سلامة الطيران
AVIATION SAFETY

الهيئة العامة للطيران المدني
Civil Aviation Authority
State of Kuwait | دولة الكويت

2026/04/14

2026/051/SUPDT-R/41

**All KCASR Stakeholders and Users**

*Sub.:* ***Regulatory Circular No. 2026-02.***
***Revision Number 06 to Kuwait Civil Aviation Safety Regulations – KCASR 1 – PERSONNEL LICENSINGPART 66 – AIRCRAFT MAINTENANCE ENGINEER LICENCE.***

Dear Sir,

Please find enclosed herewith the regulatory circular No. ***2026-02*** regarding the issuance of ***KCASR 1 – PERSONNEL LICENSINGPART 66 – AIRCRAFT MAINTENANCE ENGINEER LICENCE Rev. 06.*** This is for your information and distribution to all concerned departments.

Up to date KCASR Parts are published on the DGCA/ASD website (https://kcasr.dgca.gov.kw).

If required, the DGCA/Aviation Safety Department personnel are available to answer your questions on the interpretation and intended implementation of the proposed amendments.

***KCASR 1 – PERSONNEL LICENSINGPART 66 – AIRCRAFT MAINTENANCE ENGINEER LICENCE Rev. 06*** will be in effect from 31/May/2026.

Yours Sincerely,

**President of Civil Aviation.**

**Abdullah F. Alrajhi**
Acting / Deputy Director General
for Aviation Safety, Air Transport & Aviation Security

CC: Director General of Civil Aviation.
Dy. Dir. Gen. Kuwait. Intel. Airport Affairs.
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Safety Management Coordination Center (SMCC).
Head of Technical Office.
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Air Transport Director.
Legal Department

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2026/04/14

2026/050/SUPDT-R/41

# REGULATORY CIRCULAR (NO. 2026-02)

**Subject:**

**Notice of Amendment to Kuwait Civil Aviation Safety Regulations KCASR (issue 4).**

**Purpose:**

The purpose of this Regulatory Circular No. **2026-02** is to Amend **KCASR 1 – PERSONNEL LICENSINGPART 66 – AIRCRAFT MAINTENANCE ENGINEER LICENCE** (issue 4) to comply with DGCA requirements.

This Regulatory Circular No.**2026-02** is based on (NPA) No. 2026-01 dated 05/Jan/2026

**Revisions**:

This amendment will be included in the revision (**06**) of KCASR 1 – PERSONNEL LICENSINGPART 66 – AIRCRAFT MAINTENANCE ENGINEER LICENCE.

**Regulatory Requirements:**

This amendment shall apply to the following Organizations approved by the Directorate General of Civil Aviation (DGCA) or authorised to operate within the State of Kuwait:

1. Airport Operators;
2. Air Navigation Service Providers;
3. Air Operator Certificate (AOC);
4. Approved Maintenance Organizations (AMO) Holders;
5. Ground Handling Service Providers;
6. Training Organizations;
7. All users of KCASRs.

**Effective Date:**

This new revision will be in effect from **31/May/2026**.

**Required Action:**

All users of KCASR must comply with the provisions of this amendment from the effective date.

President of Civil Aviation

Abdullah F. Alrajhi
Acting / Deputy Director General
for Aviation Safety, Air Transport & Aviation Security




# Kuwait Civil Aviation Safety Regulations

## KCASR 1 – PERSONNEL LICENSING

## *PART 66 –*

## *AIRCRAFT MAINTENANCE ENGINEER LICENCE*

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# Amendment Record

| Amendment No | Date of Issue | Remarks |
|---|---|---|
| 1 | March 2018 | NSRA 2018-01 Implemented |
| 2 | April 2018 | NPA 2018-18 addition of appendix VII, and Part Rename |
| 3 | April 2026 | NPA 2018-47 Implemented – Rev 2 |
| 4 | April 2019 | NPA 2019-02 Foreign Licences |
| 5 | Aug 2021 | NPA 2021-14 |
| 6 | April 2026 | NPA 2026-01 – In order to be synchronised with EASA (989/2023) |
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# Control of this Document

## DC.1 Introduction

DC.1.1 Pursuant to Law No (85) of the year 2025, (30) of the year 1960 and subsequent Ministerial Decision No (18) of the year 1996, based upon that Law, the President of the Kuwait Directorate General of Civil Aviation is empowered to adopt and amend Kuwait Civil Aviation Safety Regulations. In accordance herewith, the following Regulation is hereby established for compliance by all persons concerned. This regulation shall be known as KCASR 1 - Part 66 Aircraft Maintenance Engineer Licence and any reference to this title shall mean referring to these regulations governing the basic requirements to be met for civil aviation in the State of Kuwait.

## DC.2 Authority for this Regulation

DC.2.1 This KCASR 1 - Part 66 Aircraft Maintenance Engineer Licence is issued on the authority of the President of the Kuwait Directorate General of Civil Aviation.

## DC.3 Applicability

DC.3.1 This KCASR 1 - Part 66 Aircraft Maintenance Engineer Licence is applicable to the aviation industry of the State of Kuwait.

## DC.4 Scope

DC.4.1 KCASR Part 1 - Personnel Licensing contains the personnel licensing regulations of the State of Kuwait, and shows compliance with ICAO Annex 1. The regulations in KCASR 1 - are separated into the following parts with cross references between parts where applicable.

