. Supervisor's signature and stamp.

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

AMC to Appendix III to CAR-66

Aircraft type training and On-the-Job Training

The theoretical and practical training providers, as well as the OJT provider, may contractthe 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 CAR-66

Aircraft type training

1. Aircraft type training may be subdivided in airframe and/or power plant and/oravionics/electrical systems type training courses

   i. Airframe type training course means a type training course including all relevant aircraft structure and electrical and mechanical systems excluding thepower plant.

   ii. Power plant type training course means a type training course on the bare engine, including the build-up to a quick engine change unit.

   iii. The interface of the engine/airframe systems should be addressed by either airframe or

power plant 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.

iv. 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:

i. address the different parts of the aircraft which are representative of the structure, the systems/components installed and the cabin; and

ii. include training on the use of technical manuals, maintenance procedures and the interface with the operation of the aircraft.

iii. Therefore, it should be based on the following elements:

a. Type design including relevant type design variants, new technology and techniques;

b. Feedback from in-service difficulties, occurrence reporting, etc.;

c. Significant applicable airworthiness directives and service bulletins;

d. Known human factor issues associated with the particular aircraft type;

e. Use of common and specific documentation, (when applicable, such as MMEL, AMM, MPD, TSM, SRM, WD, AFM, tool handbook), philosophy of the troubleshooting, etc.;

f. Knowledge of the maintenance on-board reporting systems and ETOPS maintenance conditions, when applicable;

g. Use of special tooling and test equipment and specific maintenance practices including critical safety items and safety precautions;

h. 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.

i. 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);

j. 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 CAR-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 provetheir 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:

   i. Integrated or split;

   ii. 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 CAR-66 "Aircraft TypeTraining 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 partof 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 inthe table contained in paragraph 3.2 of Appendix III to CAR-66.

3. The duration of the practical training should ensure that the content of training required by paragraph 3.2 of Appendix III to CAR-66 is completed.

   Nevertheless, for aeroplanes with a MTOM equal or above 30 000 kg, the duration for the practical element of a type rating training course should not be less than two weeks, unless a shorter duration meeting the objectives of the training and taking into account pedagogical aspects (maximum duration per day) is justified to the DGCA.

4. The organisation providing the practical element of the type training should provide trainees with 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 practical assessor. The logbook format and its use should be clearly defined.

5. In paragraph 4.2 of Appendix III to CAR-66, the term practical assessors appropriately qualified" means that the assessors should demonstrate training and experience on the assessment process being undertaken and be authorised to do so by the organisation.

Further guidance about the assessment and the practical assessors is provided inAppendix III to AMC to CAR-66.

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

AMC to Paragraph 1(c) of Appendix III to CAR-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 CAR-66) for the purpose of typerating endorsement on the aircraft maintenance licence.

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

For this purpose the procedure to conduct difference training for different variants within the same aircraft type rating shall be defined in the MTOE/MOE.

AMC to point 3.1(d) of Appendix III to CAR-66 "Aircraft Type Training andExamination 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 CAR-66, has been determined based on:

   i. generic categories of aircraft and minimum standard equipment fit;
   ii. the estimated average duration of standard courses imparted.

2. The purpose of the Training Needs Analysis (TNA) is to adapt and justify the durationof 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 belowthe minimum duration described in Appendix III to CAR-66.

   In the particular case of type training courses approved on the basis of the requirements valid before this CAR is applicable and having a duration for the theoretical element equal to or above the minimum duration contained in paragraph3.1(c) of Appendix III to CAR-66, it is acceptable that the TNA only covers the differences introduced by this CAR in paragraph 3.1(e) "Content" and the criteria introduced in paragraph 3.1(d) "Justification of course duration" related to the minimum attendance and the maximum number of training hours per day. This TNAmay result in a change in the duration of the theoretical element.

3. The content and the duration deriving from the TNA may be supported by an analysisfrom the Type Certificate holder.

4. In order to approve a reduction of such minimum duration, the evaluation done by the DGCA 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 large transport category 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 thereis 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 to meet the learning objectives.

b) As a minimum, the Training Need Analysis (TNA) should take into account all theapplicable elements contained in paragraph 3.1 of CAR-66 Appendix III and associated AMCs.

c) The TNA should set up the course content considering the Appendix III objectives foreach level of training and the prescribed topics in the theoretical element table contained in paragraph 3.1 of CAR-66 Appendix III.

d) For each Chapter described in the theoretical element table contained in paragraph 3.1 of CAR-66 Appendix III, the corresponding training time should be recorded

e) Typical documents to be used to identify the areas and elements where there is a needfor 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:

i) Consideration should be given to the following typical activities:

1. Activation/reactivation;
2. Removal/installation;
3. Testing;
4. Servicing;
5. Inspection, check and repairs;
6. Troubleshooting/diagnosis.

ii) For the purpose of identifying the specific elements constituting the trainingcourse, it is acceptable to use a filtering method based on criteria such as:

1. Frequency of the task;
2. Human factor issues associated to the task;
3. Difficulty of the task;
4. Criticality and safety impact of the task;
5. In-service experience;
6. Novel or unusual design features (not covered by CAR-66 Appendix I);
7. Similarities with other aircraft types;
8. Special tests and tools/equipment.

iii) It is acceptable to follow an approach based on:

1. Tasks or groups of tasks; or
2. Systems or subsystems or components.

g) The TNA should:

i. Identify the learning objectives for each task, group of tasks, system, subsystem or component;

ii. Associate the identified tasks to be trained to the regulatory requirements(table in paragraph 3.1 of Appendix III to CAR-66);

iii. Organise the training into modules in a logical sequence (adequate combinationof chapters as defined in Appendix III of CAR-66);

iv. Determine the sequence of learning (within a lesson and for the wholesyllabus);

v. Identify the scope of information and level of detail with regard to the minimumstandard to which the topics of the TNA should be taught according to the set- up objectives.

vi. Address the following:

1. Description of each system/component including the structure (whereapplicable);
2. System/component operation taking into account:

a. Complexity of the system (e.g. the need of further breakdown into subsystems, etc.);

b. Design specifics which may require more detailed presentation or maycontribute to maintenance errors;

c. Normal and emergency functioning;

d. Troubleshooting;

e. Interpretation of indicators and malfunctions.

f. Use of maintenance publications;

g. Identification of special tools and equipment required for servicing andmaintaining the aircraft;

h. Maintenance Practices;

i. Routine inspections, functional or operational tests, rigging/adjustment,etc.

vii. Describe the following:

1. The instructional methods and equipment, teaching methods and blending ofthe teaching methods to ensure the effectiveness of the training;

2. The maintenance training documentation/material to be delivered to thestudent; Facilitated discussions, questioning session, additional practice- oriented training, etc.;
3. The homework, if developed;
4. 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 tuitionexcluding any breaks, examination, revision, preparation and aircraft visit. In exceptional cases, the DGCA may allow deviation from this standard when it isproperly justified that the proposed number of hours follows pedagogical and human factors principles. These principles are especially important in those cases where:

i. Theoretical and practical training are performed at the same time;
ii. Training and normal maintenance duty/apprenticeship are performed at thesame time.

j) The minimum participation time for the trainee 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 theminimum 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 formechanics, 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 ofthe organisation conducting the course.