- Part ARA Authority Requirements for Aircrew
- Part ORA Organisational Requirements for Aircrew
- Part FCL Flight Crew Licensing
- Part CC Cabin Crew
- Part FOO/FD Flight Operation Officer and Flight Dispatcher
- Part MED Medical
- **Part 66 Aircraft Maintenance Engineer Licence**
- Part 147 Approved Training Organisations
- Part ATCO Air Traffic Control Officer

## DC.5 Definitions

DC.5.1 Terms not defined shall have the meaning given to them in the relevant legal instruments or international legal instruments in which they appear, especially as they appear in the Convention and its Annexes.

66.1 Competent Authority

(a) For the purpose of this KCASR 1 - Part 66, the competent authority shall be:

(1) The Kuwait DGCA to whom a person first applies for the issuance of an aircraft maintenance licence.

(b) The Kuwait DGCA shall be responsible for defining:

(1) the list of aircraft types; and

(2) what airframe/engine combinations are included in each particular aircraft type rating.

# Subpart A - Aircraft Maintenance Licence

**Section A- Technical Requirements**

## 66.A.1 Scope

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

## 66.A.3 Licence Categories

(a) Aircraft maintenance licences include the following categories:

- Category A
- Category B1
- Category B2
- Category B3
- Category C

(b) Categories A and B1 are subdivided into subcategories relative to combinations of aeroplanes, helicopters, turbine and piston engines. These subcategories are:

- A1 and B1.1 Aeroplanes Turbine
- A2 and B1.2 Aeroplanes Piston
- A3 and B1.3 Helicopters Turbine
- A4 and B1.4 Helicopters Piston

(c) Category B2

The B2 licence is applicable to all aircraft.

(d) Category B3 is applicable to piston-engine non-pressurised aeroplanes of 2 000kg MTOM and below

## 66.A.5 Aircraft groups

(a) For the purpose of ratings on aircraft maintenance 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, aircraft equipped with fly-by-wire systems and other aircraft requiring an aircraft type rating when defined so by the Kuwait 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.

## 66.A.10 Application

(a) An application for an aircraft maintenance licence or amendment to such licence shall be made on DGCA Form 19 (see Appendix V) in a manner established by the Kuwait DGCA and submitted thereto.

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

(c) In addition to the documents required in points 66.A.10 (a), 66.A.10 (b) and 66.B.105, as appropriate, the applicant for additional basic categories or subcategories to an aircraft maintenance licence shall submit his/her current original aircraft maintenance licence to the Kuwait DGCA together with the DGCA Form 19.

(d) Reserved

(e) Reserved

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

## 66.A.15 Eligibility

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

## 66.A.20 Privileges

(a) The following privileges shall apply:

(1) A category A aircraft maintenance licence permits the holder to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation referred to in point 145.A.35 of KCASR 8 - Part 145. The certification privileges shall be restricted to work that the licence holder has personally performed in the maintenance organisation that issued the certification authorisation.

(2) A category B1 aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B1 support staff following:

(i) maintenance performed on aircraft structure, powerplant and mechanical and electrical systems,

(ii) work on avionic systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.

category B1 includes the corresponding A subcategory.

(3) A category B2 aircraft maintenance licence shall permit the holder:

(i) to issue certificates of release to service and to act as B2 support staff for following:

(A) maintenance performed on avionic and electrical systems, and

(B) electrical and avionics tasks within powerplant and mechanical systems, requiring only simple tests to prove their serviceability; and

(ii) to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation referred to in point 145.A.35 of KCASR 8 - Part 145 . This certification privilege shall be restricted to work that the licence holder has personally performed in the maintenance organisation which issued the certification authorisation and limited to the ratings already endorsed in the B2 licence.

The category B2 licence does not include any A subcategory.

(4) A category B3 aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B3 support staff for the following:

- maintenance performed on aeroplane structure, power plant and mechanical and electrical systems; and
- work on avionics systems requiring only simple tests to prove their serviceability and not requiring troubleshooting.

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

A Category C aircraft maintenance licence issued with respect to complex motor-powered aircraft shall, upon application by the holder, include the Category C privileges for other-than-complex motor-powered aircraft.

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

(1) In compliance with the applicable requirements of KCASR 8 - Part M and KCASR 8 - Part 145; and

(2) In the preceding 2-year period he/she has, either had 6 months of maintenance experience in accordance with the privileges granted by the aircraft maintenance licence or, met the provision for the issue of the appropriate privileges; and

(3) He/she has the adequate competence to certify maintenance on the corresponding aircraft; and

(4) He/she is able to read, write and communicate to an understandable level in the language(s) in which the technical documentation and procedures necessary to support the issue of the certificate of release to service are written.

## 66.A.25 Basic Knowledge Requirements

(a) An applicant for an aircraft maintenance licence, or the addition of a category or subcategory to such a licence, shall demonstrate by examination a level of knowledge in the related subject modules in accordance with the Appendix I to KCASR 1 Part 66.

(b) The basic knowledge examinations shall comply with the standard set out in Appendix II to this part and shall be conducted either by a training organisation appropriately approved in accordance with KCASR 1 - Part 147 or by the Kuwait DGCA.

(c) The training courses and basic knowledge examinations shall have been passed within 10 years prior to the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence. The 10 years' validity requirement applies to each individual module examination, except for those module examinations which were already passed as part of another licence category and the licence has already been issued.

(d) The holder of an aircraft maintenance licence applying for the addition of a different category or subcategory shall complement by examination the level of knowledge that is appropriate to the related subject modules in accordance with Appendix I to this part.

Appendix VII details the modules of Appendix I required for the addition of a new category or subcategory to an existing licence issued in accordance with this part.

(e) Kuwait DGCA may conduct an oral examination assessment or review with any application for basic licence.

## 66.A.30 Basic Experience Requirements

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

(1) For category A, subcategories B1.2 and B1.4and B3:

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

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

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

(2) For category B2 and subcategories B1.1 and B1.3:

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

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

(iii) 2 years of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with KCASR 1 - Part 147;

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

(i) 3 years of experience exercising category B1.1, B1.3 or B2 privileges as support staff or both support staff and certifying staff, in accordance with point 145.A.35 of KCASR 8 Part-145, at a maintenance organisation working on CMPA, including 12 months experience as base maintenance support staff; or

(ii) 5 years of experience exercising category B1.2 or B1.4 privileges as support staff, or both support staff and certifying staff, in accordance with point 145.A.35 of KCASR 8 Part-145, at a maintenance organisation working on CMPA, including 12 months of experience as base maintenance support staff; or

(iii) for applicants holding an academic degree, 3 years of experience in working at an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance, including 6 months of participation in the performance of base maintenance tasks in operating CMPA;

(iv) to extend the endorsed category C with respect to other than CMPA to CMPA:

(a) 2 years of experience in exercising category B1.1, B1.2, B1.3, B1.4 or B2 privileges as support staff, or both support staff and certifying staff, in accordance with point 145.A.35 of KCASR 8 (Part- 145), at a maintenance organisation in operating CMPA, including 6 months of experience as base maintenance support staff; or

(b) when holding a category C licence based on an academic degree, 2 years of experience in working at an aircraft maintenance environment on a representative selection of tasks that are directly associated with aircraft maintenance, including 3 months of participation in the performance of base maintenance tasks in operating CMPA;

(4) For category C with respect to other than CMPA:

(i) 3 years of experience exercising category B1, B2 or B3 privileges as support staff or both support staff and certifying staff, in accordance withpoint 145.A.35 of KCASR 8 (Part-145) at a maintenance organisation in operating other than CMPA, including 6 months of experience as base maintenance support staff; or

(ii) for holders of an academic degree, 3 years of experience in working at an aircraft maintenance environment, on a representative selection of tasks that are directly associated with aircraft maintenance, including 6 months of participation in the performance of base maintenance tasks in operating other than CMPA; or

(iii) already holding category C with respect to complex motor-powered aircraft (CMPA):

(5) the academic degree shall be in a relevant technical discipline, issued by a university or any other higher educational institution recognised by Kuwait DGCA.
.

(b) An applicant for an extension to an aircraft maintenance licence shall have a minimum civil aircraft maintenance experience requirement appropriate to the additional category or subcategory of licence applied for as defined in Appendix IV to this KCASR 1 Part 66.

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

(d) At least 1 year of the required experience shall be recent maintenance experience on aircraft of the category/ subcategory for which the initial aircraft maintenance licence is sought. For

subsequent category/subcategory additions to an existing aircraft maintenance licence, the additional recent maintenance experience required may be less than 1 year, but shall be at least 3 months.

The required experience shall be dependent upon the difference between the licence category/subcategory held and applied for. Such additional experience shall be typical of the new licence category/subcategory sought.

(e) Notwithstanding point (a), experience in aircraft maintenance gained in organisations not approved in accordance with KCASR 8 (Part-145) may be recognised when such maintenance is equivalent to that required by this Part as established by Kuwait DGCA.

However, demonstration of additional experience in organisations approved in accordance with KCASR 8 or under the supervision of independent certifying staff, shall be required.

(f) Experience shall have been acquired within the 10 years preceding the application for an aircraft maintenance licence or for the addition of a category or subcategory to such a licence.

## 66.A.40 Continued Validity of the Aircraft Maintenance Licence

(a) The aircraft maintenance licence becomes invalid 5 years after its last issue or change, unless the holder submits his/her aircraft maintenance licence to the Kuwait DGCA, in order to verify that the information contained in the licence is the same as that contained in the Kuwait DGCA records, pursuant to point 66.B.120.

(b) The holder of an aircraft maintenance licence shall complete the relevant parts of DGCA Form 19 (see Appendix V) and submit it with the holder's copy of the licence to the Kuwait DGCA, unless the holder works in a maintenance organisation approved in accordance with KCASR 8 - Part 145 that has a procedure in its exposition whereby such organisation may submit the necessary documentation on behalf of the aircraft maintenance licence holder.

(c) Any certification privilege based upon an aircraft maintenance licence becomes invalid as soon as the aircraft maintenance licence is invalid.

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

## 66.A.45 Endorsement with aircraft ratings for aircraft registered in the State of Kuwait

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

(1) For category B1, B2 or C the relevant aircraft ratings are the following:

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

(ii) For group 2 aircraft, the appropriate aircraft type rating, manufacturer sub-group rating or full sub-group rating.

(iii) For group 3 aircraft, the appropriate aircraft type rating or full group rating.

(2) For category B3, the relevant rating is 'piston-engine non-pressurised aeroplanes of 2 000kg and below.

(3) For category A, no rating is required, subject to compliance with the requirements of point 145.A.35 of KCASR 8 - Part 145.

(b) The endorsement of aircraft type ratings requires the satisfactory completion of the relevant category B1, B2 or C aircraft type training.

(c) 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 KCASR 1 Part 66.