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

AMC to Section 5 of Appendix III to CAR-66

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 CAR-66

On-the-Job Training (OJT)

1. "A maintenance organisation appropriately approved for the maintenance of the particular aircraft type" means a CAR-145 or M.A. Subpart F 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 CAR-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:

   i. 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.

   ii. 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 behavior in the maintenance environment.

   iii. 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.

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

   v. The supervisor(s) should therefore:

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

b) be competent for the selected tasks;

c) be safety-orientated;

d) 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.);

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

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

a) The function of the assessor, as described in Section 6 of Appendix III to CAR-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 ofOJT and should be based on the supervisor(s) reports and feedback.

b) In Section 6 of Appendix III to CAR-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 -authorized as per CAP2100 .

Further guidance about the assessment and the designated assessors is provided inAppendix III to AMC to CAR-66.

9 The procedures for OJT of a Part-145 organisation should be included into the approved maintenance organization exposition (Chapter 3.20, as indicated in AMC 145.A.70 (a)).

These procedures in the Exposition Manual are approved by the DGCA, and providingtraining is not one of the privileges of a maintenance organisation, they can only be used when the licencing authority is the DGCA. In other cases, it is up to the licencingauthority to decide whether it accepts such procedures for the purpose of approvingthe OJT .

Appendix IV - Experience requirements for extending a CAR-66 Aircraft Maintenance Engineer's Licence

The table below shows the experience requirements for adding a new category orsubcategory to an existing CAR-66 licence.

The experience shall be practical maintenance experience on an operating aircraft in the group/subgroup of the subcategory relevant to the application.

The experience is to be signed by the post holder only and this procedure is to bereflected in MOE

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

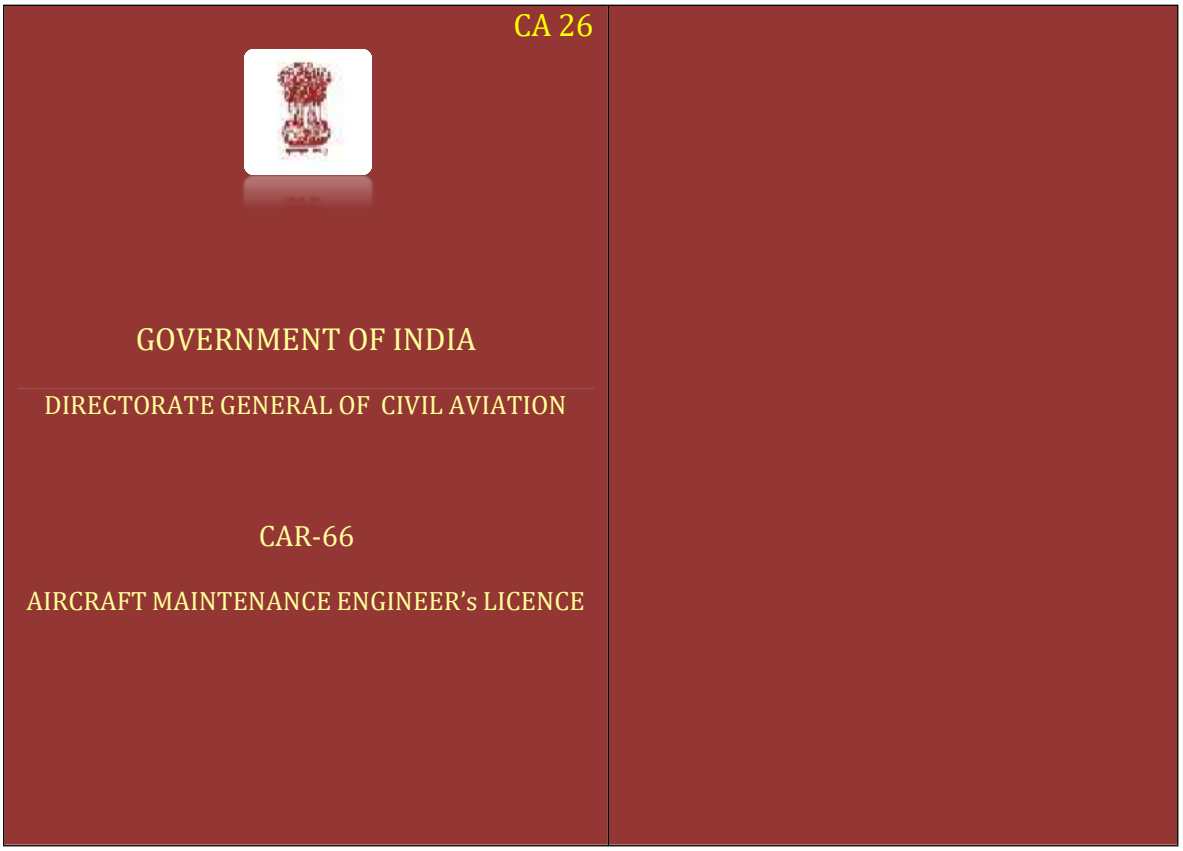
To From	A1	A2	A3	A4	B1.1	B1.2	B1.3	B1.4	B2	B2L	B3
A1	—	6 months	6 months	6 months	2 years	6 months	2 years	1 year	2 years	1 year	6 months
A2	6 months	—	6 months	6 months	2 years	6 months	2 years	1 year	2 years	1 year	6 months
A3	6 months	6 months	—	6 months	2 years	1 year	2 years	6 months	2 years	1 year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

Application forms (published on DGCA Website dgca.gov.in and available on eGCA)

Appendix VI - Aircraft Maintenance Engineer's Licence referred to in Rule 61 of the Aircraft Rules, 1937 - CA Form 26 / Plastic Card

1. An example of the aircraft maintenance licence referred to in CAR-66 can be found on the following pages.
2. The preparation of any change to an existing aircraft maintenance licence shall be carried out by the DGCA.
3. 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 Indian Penal Code.
4. 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 be left blank or mention 'Not applicable'.