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

(1) Satisfactory completion of the relevant category B1, B2 or C aircraft type examination described in Appendix III to this KCASR 1 - Part 66, and

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

In the case of a category C rating for a person qualified by holding an academic degree as specified in point 66.A.30(a)(5), the first relevant aircraft type examination shall be at the category B1 or B2 level.

(e) For group 2 aircraft:

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

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

(3) The endorsement of manufacturer sub-groups and full sub-group ratings for category B2 licence holders requires demonstration of practical experience which shall include a representative cross section of maintenance activities relevant to the licence category and to the applicable aircraft sub-group.

(f) For group 3 aircraft:

(1) The endorsement of the full group 3 rating for category B1, B2 and C 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.

(2) For category B1, unless the applicant provides evidence of appropriate experience, the group 3 rating shall be subject to the following limitations, which shall be endorsed on the licence:

(i) pressurised aeroplanes

(ii) metal structure aeroplanes

(iii) composite structure aeroplanes

(iv) wooden structure aeroplanes

(v) aeroplanes with metal tubing structure covered with fabric.

(g) For the B3 licence:

(1) The endorsement of the rating 'piston-engine non-pressurised aeroplanes of 2000kg MTOM and below' requires demonstration of practical experience which shall include a representative cross-section of maintenance activities relevant to the licence category.

(2) Unless the applicant provides evidence of appropriate experience, the rating referred to in point 1 shall be subject to the following limitations, which shall be endorsed on the licence:

(i) wooden structure aeroplanes.

(ii) aeroplanes with metal tubing structure covered with fabric.

(iii) metal structure aeroplanes

(iv) composite structure aeroplanes

*Note:* Kuwait DGCA may endorse a type rating for an aircraft type not registered in the state of Kuwait, if the employer of the licence holder, being a DGCA KCASR Part-145 approved maintenance organization, has an approval rating to maintain that aircraft type, or in the process of obtaining such an approval rating. Kuwait DGCA reserves the right not to accept any application for type rating as it deems fit.

## 66.A.50 Limitations

(a) Limitations introduced on an aircraft maintenance licence are exclusions from the certification privileges and 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 Kuwait 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 point 66.B.300.

## 66.A.55 Evidence of qualification

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

## 66.A.70 Conversion Provisions

(a) The holder of a certifying staff qualification valid in the State of Kuwait, prior to the date of entry into force of KCASR 1 - Part 66 shall be issued an aircraft maintenance licence by the Kuwait DGCA without further examination subject to the conditions specified in Section B Subpart D.

(b) A person undergoing a certifying staff qualification process prior to the date of entry into force of KCASR 1 Part 66 may continue to be qualified. The holder of a certifying staff qualification gained following such process shall be issued an aircraft maintenance licence by the Kuwait DGCA without further examination subject to the conditions specified in Section B Subpart D.

(c) Where necessary, the aircraft maintenance licence shall contain limitations in accordance with point 66.A.50 to reflect the differences between (i) the scope of the certifying staff qualification valid in the accepted ICAO Member State before the entry into force of this Regulation and (ii) the basic knowledge requirements and the basic examination standards laid down in Appendix I and II to this KCASR 1 - Part 66.

(d) By derogation to paragraph (c) for aircraft not involved in commercial air transport other than large aircraft, the aircraft maintenance licence shall contain limitations in accordance with point 66.A.50 to ensure that the certifying staff privileges valid in the State of Kuwait before the entry into force of this Regulation and the privileges of the converted KCASR 1 - Part 66 Aircraft Maintenance Engineer licence remain the same.

- Refer to appendix VII for further details.

**Section B – Procedures for the Kuwait DGCA**

# Subpart A - General

## 66.B.1 Scope

This section establishes the procedures including the administrative requirements to be followed by the Kuwait DGCA in charge of the implementation and the enforcement of Section A of this KCASR 1 - Part 66.

## 66.B.10 Kuwait DGCA

(a) General

The State of Kuwait shall designate the Kuwait DGCA allocated responsibilities for the issuance, continuation, change, suspension or revocation of aircraft maintenance licences.

This Kuwait DGCA shall establish an adequate organisational structure to ensure compliance with this KCASR 1 - Part 66.

(b) Resources

The Kuwait DGCA shall be appropriately staffed to ensure the implementation of the requirements of this KCASR 1 - Part 66.

(c) Procedures

The Kuwait DGCA shall establish documented procedures detailing how compliance with this KCASR 1 - Part 66 is accomplished. These procedures shall be reviewed and amended to ensure continued compliance.

## 66.B.20 Record-keeping

(a) The Kuwait DGCA shall establish a system of record-keeping that allows adequate traceability of the process to issue, revalidate, change, suspend or revoke each aircraft maintenance licence.

(b) These records shall include for each licence:

(1) The application for an aircraft maintenance licence or change to that licence, including all supporting documentation;

(2) A copy of the aircraft maintenance licence including any changes;

(3) Copies of all relevant correspondence;

(4) Details of any exemption and enforcement actions;

(5) Any report from other competent authorities relating to the aircraft maintenance licence holder;

(6) The records of examinations conducted by the Kuwait DGCA;

(7) The applicable conversion report used for conversion;

(8) The applicable credit report used for crediting.

(c) Records referred to in points (1) to (5) of 66.B.20 (b) shall be kept at least 5 years after the end of the licence validity.

(d) Records referred to in points (6), (7) and (8) of 66.B.20 (b) shall be kept for an unlimited period.