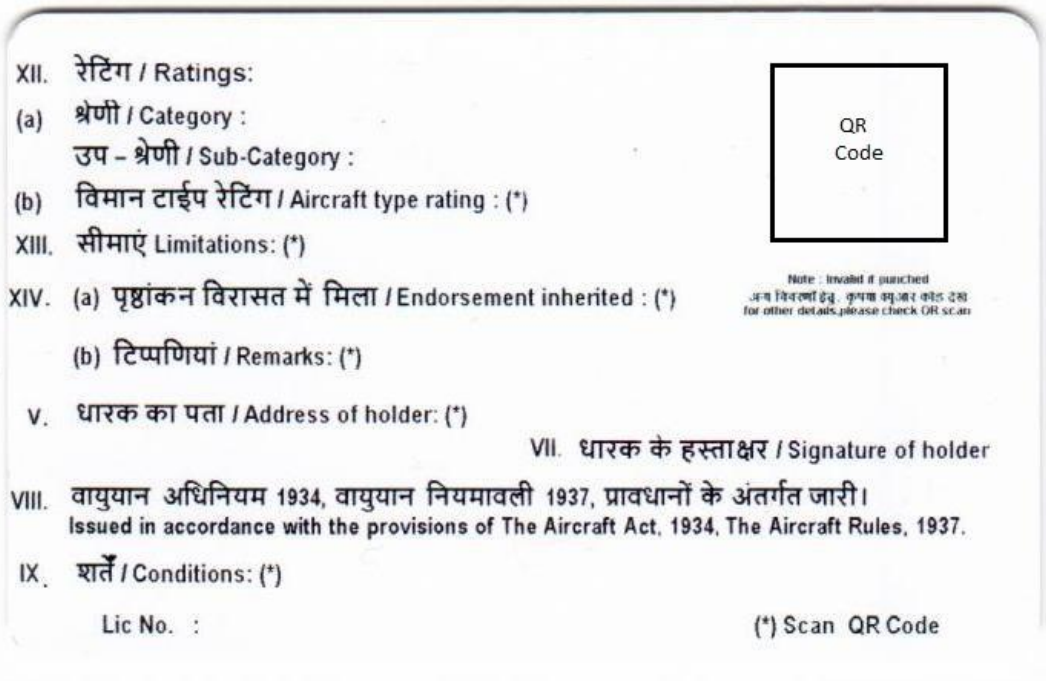
<table>
<tr><td>I</td><td colspan="3">INDIA</td><td rowspan="10">IX. CONDITIONS
a. Certified that holder is authorized to exercise the privileges of the licence as given in Rule 61 of the Aircraft Rules, 1937.
b. Endorsement of aircraft types at section XII (b) titled AIRCRAFT TYPE RATING means the holder is qualified to issue a certificate of release to service for such aircraft from the date of endorsement with a valid authorization issued by approved maintenance organization.
c. Holder of this licence shall not exercise the privileges of the licence and related ratings at any time when he/she is aware of any decrease in medical fitness which might render him/her unable to safely and properly exercise these privileges.
d. This licence is not valid unless it bears the signature of the holder.
e. This licence remains current till the valid date specified at section XIV whilst in compliance with the Aircraft Rule 61 and CAR 66 unless previously suspended or revoked.
f. This licence when endorsed with an aircraft type rating meets the intent of ICAO Annex 1.
g. Entry, endorsement or alteration in the licence shall be made by person authorized for this purpose by the Director General.
h. Limitations (if any) specified at section XIII are the exclusions from the certification privileges.</td></tr>
<tr><td>II.</td><td colspan="3">Aircraft Maintenance Engineer’s Licence</td></tr>
<tr><td>III.</td><td>Licence number</td><td></td><td rowspan="3">STAMP SIZE PHOTO</td></tr>
<tr><td>IV.</td><td>Name of holder in full</td><td></td></tr>
<tr><td>IVa</td><td>Date of birth</td><td></td></tr>
<tr><td>V.</td><td>Address of holder</td><td colspan="2"></td></tr>
<tr><td>VI.</td><td>Nationality</td><td colspan="2"></td></tr>
<tr><td>VII.</td><td>Signature of Holder</td><td colspan="2"></td></tr>
<tr><td>VIII.</td><td colspan="3">Issued in accordance with the provisions of the Aircraft Act 1934, and Aircraft Rules 1937.</td></tr>
<tr><td rowspan="2">X</td><td>Signature of Issuing Authority</td><td colspan="2">……
……..……
(for the Director General of Civil Aviation)</td></tr>
<tr><td>Date of Issue:</td><td colspan="2"></td></tr>
<tr><td>XI.</td><td>Stamp of the Issuing Authority</td><td colspan="2"></td></tr>
<tr><td colspan="4">1</td><td>III. LIC No. 2</td></tr>
</table>

		XII (a). LICENCE (SUB) CATEGORIES								XII (b). AIRCARFT RATING TYPE		
CATEGORIES		A	B1	B2	B2L	B3	L	C	DATE	AIRCRAFT TYPE OR GROUP	CATEGORY	STAMP & DATE
AEROPLANES TURBINE				n/a	n/a	n/a	n/a	n/a				
AEROPLANES PISTON				n/a	n/a	n/a	n/a	n/a				
HELICOPTERS TURBINE				n/a	n/a	n/a	n/a	n/a				
HELICOPTERS PISTON				n/a	n/a	n/a	n/a	n/a				
AVIONICS		n/a	n/a			n/a	n/a	n/a				
AIRCRAFT		n/a	n/a	n/a	n/a	n/a	n/a					
Sailplances, powered sailplanes, LA1 aeroplances, balloons and airships		n/a	n/a	n/a	n/a	n/a		n/a				
PISTON-ENGINE NON-PRESSURISED AEROPLANES OF 2000KG MTOM AND BELOW		n/a	n/a	n/a	n/a			n/a				
III. LIC No.		**3**								**III. LIC No.**	**4**	

XIII. LIMITATIONS				XIV. LICENCE VALIDITY		
AIRCRAFT TYPE OR GROUP	CATEGORY	LIMITATION CODE	SIGNATURE WITH DATE (REMOVAL OF LIMITATION)	VALID TILL	SIGNATURE WITH DATE	SEAL
III. LIC No. 5				**III. LIC No 6**		

XIV (a) LICENCE ENDORSEMENTS INHERITED FROM THE AME LICENCE HELD PRIOR TO CAR-66 LICENCE			XIV (b). REMARKS
RATING	CATEGORY	SIGNATURE WITH DATE	
III. LIC No. 7			**III. LIC No. 8**

Appendix VI(a) - Aircraft Maintenance Engineer's Licence (PLASTIC CARD) format [issued through eGCA]



QR CODE OUTPUT

I.

Government of India

II.