### 66.B.25 Mutual exchange of information

(a) Reserved

(b) Reserved

### 66.B.30 Exemptions

Not applicable.

## Subpart B – Issue of an Aircraft Maintenance Licence

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

### 66.B.100 Procedure for the issue of an Aircraft Maintenance Licence by the Kuwait DGCA

(a) On receipt of DGCA Form 19 and any supporting documentation, the Kuwait DGCA shall verify the DGCA Form 19 for completeness and ensure that the experience claimed meets the requirement of this KCASR 1 - Part 66.

(b) The Kuwait DGCA shall verify an applicant's examination status and/or confirm the validity of any credits to ensure that all required modules of Appendix I have been met as required by this KCASR 1 - Part 66.

(c) When having verified the identity and date of birth of the applicant and being satisfied that the applicant meets the standards of knowledge and experience required by this KCASR 1 - Part 66, the Kuwait DGCA shall issue the relevant aircraft maintenance licence to the applicant. The same information shall be kept on the Kuwait DGCA's records.

(d) In the case where aircraft types or groups are endorsed at the time of the issuance of the first aircraft maintenance licence, the Kuwait DGCA shall verify compliance with point 66.B.115.

### 66.B.105 Procedure for the issue of an Aircraft Maintenance licence via a Maintenance Organisation Approved in accordance with KCASR 8 - Part 145

(a) A maintenance organisation approved in accordance with KCASR 8 - Part 145, when authorised to carry out this activity by the Kuwait DGCA, may (i) prepare the aircraft maintenance licence on behalf of the Kuwait DGCA or (ii) make recommendations to the Kuwait DGCA regarding the application from an individual for a aircraft maintenance licence so that the Kuwait DGCA may prepare and issue such licence.

(b) Maintenance organisations referred to in point (a) shall ensure compliance with points 66.B.100 (a) and (b).

(c) In all cases, the aircraft maintenance licence can only be issued to the applicant by the Kuwait DGCA.

## 66.B.110 Procedure for the change of an Aircraft Maintenance Licence to include an Additional Basic Category or Subcategory

(a) At the completion of the procedures specified in points 66.B.100 or 66.B.105, the Kuwait DGCA shall endorse the additional basic category or subcategory on the aircraft maintenance licence by stamp and signature and reissue the licence.

(b) The Kuwait DGCA record system shall be changed accordingly.

## 66.B.115 Procedure for the change of an Aircraft Maintenance Licence to include an Aircraft Rating or to Remove Limitations

(a) On receipt of a satisfactory DGCA Form 19 and any supporting documentation demonstrating compliance with the requirements of the applicable rating together with the accompanying aircraft maintenance licence, the Kuwait DGCA shall either:

(1) Endorse the applicant's aircraft maintenance licence with the applicable aircraft rating; or

(2) Reissue the said licence to include the applicable aircraft rating; or

(3) Remove the applicable limitations in accordance with point 66.A.50.

The Kuwait DGCA record system shall be changed accordingly.

(b) In the case where the complete type training is not conducted by maintenance training organisation appropriately approved in accordance with KCASR 1 - Part 147, the Kuwait DGCA shall be satisfied that all type training requirements are complied with in accordance with Part 66 appendix III before the type rating is issued.

(c) In the case where the On the Job Training is not required, the aircraft type rating shall be endorsed based on a Certificate of Recognition issued by a maintenance training organisation approved in accordance with KCASR 1 - Part 147.

(d) In the case where the aircraft type training is not covered by a single course, the Kuwait DGCA shall be satisfied prior to the type rating endorsement that the content and length of the courses fully satisfy the scope of the licence category and that the interface areas have been appropriately addressed.

(e) In the case of differences training, the Kuwait DGCA shall be satisfied that (i) the applicant's previous qualification, supplemented by (ii) either a course approved in accordance with KCASR 1 - Part 147 or a course directly approved by the Kuwait DGCA, are acceptable for type rating endorsement.

(f) Compliance with the practical elements shall be demonstrated (i) by the provision of detailed practical training records or a logbook provided by a maintenance organisation appropriately approved in accordance with KCASR 8 - Part 145 or, where available, (ii) by a training certificate covering the practical training element issued by a maintenance training organisation appropriately approved in accordance with KCASR 1 - Part 147.

(g) Aircraft type endorsement shall use the aircraft type ratings specified by the Kuwait DGCA.

## 66.B.120 Procedure for the Renewal of an Aircraft Maintenance Licence Validity

(a) The Kuwait DGCA shall compare the holder's aircraft maintenance licence with the Kuwait DGCA's records and verify any pending revocation, suspension or change action pursuant to point 66.B.500. If the documents are identical and no action is pending pursuant to point 66.B.500, the holder's copy shall be renewed for 5 years and the file endorsed accordingly.

(b) If the Kuwait DGCA records are different from the aircraft maintenance licence held by the licence holder:

(1) The Kuwait DGCA shall investigate the reasons for such differences and may choose not to renew the aircraft maintenance licence.

(2) The Kuwait DGCA shall inform the licence holder and any known maintenance organisation approved in accordance with KCASR 8 - Part 145 that may be directly affected of such fact.

(3) The Kuwait DGCA shall, if necessary, take action in accordance with point 66.B.500 to revoke, suspend or change the licence in question.

## 66.B.125 Procedure for the Conversion of Licences including Group Ratings

(a) Individual aircraft type ratings already endorsed on the aircraft maintenance licence shall remain on the licence and shall not be converted to new ratings unless the licence holder fully meets the requirements for endorsement defined in point 66.A.45 of this KCASR 1 - Part 66 for the corresponding group/sub-group ratings.