Aircraft Maintenance Engineer's Licence

III. LICENCE NO. :

IV. NAME OF HOLDER IN FULL :

IV (a). DATE OF BIRTH :

VI. NATIONALITY :

X. ISSUING OFFICER'S NAME : DATE OF ISSUE :

XI. ISSUING AUTHORITY : DGCA, India

X (a) **DATE OF ISSUE :**

	DATE	NAME OF ISSUING OFFICER	OFFICE
Initial CAR 66 Licence			DGCA, HQ

XII (a). LICENCE CATEGORIES/ SUB-CATEGORIES:

CATEGORY	SUB-CATEGORY	DATE OF ISSUE

XII (b). AIRCRAFT TYPE RATING :

CATEGORY	SUB-CATEGORY	AIRCRAFT TYPE/ GROUP	Date	OFFICE

XIII. LIMITATIONS :

CATEGORY	SUB-CATEGORY	AIRCRAFT TYPE/ GROUP	LIMITATION	LIMITATION REMOVAL DATE	OFFICER'S NAME & DESIGNATION	OFFICE

XIV. LICENCE VALIDITY :

VALID TILL	OFFICER'S NAME & DESIGNATION	DATE OF SIGN	OFFICE

XIV (a). ENDORSEMENTS INHERITED:

RATING	CATEGORY	OFFICER'S NAME & DESIGNATION	DATE

XIV (b). REMARKS:

V. ADDRESS OF HOLDER:

VIII. ISSUED IN ACCORDANCE WITH THE PROVISIONS OF THE AIRCRAFT ACT 1934, AND AIRCRAFT RULES 1937

IX. CONDITIONS :

a) Certified that holder is authorized to exercise the privileges of the licence as given in Rule 61 of the Aircraft Rules, 1937.

b) Endorsement of aircraft types at section XII (b) titled AIRCRAFT TYPE RATING means the holder is qualified to issue a certificate of release to service for such aircraft from the date of endorsement with a valid authorization issued by approved maintenance organization.

c) Holder of this licence shall not exercise the privileges of the licence and related ratings at any time when he/she is aware of any decrease in medical fitness which might render him/her unable to safely and properly exercise these privileges.

d) This licence is not valid unless it bears the signature of the holder.

e) This licence remains current till the valid date specified at section XIV whilst in compliance with the Aircraft Rule 61 and CAR 66 unless previously suspended or revoked.

f) This licence when endorsed with an aircraft type rating meets the intent of ICAO Annex 1.

g) Entry, endorsement or alteration in the licence shall be made by person authorized for this purpose by the Director General.

h) Limitations (if any) specified at section XIII are the exclusions from the certification privileges.

MODULES 11L — AIRSHIPS HOT AIR/GAS	
11L.1 Basic principles and assembly of small airships – Envelope, ballonnets; – 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	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; – Testing and maintenance requirements.	2
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 appliedin the wrong sense or incorrect unit conversions: they must not be mere randomnumbers;

(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 whichis 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 module shall be as follows:

Module	No of Questions	Time Allowed (minutes)
2L-Human factors	8	10
3L-Aviation legislation	24	30
4L- Airframe wooden/metal tube and fabric	32	40
5L-Airframe composite	32	40
6L-Airframe metal	32	40
7L-Airframe general	64	80
8L-Power plant	48	60
9L-Balloon/Airship hot air	36	45
10L-Balloon/Airship gas (free/tethered)	40	50
11L-Airships hot air/gas	36	45
12-Radio Com/ELT/transponder/instruments	16	20

Appendix I

AIRCRAFT TYPE RATINGS
FOR CAR-66 AIRCRAFT MAINTENANCE ENGINEER'S LICENCE

(Published Separately on DGCA Website)

Appendix II to AMC to CAR-66

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) Aeroplanes

I Time limits/Maintenance checks (ATA 05)

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

II Dimensions/Areas(ATA 06)

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

III Lifting and Shoring(ATA 07)

Assist in :

a. Jack aircraft nose or tail wheel.
b. Jack complete aircraft.
c. Sling or trestle major component.

IV Leveling /Weighing (ATA 08)

a. Level aircraft.
b. Weigh aircraft.
c. Prepare weight and balance amendment.
d. Check aircraft against equipment list.

V Towing and Taxing (ATA 09)

a. Prepare for aircraft towing
b. Tow aircraft
c. Be part of aircraft towing team.

VI Parking and mooring (ATA 10)

a. Tie down aircraft.
b. Park, secure and cover aircraft.
c. Position aircraft in dock.
d. Secure rotor blades.

VII Placards and Marking (ATA11)

a. Check aircraft for correct placards.
b. Check aircraft for correct markings.

VII Servicing (ATA 12)

a. Refuel aircraft.
b. Defuel aircraft
c. Carry out tank to tank fuel transfer
d. Check / adjust tire pressures.
e. Check / replenish oil level.
f. Check/ replenish hydraulic fluid level.
g. Check/ replenish accumulator pressure.
h. Charge pneumatic system.
i. Grease aircraft.
j. Connect ground power.
k. Service toilet/water system
l. Perform pre-flight/daily check

IX Vibration and Noise Analysis (ATA 18)

a. Analyze helicopter vibration problem.
b. Analyze noise spectrum.
c. Analyse engine vibration.

X Air Conditioning (ATA 21)

a. Replace combustion heater.
b. Replace flow control valve.
c. Replace outflow valve.

d. Replace safety valve.
e. Replace vapour cycle unit.
f. Replace air cycle unit.
g. Replace cabin blower.
h. Replace heat exchanger.
i. Replace pressurization controller.
j. Clean outflow valves.
k. Deactivate/reactivate cargo isolation valve.
l. Deactivate/reactivate avionics ventilation components
m. Check operation of air conditioning/heating system
n. Check operation of pressurizationsystem
o. Troubleshoot faulty system

XI Auto flight (ATA 22)

a. Install servos.
b. Rig bridle cables
c. Replace controller. Replace amplifier.
d. Replacement of the auto flight system LRUs in case of fly- by - wireaircraft
e. Check operation of auto-pilot.
f. Check operation of auto-throttle /auto thrust.
g. Check operation of yaw damper.
h. Check and adjust servo clutch.
i. Perform autopilot gain adjustments.
j. Perform mach trim functional check.
k. Troubleshoot faulty system.
l. Check auto land system
m. Check flight management systems
n. Check stability augmentation system

XII Communications (ATA 23)

a. Replace VHF com unit.
b. Replace HF com unit.
c. Replace existing antenna.
d. Replace static discharge wicks.
e. Check operation of radios.
f. Perform antenna VSWR check.
g. Perform Selcal operational check.
h. Perform operational check of passenger address system.
i. Functionally check audio integratingsystem.
j. Repair co-axial cable.
k. Troubleshoot faulty system
l. Check SATCOM