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

| Category | | Conversion |
|---|---|---|
| B1 or C | Helicopter piston engine, full group: | Converted to "full sub-group 2c" plus the aircraft type ratings for those single piston engine helicopters which are in group 1. |
| | Helicopter piston engine, manufacturer group: | Converted to the corresponding "manufacturer sub-group 2c" plus the aircraft type ratings for those single piston engine helicopters of that manufacturer which are in group 1. |
| | Helicopter turbine engine, full group: | Converted to "full sub-group 2b" plus the aircraft type ratings for those single turbine engine helicopters which are in group 1 |
| | Helicopter turbine engine, manufacturer group: | Converted to the corresponding "manufacturer sub-group 2b" plus the aircraft type ratings for those single turbine engine helicopters of that manufacturer which are in group 1. |
| | Aeroplane single piston engine — metal structure, either full group or manufacturer group: | Converted to "full group 3".<br>For the B1 licence the following limitations shall be included: composite structure aeroplanes, wooden structure aeroplanes and metal tubing and fabric aeroplanes. |
| | Aeroplane multiple piston engines — metal structure, either full group or manufacturer group: | Converted to "full group 3".<br>For the B1 licence the following limitations shall be included: composite structure aeroplanes, wooden structure aeroplanes and metal tubing and fabric aeroplanes. |
| | Aeroplane single piston engine — wooden | Converted to "full group 3". |

| Category | | Conversion |
|---|---|---|
| | structure, either full group or manufacturer group: | For the B1 licence the following limitations shall be included: metal structure aeroplanes, composite structure aeroplanes and metal tubing and fabric aeroplanes. |
| | Aeroplane multiple piston engine — wooden structure, either full group or manufacturer group: | Converted to "full group 3".<br>For the B1 licence the following limitations shall be included: metal structure aeroplanes, composite structure aeroplanes and metal tubing and fabric aeroplanes. |
| | Aeroplane single piston engine — composite structure, either full group or manufacturer group: | Converted to "full group 3".<br>For the B1 licence the following limitations shall be included: metal structure aeroplanes, wooden structure aeroplanes and metal tubing and fabric aeroplanes. |
| | Aeroplane multiple piston engine — composite structure, either full group or manufacturer group: | Converted to "full group 3".<br>For the B1 licence the following limitations shall be included: metal structure aeroplanes, wooden structure aeroplanes and metal tubing and fabric aeroplanes. |
| | Aeroplane turbine — single engine, full group: | Converted to "full sub-group 2a" plus the aircraft type ratings for those single turboprop aeroplanes which did not require an aircraft type rating in the previous system and are in group 1. |
| | Aeroplane turbine — single engine, manufacturer group: | Converted to the corresponding "manufacturer sub- group 2a" plus the aircraft type ratings for those single turboprop aeroplanes of that manufacturer which did not require an aircraft type rating in the previous system and are in group 1. |
| | Aeroplane turbine — multiple engine, full group: | Converted to the aircraft type ratings for those multiple turboprop aeroplanes which did not require an aircraft type rating in the previous system. |
| B2 | Aeroplane: | Converted to "full sub-group 2a" and "full group 3", plus the aircraft type ratings for those aeroplanes which did not require an aircraft type rating in the previous system and are in group 1. |
| B2 | Helicopter | Converted to "full sub-groups 2b and 2c", plus the aircraft type ratings for those helicopters which did not require an aircraft type rating in the previous system and are in group 1. |
| C | Aeroplane: | Converted to "full sub-group 2a" and "full group 3", plus the aircraft type ratings for those aeroplanes which did not require an aircraft type rating in the previous system and are in group 1, |
| C | Helicopter: | Converted to "full sub-groups 2b and 2c", plus the aircraft type ratings for those helicopters which did not require an aircraft type rating in the previous system and are in group 1. |

(c) If the licence was subject to limitations following the conversion process referred to in point 66.A.70, these limitations shall remain on the licence, unless they are removed under the conditions defined in the relevant conversion report referred to in point 66.B.300.

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

The Kuwait DGCA may approve aircraft type training not conducted by a maintenance training organisation approved in accordance with KCASR 1 - Part 147, pursuant to point 1 of

Appendix III to this KCASR 1 - Part 66. In such case the Kuwait DGCA shall have a procedure to ensure the aircraft type training complies with Appendix III of this KCASR 1 - Part 66.

# Subpart C - Examinations

This Subpart provides the procedures to be followed for the examinations conducted by the Kuwait DGCA.

## 66.B.200 Examination by the Kuwait DGCA

(a) All examination questions shall be kept in a secure manner prior to an examination, to ensure that candidates will not know which particular questions will form the basis of the examination.

(b) The Kuwait DGCA shall nominate:

(1) Persons who control the questions to be used for each examination;

(2) Examiners who shall be present during all examinations to ensure the integrity of the examination.

(c) Basic examinations shall follow the standard specified in Appendix I and II to this KCASR 1 - Part 66.

(d) Type training and type examinations shall follow the standard specified in Appendix III to this KCASR 1 - Part 66.

(e) New essay questions shall be raised at least every 6 months and questions already used withdrawn or rested from use. A record of the questions used shall be retained in the records for reference.

(f) All examination papers shall be handed out at the start of the examination to the candidate and handed back to the examiner at the end of the allotted examination time period. No examination paper may be removed from the examination room during the allotted examination time period.

(g) Apart from specific documentation needed for type examinations, only the examination documents may be available to the candidate during the examination.

(h) Examination candidates shall be separated from each other so that they cannot read each other's examination papers. They may not speak to any person other than the examiner.

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

# Subpart D - Conversion of Certifying Staff Qualifications

This Subpart provides the procedures for the conversion of certifying staff qualifications referred to in point 66.A.70 to aircraft maintenance licences.

## 66.B.300 General

(a) The Kuwait DGCA may only convert qualifications (i) obtained in the State of Kuwait for which it is competent, without prejudice to bilateral agreements and (ii) valid prior to the entry into force of the applicable requirements of this KCASR 1 - Part 66.

(b) The Kuwait DGCA may only perform the conversion in accordance with a conversion report established pursuant to points 66.B.305 or 66.B.310, as applicable.

(c) Conversion reports shall be either (i) developed by the Kuwait DGCA or (ii) approved by the Kuwait DGCA to ensure compliance with this KCASR 1 - Part 66.

(d) Conversion reports together with any change of these shall be kept on record by the Kuwait DGCA in accordance with point 66.B.20.

## 66.B.305 Conversion Report for National Qualifications

(a) The conversion report for Kuwait certifying staff qualifications shall describe the scope of each type of qualification, including the associated national licence, if any, the associated privileges and include a copy of the relevant Kuwait regulations defining these.

(b) The conversion report shall show for each type of qualification referred to in point (a):

(1) To which aircraft maintenance licence it will be converted; and

(2) Which limitations shall be added in accordance with points 66.A.70(c) or (d), as applicable; and

(3) The conditions to remove the limitations, specifying the module/subjects on which examination is needed to remove the limitations and obtain a full aircraft maintenance licence, or to include an additional (sub-) category. This shall include the modules defined in Appendix III to this KCASR 1 - Part 66 not covered by the national qualification.

## 66.B.310 Conversion report for Approved Maintenance Organisations Approvals

(a) For each approved maintenance organisation concerned, the conversion report shall describe the scope of each type of authorisation issued by the maintenance organisation and include a copy of the relevant approved maintenance organisation's procedures for the qualification and the authorisation of certifying staff on which the conversion process is based.

(b) The conversion report shall show for each type of authorisation referred to in point (a):

(1) To which aircraft maintenance licence it will be converted, and

(2) Which limitations shall be added in accordance with points 66.A.70(c) or (d), as applicable, and

(3) The conditions to remove the limitations, specifying the module/subjects on which examination is needed to remove the limitations and obtain a full aircraft

maintenance licence, or to include an additional (sub-) category. This shall include the modules defined in Appendix III to this KCASR 1 - Part 66 not covered by the national qualification.

# Subpart E – Examination Credits

Not applicable.

## 66.B.400 General

Not applicable.

## 66.B.405 Examination credit report

Not applicable.

## 66.B.410 Examination Credit Validity

Not applicable.

# Subpart F – Continuing Oversight

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

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

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

1. obtaining the aircraft maintenance licence and/or the certification privileges by falsification of documentary evidence;

2. failing to carry out requested maintenance combined with failure to report such fact to the organisation or person who requested the maintenance;

3. failing to carry out required maintenance resulting from own inspection combined with failure to report such fact to the organisation or person for whom the maintenance was intended to be carried out;

4. negligent maintenance;

5. falsification of the maintenance record;
6. issuing a certificate of release to service knowing that the maintenance specified on the certificate of release to service has not been carried out or without verifying that such maintenance has been carried out;

7. carrying out maintenance or issuing a certificate of release to service when adversely affected by alcohol or drugs;

8. issuing certificate of release to service while not in compliance with KCASR 8 -Part M, KCASR 8 - Part 145 or KCASR 1 – Part 66.

# Appendices

## Appendix I - Basic Knowledge Requirements

### 1. Knowledge levels for Category A, B1, B2, B3 and C Aircraft Maintenance Licence

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

The knowledge level indicators are defined on 3 levels as follows: LEVEL 1: A familiarisation with the principal elements of the subject. Objectives:

(a) The applicant should be familiar with the basic elements of the subject.

(b) The applicant should be able to give a simple description of the whole subject, using common words and examples.

(c) The applicant should be able to use typical terms.

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

Objectives:

(a) The applicant should be able to understand the theoretical fundamentals of the subject.

(b) The applicant should be able to give a general description of the subject using, as appropriate, typical examples.

(c) The applicant should be able to use mathematical formulae in conjunction with physical laws describing the subject.

(d) The applicant should be able to read and understand sketches, drawings and schematics describing the subject.

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

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

Objectives:

(a) The applicant should know the theory of the subject and interrelationships with other subjects.

(b) The applicant should be able to give a detailed description of the subject using theoretical fundamentals and specific examples.

(c) The applicant should understand and be able to use mathematical formulae related to the subject.

(d) The applicant should be able to read, understand and prepare sketches, simple drawings and schematics describing the subject.

(e) The applicant should be able to apply his knowledge in a practical manner using manufacturer's instructions.