XIII Electrical Power (ATA 24)

a. Charge lead/acid battery.
b. Charge Ni-Cd battery.
c. Check battery capacity.
d. Deep-cycle Ni-Cd battery.
e. Replace Integrated drive/generator/alternator.
f. Replace switches.
g. Replace circuit breakers.
h. Adjust voltage regulator.
i. Amend electrical load analysisreport.
j. Repair/replace electrical feedercable.
k. Perform functional check of IDG /Generator / Alternator
l. Perform functional check of voltageregulator.
m. Perform functional check of emergency generation system.
n. Troubleshoot faulty system

XIV **Equipment/Furnishings (ATA 25)**

a. Replace carpets
b. Replace crew seats.
c. Replace passenger seats.
d. Check inertia reels.
e. Check seats/belts for security.
f. Check emergency equipment.
g. Check ELT for compliance withregulations.
h. Repair toilet waste container.
i. Repair upholstery.
j. Change cabin configuration.
k. Replace escape slides/ropes
l. Replace cargo loading systemactuator.
m. Test cargo loading system

XV Fire protection (ATA 26)

a. Check fire bottle contents.
b. Check / test operation of fire /smoke detection and warning system.
c. Check cabin fire extinguishercontents.
d. Check lavatory smoke detectorsystem.
e. Check cargo panel sealing.
f. Install new fire bottle.
g. Replace fire bottle squib.
h. Troubleshoot faulty system.
i. Inspect engine fire wire detectionsystems.

XVI Flight Controls (ATA 27)

a. Inspect primary flight controls and related components i.a.w. AMM.
b. Extending/retracting flaps & slats.
c. Replace horizontal stabilizer.
d. Replace spoiler/lift damper.
e. Replace elevator.
f. Deactivation/reactivation of aileron servo control.
g. Replace aileron.
h. Replace rudder.
i. Replace trim tabs.
j. Install control cable and fittings.
k. Replace slats.
l. Replace flaps.
m. Replace powered flying control unit.
n. Replace flap actuator
o. Adjust trim tab.
p. Adjust control cable tension.
q. Check control range and direction ofmovement.
r. Check for correct assembly and locking.
s. Troubleshoot faulty system.
t. Functional test of primary flight controls.
u. Functional test of flap system.
v. Operational test of the side stick assembly.
w. Operational test of the THS.
x. THS system wear check.

XVII Fuel (ATA 28)

a. Water drain system (operation).
b. Replace booster pump.
c. Replace fuel selector.
d. Replace fuel tank cells.
e. Replace/test fuel control valves.
f. Replace magnetic fuel level indicators.
g. Replace water drain valve.
h. Check filters.
i. Flow check system.
j. Check calibration of fuel quantity gauges.
k. Check operation feed/selectors
l. Check operation of fuel dump/jettison system.
m. Fuel transfer between tanks.
n. Pressure defuel. Pressure refuel(manual control).
o. Troubleshoot faulty system.

XVIII Hydraulics (ATA 29)

a. Replace engine driven pump.
b. Check/replace case drain filter.
c. Replace hydraulic motorpump/generator.
d. Replace standby pump.
e. Replace accumulator.
f. Check operation of shut off valve.
g. Check filters / Clog indicators.
h. Check indicating systems.
i. Perform functional checks.
j. Pressurisation/depressurisation ofthe hydraulic system.
k. Power Transfer Unit (PTU)operation
l. Replacement of PTU.
m. Troubleshoot faulty system.

XIX Ice and rain protection (ATA 30) Replace pump.

a. Replace timer.
b. Inspect repair propeller deice boot.
c. Test propeller de-icing system.
d. Inspect/test wing leading edge de- icer boot.
e. Replace anti-ice/deice valve.
f. Install wiper motor.
g. Check operation of systems.
h. Operational test of the pitot-probe ice protection.
i. Operational test of the TAT ice protection.
j. Operational test of the wing ice protection system.
k. Assistance to the operational test of the engine air-intake ice protection (with engines operating)
l. Troubleshoot faulty system.

XX Indicating/recording systems (ATA 31)

a. Replace flight data recorder.
b. Replace cockpit voice recorder.
c. Replace clock.
d. Replace master caution unit.
e. Replace FDR.
f. Perform FDR data retrieval.
g. Troubleshoot faulty system.
h. Implement ESDS procedures
i. Inspect for HIRF requirements
j. Start/stop EIS procedure.
k. Bite test of the CFDIU.
l. Ground scanning of the central warning system.

XXI Landing Gear (ATA 32)

a. Build up wheel.
b. Replace main wheel.
c. Replace nose wheel.
d. Replace steering actuator.
e. Replace truck tilt actuator.
f. Replace gear retraction actuator.
g. Replace uplock/downlock assembly.
h. Replace shimmy damper.
i. Rig nose wheel steering.
j. Replace shock strut seals.
k. Servicing of shock strut.
l. Replace brake unit.
m. Replace brake control valve.
n. Bleed brakes.
o. Replace brake fan.
p. Test anti-skid unit.
q. Test gear retraction.
r. Change bungees.
s. Adjust micro switches/sensors.
t. Charge struts with oil and air.
u. Troubleshoot faulty system.
v. Test auto-brake system.
w. Replace rotorcraft skids.
x. Replace rotorcraft skid shoes.
y. Pack and check floats.
z. Flotation equipment.
aa. Check/test emergency blowdown (emergency landing gear extension).
bb. Operational test of the landing gear doors.

XXII Lights (ATA 33)

a. Repair/replace rotating beacon.
b. Repair/replace landing lights.
c. Repair/replace navigation lights.
d. Repair/replace interior lights.
e. Replace ice inspection lights.
f. Repair/replace logo lights.
g. Repair/replace emergency lighting system.
h. Perform emergency lighting system checks.
i. Troubleshoot faulty system

Instruments

a. Troubleshoot faulty system.
b. Calibrate magnetic direction indicator.
c. Replace airspeed indicator.
d. Replace altimeter.
e. Replace air-data computer.
f. Replace ADI.
g. Replace HSI.
h. Check pitot static system for leaks.
i. Check operation of directional gyro.
j. Check calibration of pitot static instruments.
k. Compass replacement direct/indirect.
l. Functional check flight director system

Surveillance

a. Troubleshoot faulty system.
b. Functional check weather radar.
c. Functional check doppler.
d. Functional check TCAS.
e. Functional check ATC transponder.
f. Check calibration of pressure altitude

reporting system.

XXIII Navigation (ATA 34)

a. Functional check inertial navigation system.
b. Complete quadrantal error correction of ADF system.
c. Check GPS.
d. Test AVM.
e. Check marker systems.
f. Functional check DME.

XXIV Oxygen (ATA 35)

a. Inspect on board oxygen equipment.
b. Purge and recharge oxygen system.
c. Replace regulator.
d. Replace oxygen generator.
e. Test crew oxygen system.
f. Perform auto oxygen system deployment check.
g. Troubleshoot faulty system.

XXV Pneumatic systems (ATA 36)

a. Replace filter.
b. Replace air shut off valve.
c. Replace pressure regulating valve.
d. Replace compressor.
e. Recharge dessicators.
f. Adjust regulator.
g. Check for leaks.
h. Troubleshoot faulty system.

XXVI Vacuum systems (ATA 37)

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

XXVII Water/Waste (ATA 38)

a. Replace water pump.
b. Replace tap.
c. Replace toilet pump.
d. Perform water heater functional check.
e. Troubleshoot faulty system.
f. Inspect waste bin flap closure.

XXVIII Central Maintenance System (ATA 45)

a. Retrieve data from CMU.
b. Replace CMU.
c. Perform Bite check.
d. Troubleshoot faulty system.

XXIX Airborne Auxiliary power (ATA 49)

a. Removal /Installation of APU.
b. Removal/installation of the inlet guide-vane actuator.
c. Operational test of the APU emergency shut-down test.
d. Operational test of APU.

XXX Structures (ATA 51)

a. Assessment of damage.

a. Sheet metal repair.
b. Fibre glass repair.
c. Wooden repair.

b. Fabric repair (ATA 51)

a. Recover fabric control surface.
b. Treat corrosion.
c. Apply protective treatment.

XXXI Doors (ATA 52)

a. Inspect passenger door i.a.w. AMM.
b. Rig/adjust locking mechanism.
c. Adjust air stair system.
d. Check operation of emergency exits.
e. Test door warning system.
f. Troubleshoot faulty system.
g. Remove and install passenger door i.a.w. AMM.
h. Remove and install emergency exit i.a.w. AMM.
i. Inspect cargo door i.a.w. AMM.

XXXII Windows (ATA 56)

a. Replace windshield.
b. Replace direct vision window.
c. Replace cabin window
d. Repair transparency.

XXXIII Wings (ATA 57)

a. Skin repair.
b. Recover fabric wing.
c. Replace tip.
d. Replace rib.
e. Replace integral fuel tank panel.
f. Check incidence/rig.

XXXIV Propeller (ATA 61)

a. Assemble prop after transportation.
b. Replace propeller.
c. Replace governor.
d. Adjust governor.
e. Perform static functional checks.
f. Check operation during ground run.
g. Check track.
h. Check setting of micro switches.
i. Dress out blade damage.
j. Dynamically balance prop.
k. Troubleshoot faulty system.

XXXV Main Rotors (ATA 62)

a. Replace blades.
b. Replace damper assembly.
c. Check track.
d. Check static balance.
e. Check dynamic balance.
f. Troubleshoot.

XXXVI Rotor Drive (ATA 63)

a. Replace mast.
b. Replace drive coupling.
c. Replace clutch/freewheel unit
d. Replace drive belt.
e. Install main gearbox.
f. Overhaul main gearbox.
g. Check gearbox chip detectors.

XXXVII Tail Rotors (ATA 64)

a. Install rotor assembly.
b. Replace blades.
c. Troubleshoot.

XXXVIII Tail Rotor Drive (ATA 65)

a. Replace bevel gearbox.
b. Replace universal joints.
c. Overhaul bevel gearbox.
d. Install drive assembly.
e. Check chip detectors.
f. Check/install bearings and hangers.
g. Check/service/assemble flexiblecouplings.
h. Check alignment of drive shafts.
i. Install and rig drive shafts.

XXXIX Rotorcraft flight controls (ATA 67)

a. Install swash plate.
b. Install mixing box.
c. Adjust pitch links.
d. Rig collective system.
e. Rig cyclic system.
f. Rig anti-torque system.
g. Check controls for assembly and locking.
h. Check controls for operation and sense.
i. Troubleshoot faulty system.

XL Power Plant (ATA 71)

a. Build up ECU.
b. Replace engine.
c. Repair cooling baffles.
d. Repair cowling.
e. Adjust cowl flaps.
f. Repair faulty wiring.
g. Troubleshoot.
h. Assist in dry motoring check.
i. Assist in wet motoring check.
j. Assist in engine start (manual mode).

XLI Piston Engines (ATA 72)

a. Remove/install reduction gear.
b. Check crankshaft run-out.
c. Check tappet clearance.
d. Check compression.
e. Extract broken stud.
f. Install helicoil.
g. Perform ground run.
h. Establish/check reference RPM.
i. Troubleshoot.

XLII Turbine Engines (ATA 72)

a. Replace module.
b. Replace fan blade.
c. Hot section inspection/borescope check.
d. Carry out engine/compressor wash.
e. Carry out engine dry cycle.
f. Engine ground run.
g. Establish reference power.
h. Trend monitoring/gas path analysis.
i. Troubleshoot.

XLIII Fuel and control, piston (ATA 73)

a. Replace engine driven pump.
b. Adjust AMC.
c. Adjust ABC.
d. Install carburetor/injector.
e. Adjust carburetor/injector.
f. Clean injector nozzles.
g. Replace primer line.
h. Check carburetor float setting.

XLIV Fuel and control, turbine (ATA 73)

a. Replace FCU.
b. Replace engine electronic controlunit (FADEC).
c. Replace fuel metering unit (FADEC).
d. Replace engine driven pump.
e. Clean/test fuel nozzles.
f. Clean/replace filters.
g. Adjust FCU.
h. Troubleshoot faulty system.
i. Functional test of FADEC.

XLV Ignition systems, piston (ATA 74)

a. Change magneto.
b. Change ignition vibrator.
c. Change plugs.
d. Test plugs.
e. Check H.T. leads.
f. Install new leads.
g. Check timing.
h. Check system bonding.
i. Troubleshoot faulty system.

XLVI Ignition systems, turbine (ATA 74)

a. Perform functional test of theignition system.
b. Check glow plugs/ ignitors.
c. Check H.T. leads.
d. Check ignition unit.
e. Replace ignition unit.
f. Troubleshoot faulty system.

XLVII Engine Controls(ATA 76)

a. Rig thrust lever.
b. Rig RPM control.
c. Rig mixture HP cock lever.
d. Rig power lever.
e. Check control sync (multi-eng).
f. Check controls for correct assemblyand locking.
g. Check controls for range anddirection of movement.
h. Adjust pedestal micro-switches.
i. Troubleshoot faulty system.

XLVIII Engine Indicating (ATA 77)

a. Replace engine instruments(s).
b. Replace oil temperature bulb.
c. Replace thermocouples.
d. Check calibration.
e. Troubleshoot faulty system.

XLIX Exhaust, piston (ATA 78)

a. Replace exhaust gasket.
b. Inspect welded repair.
c. Pressure check cabin heater muff.
Troubleshoot faulty system.

L Exhaust, turbine (ATA 78)

a. Change jet pipe.
b. Change shroud assembly.
c. Install trimmers.
d. Inspect/replace thrust reverser.
e. Replace thrust reverser component.
f. Deactivate/reactivate thrust reverser.
g. Operational test of the thrust reverser system.

LI Oil (ATA 79)

a. Change oil.
b. Check filter(s).
c. Adjust pressure relief valve.
d. Replace oil tank.
e. Replace oil pump.
f. Replace oil cooler.
g. Replace firewall shut off valve.
h. Perform oil dilution.
i. Troubleshoot faulty system.

LII Starting (ATA 80)

a. Replace starter.
b. Replace start relay.
c. Replace start control valve.
d. Check cranking speed.
e. Troubleshoot faulty system.

LIII Turbines, piston engines (ATA 70)

a. Replace PRT.
b. Replace turbo-blower.
c. Replace heat shields.
d. Replace waste gate.
e. Adjust density controller.

LIV Engine water injection (ATA 82)

a. Replace water/methanol pump.
b. Flow check water/methanol system.
c. Adjust water/methanol control unit.
d. Check fluid for quality.
e. Troubleshoot faulty system

LV Accessory gear boxes (ATA 83)

a. Replace gearbox.
b. Replace drive shaft.
c. Check Chip detector

B. SPECIFIC TASKS FOR SAILPLANES AND POWERED SAILPLANES

General activities	
Placards check or replace	x
Weighing, weight & balance sheet	x
Documentation of annual inspection, repair	x
Review records for compliance with airworthiness directives	x
Five annual inspections	x
Inspection after an occurrence	x
Dismantling/reinstallation of wings and empennages	x
Leveling and weighing	
Level the sailplane	x
Weighing, weight & balance sheet	x
Prepare a weight and balance amendment	x
Check the list of equipment	x
Flight controls and flight control systems	
Aileron, flaps: Removal — Balancing — Reinstallation	x
Elevator: Removal — Balancing — Reinstallation	x
Rudder: Removal — Balancing — Reinstallation	x
Rudder cable: Fabrication and installation	x
Elevator pushrod: Installation	x
Safeguarding of pins, screws, castellated nuts	x
Sealing of gaps	x
Electrical systems	
Electrical components, wiring: Removal — Installation	x
Batteries — Servicing	x
Avionics systems	
COM: Removal — Installation	x
NAV: Removal — Installation	x
XPDR: Removal — Installation	x
Antenna/antenna cable: Removal — Installation	x
Cabin equipment/systems	
Belts/safety harnesses: Removal — Installation	x
Oxygen system removal installation — Test	x
Canopy replacement or repair	x
Pitot/static system: Removal — Installation — Test	x
Flight instruments: Removal — Installation	x
Installation of approved equipment	x
Compass: Installation — Compensation	x
Tow release: Removal — Installation	x

Water ballast system: Removal — Installation — Test	x
Undercarriage: Removal — Installation	x
Brake system: Replacement of components	x
Fuel — Engine — Propeller — Engine — Instruments	x
Refer to the tasks related to propeller, piston engine, fuel and control, ignition, engine indications and exhaust, which are contained in Table A 'Specific tasks for aeroplanes'	
Verification and adjustment of folding system of powered sailplanes	x
Wooden structures/Metal tubes and fabric	
Inspection/testing for damages	x
Rib structure repair	x
Plywood skin repair	x
Recover or repair structure with fabric	x
Protective coating and finishing	x
Install patch on fabric material	x
Repair of fairings	x
Composite structures	
Laminate repair	x
Sandwich structure repair	x
Partial gel coat repair	x
Complete gel coating	x
Repair of fairings	x
Metal structures	
Crack testing	x
Repair of covering	x
Drilling cracks	x
Riveting jobs	x
Bonding of structures	x
Anti-corrosion treatment	x
Repair of fairings	x

C. SPECIFIC TASKS FOR BALLOONS AND AIRSHIPS

	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
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
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
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:					
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
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 to AMC of CAR-66

Evaluation of the competence: assessment and assessors

This Appendix applies to the competence assessment performed by the designatedassessors (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 majorfactors 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 sufficient knowledge to perform the required tasks.

"Attitude" is indivisible from the "skill" as this greatly contributes to the safeperformance of the tasks.

The evaluation of the competence should be based on the learning objectives of thetraining, in particular:

- the (observable) desired performance. This covers what the trainee is expected to beable 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 thetrainee'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. Conditionsconsist of the training methods, the environmental, situational and regulatory factors.

The assessment should focus on the competencies relevant to the aircraft type and itsmaintenance including, but not limited to:

- Environmental awareness (act safely, apply safety precautions and preventdangerous situations);

- Systems integration (demonstrate understanding of aircraft systems interaction,identify, describe, explain, plan, execute);

- Knowledge and understanding of areas requiring special emphasis or novelty (areaspeculiar to the aircraft type, domains not covered by CAR 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 reords /logbooks).

2) How to assess

As far as feasible, the objectives of the assessment should be associated with the learningobjectives and the passing level; it means that observable criteria should be set tomeasure the performance and should remain as objective as possible.

The general characteristics of effective assessment are: objective, flexible, acceptable, comprehensive, constructive, organized 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 theassessment:

- What are the success factors for the job?
- What are typical characteristics of a correct behavior 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:o "Go-no go" situation;
  - o How to allocate points? Minimum amount to succeed;
  - o "Must know or execute" versus "Good to know or execute" versus "Don't expectthe candidate to be an expert".
- Minimum or maximum time to achieve? Use time effectively and efficiently.
- What if the trainee fails? How many times is the trainee allowed to fail?
- When and how should the trainee be prepared for the assessment?
- What proportion of judgment by the instructor out of collaboration with the traineeis needed during the evaluation stage?

The assessment may be:

- diagnostic (prior to a course), formative (reorientate the course on areas where thereis 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/ herself, then discussing areas where the perceptions of the trainee's performance by theassessors differ in

order to:

- develop the self-assessment habits;
- make the assessment more acceptable and understandable to both parties.

A "box-ticking" exercise would be pointless. Experience has shown that assessment sheets have largely evolved over time into assessment of groups of "skills" because in practice such things eventually detracted from the training and assessment that it was intended to serve: evaluate at a point of time, encourage and orientate the training needs, improve safety and ultimately qualify people for their duties.

In addition, many other aspects should be appropriately considered during the assessment process such as stress and environmental conditions, difficulty of the test, history of evaluation (such as tangible progresses or sudden and unexpected poor performance made by the trainee), amount of time necessary to build competence, etc.

All these reasons place more emphasis on the assessor and highlight the function of the organisation's approval.

3) Who should assess

In order to qualify, the assessor should:

- Be proficient and have sufficient experience or knowledge in:
  - human performance and safety culture;
  - the aircraft type (necessary to have the certifying staff privileges in case of CRS issuances);
  - training/coaching/testing skills;
  - instructional tools to use;
- Understand the objective and the content of the practical elements of the training that is being assessed;
- Have interpersonal skills to manage the assessment process (professionalism, sincerity objectivity and neutrality, analysis skills, sense of judgment, 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.);
- Designated assessor is required to be nominated by the AMO and shall be authorised by DGCA.

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 with each role are clearly understood and that the competence and qualification criteria according to the approved manuals (MTOE/MOE) are met for both functions. Whenever possible (depending on the size of the organisation), it is recommended to split the roles (two different persons) in order to avoid any conflicts of interests.

When the functions are not combined, the role of each function should be clearly understood.

Appendix IV to AMC of CAR- 66. A. 45(d)

Fuel Tank Safety training

This appendix includes general instructions for providing training on Fuel Tank Safetyissues.

1. Level of training required by this Annex is only level 2.

Level 2 Detailed training

Objectives: The attendant should, after the completion of the training:

1. know the history and the theoretical and practical elements of the subject, have an overview of Special Federal Aviation Regulations (SFARs) from 14 CFR SFAR 88 of theFAA and of JAA TGL 47, be able to give a detailed description of the concept of CDCCL, Airworthiness Limitations Items (ALI) and using theoretical fundamentals and specificexamples,
2. have the capacity to combine and apply the separate elements of knowledge in a logical and comprehensive manner.
3. have detailed information on how the above items affect the aircraft in the scope of theactivity of the organisation or in the fleet.
4. understand and carry out activities with the use of manufacturer and regulatory authority data providing instructions on design and maintenance, such as Service Bulletins, Airworthiness Directives, Aircraft Maintenance Manual, Component Maintenance Manual etc.
5. use easily the manufacturer's documentation from various sources and apply corrective action where appropriate.
6. identify the components or parts or the aircraft subject to FTS from the manufacturer's documentation, plan the action or apply a Service Bulletin and an Airworthiness Directive.

Continuing training

The interval between continuing training shall be established by the organisation employing such personnel, but should not exceed two years. The continuing training shallinclude knowledge on evolution of material, tools, documentation and manufacturer's orDGCA directives.

2. The personnel directly involved in Fuel Tank Safety (FTS) systems shall be qualified according to the following table:

Organisation	**Personnel**	**Level of knowledge**	**Continuing training**
CAR-66 licence holders in a continuing airworthiness management organisation	The airworthinessreview staff as required by M.A.707.	2	Yes
CAR-66 licence holders in aircraft and component maintenance organisations	Maintenance organisation supportand certifying staff	2	Yes

3. General requirements

The training for the personnel designated in table above has to be carried out before anyairworthiness review certificate is issued or any maintenance task is certified on an aircraft or a component.

The training should be made in appropriate facilities containing examples of components,systems and parts affected by FTS issues and having access to aircraft or component where typical examples of FTS issues can be shown. The use of pictures, films and practical examples of the maintenance on fuel tank system is recommended. The trainingshall include a representative number of repair and inspections as required by the maintenance programme showing the necessity of using the manufacturer's data.

4. Characteristics of the training

The following characteristics shall be taken into consideration when the level 2 training programme are being established:

(a) understanding of the background and concepts of fuel tank safety as developed during the last 10 years, and

(b) how in maintenance organisations mechanics can recognize, interpret and handle the improvements that have been made or are being made during fuel tank system maintenance,

(c) awareness of any hazards working on the Fuel System, and especially with a Flammability Reduction System using nitrogen.

a), b) and c) should be introduced in the training programme addressing the following issues:

i) The theoretical background behind the fuel tank safety: the explosions of mixtures of fuel and air, the behavior of those mixtures in an aviation environment, the effectsof temperature and pressure, energy needed for ignition etc, the 'fire triangle', - Explain 2 concepts to prevent explosions: (1) ignition source prevention and (2) flammability reduction,

ii) The major accidents and accident investigations and their conclusions,

iii) SFARs from 14 CFR SFAR 88 of the FAA and JAA Internal Policy INT POL 25/12: reason of these documents, and what was the ultimate goal, margins of fuel system safety improvements (from 10-6 to 10-9, in fact improvement by a factor 100- 1000,to identify unsafe conditions and to correct them, to systematically improve fuel tank maintenance),

iv) Explain the concepts that are being used: the results of SFAR 88 of the FAA and JAAINT/POL 25/12: modifications, airworthiness limitations and CDCCL,

v) Where relevant information can be found by the mechanics and how to use and interpret this information (maintenance manuals, component maintenance manuals)

vi) Fuel Tank Safety and Maintenance: fuel tank entry and exit procedures, clean working environment, what is meant by configuration control, wire separation, bonding of components etc,

vii) Flammability reduction systems: reason for their presence, their effects, the hazards of an FRS using nitrogen for maintenance, safety precautions in maintenance/working with an FRS,

viii) Recording maintenance actions, recording measures and results of inspections.

DGCA application forms for licenses and examinations

Form No	Description
CA Form 19-01	Application for Initial Issue of CAR- 66 Aircraft Maintenance Engineer'sLicence
CA Form 19-02	Application for extension of CAR- 66 aircraft maintenance engineer'slicence
CA Form 19-03	Application for renewal of CAR- 66 aircraft maintenance engineer'slicence
CA Form 19-04	Application for conversion/removal of limitations of CAR- 66 aircraftmaintenance engineer's licence
CA Form 19-05	Application for issue of duplicate CAR- 66 aircraft maintenance engineer's licence
CA Form 19-06	Medical certificate
CA Form 19-07	Application for allotment of computer number for appearing in AMElicence examinations
CA Form 19-08A	Application for appearing in written paper(s) of CAR 66 basic knowledgeexamination
CA Form 19-08B	*Application for appearing in CAR 66 type examination*
CA Form 19-09	Application for appearing in skill test of CAR-66 AME licence
CA Form 19-10	Format of aircraft maintenance engineer work record / log book

Note: The requirements/ contents of the above forms have been incorporated/ captured in the respective eGCA service.

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