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

## 2. Modularization

Qualification on basic subjects for each KCASR 1 - Part 66 aircraft maintenance licence category or subcategory shall be in accordance with the following matrix. Applicable subjects are indicated by a 'X' while 'n/a' means that the subject module is neither applicable nor required.

| Subject module | B1.1 A1 | B1.2 A2 | B1.3 A3 | B1.4 A4 | B2 | B3 |
|---|---|---|---|---|---|---|
| | Turbine engine(s) | Piston engine(s) | Turbine engine(s) | Piston engine(s) | Avionics | Piston-engine non-pressurised aeroplanes MTOM ≤ 2000kg |
| 1 | X | X | X | X | X | X |
| 2 | X | X | X | X | X | X |
| 3 | X | X | X | X | X | X |
| 4 | X (n/a for A1) | X (n/a for A2) | X (n/a for A3) | X (n/a for A4) | X | X |
| 5 | X | X | X | X | X | X |
| 6 | X | X | X | X | X | X |
| 7 | X | X | X | X | X | x |

| | | | | | | |
|---|---|---|---|---|---|---|
| **8** | X | X | X | X | X | X |
| **9** | X | X | X | X | X | x |
| **10** | X | X | X | X | X | X |
| **11** | X | X | n/a | n/a | n/a | X |
| **12** | n/a | n/a | X | X | n/a | n/a |
| **13** | n/a | n/a | n/a | n/a | X | n/a |
| **14** | n/a | n/a | n/a | n/a | X | n/a |
| **15** | X | n/a | X | n/a | n/a | n/a |
| **16** | n/a | X | n/a | X | n/a | X |
| **17** | X | X | n/a | n/a | n/a | x |

**MODULE 1 — MATHEMATICS**

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

## MODULE 2 — PHYSICS

| MODULE 2 — PHYSICS | LEVEL | |
|---|---|---|
| | A1 A2 A3 A4 B3 | B1 B2 |
| 2.1 *Matter*<br>Nature of matter: the chemical elements, structure of atoms, molecules;<br>Chemical compounds;<br>States: solid, liquid, and gaseous;<br>Changes between states. | 1 | 2 |
| 2.2 *Mechanics*<br>2.2.1 *Statics*<br>Forces, moments and couples, representation as vectors;<br>Centre of gravity;<br>Elements of theory of stress, strain, and elasticity: tension, compression, shear, and torsion;<br>Nature and properties of solid, fluid, and gas matter;<br>Pressure and buoyancy in liquids (barometers). | 1 | 2 |
| 2.2.2 *Kinetics*<br>Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity);<br>Rotational movement: uniform circular motion (centrifugal/centripetal forces);<br>Periodic motion: pendular movement;<br>Simple theory of vibration, harmonics, and resonance;<br>Velocity ratio, mechanical advantage, and efficiency. | 1 | 2 |
| 2.2.3 *Dynamics*<br>(a) Mass;<br>Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency; | 1 | 2 |
| (b) Momentum, conservation of momentum;<br>Impulse;<br>Gyroscopic principles;<br>Friction: nature and effects, coefficient of friction (rolling resistance). | 1 | 2 |
| 2.2.4 *Fluid dynamics*<br>(a) Specific gravity and density; | 2 | 2 |
| (b) Viscosity, fluid resistance, effects of streamlining;<br>Effects of compressibility on fluids;<br>Static, dynamic, and total pressure: Bernoulli's Theorem, venturi. | 1 | 2 |
| 2.3 *Thermodynamics*<br>(a) Temperature: thermometers and temperature scales (Celsius, Fahrenheit and Kelvin); definition of heat; | 2 | 2 |
| (b) Heat capacity, specific heat; | 1 | 2 |

| MODULE 2 — PHYSICS | LEVEL A1 A2 A3 A4 B3 | LEVEL B1 B2 |
|---|---|---|
| Heat transfer: convection, radiation and conduction;<br>Volumetric expansion;<br>First and second law of thermodynamics;<br>Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas;<br>Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps;<br>Latent heats of fusion and evaporation, thermal energy, heat of combustion. | | |
| 2.4 *Optics* (Light)<br>Nature of light; speed of light;<br>Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses;<br>Fibre optics. | – | 2 |
| 2.5 *Wave motion and sound*<br>Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves;<br>Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect. | – | 2 |

## MODULE 3 — ELECTRICAL FUNDAMENTALS

| MODULE 3 — ELECTRICAL FUNDAMENTALS | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B2 | B3 |
| 3.1 *Electron theory*<br>Structure and distribution of electrical charges within atoms, molecules, ions, and compounds;<br>Molecular structure of conductors, semiconductors, and insulators. | 1 | 1 | 1 |
| 3.2 *Static electricity and conduction*<br>Static electricity and distribution of electrostatic charges;<br>Electrostatic laws of attraction and repulsion;<br>Units of charge, Coulomb's law;<br>Conduction of electricity in solids, liquids, gases and in vacuum. | 1 | 2 | 1 |
| 3.3 *Electrical terminology*<br>The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow. | 1 | 2 | 1 |
| 3.4 Generation of electricity<br>Production of electricity by the following methods: light, heat, friction, pressure, chemical reaction, magnetism, and motion. | 1 | 1 | 1 |
| 3.5 *Sources of DC electricity*<br>Construction and basic chemical reaction of primary cells, secondary cells, lead acid cells, nickel cadmium cells, lithium cells, nickel cells and other alkaline cells;<br>Cells connected in series and in parallel;<br>Internal resistance and its effect on a battery;<br>Construction, materials, and operation of thermocouples;<br>Operation of photocells. | 1 | 2 | 2 |
| 3.6 *DC circuits*<br>Ohm's law, Kirchhoff's voltage, and current laws;<br>Calculations using the above laws to find resistance, voltage, and current;<br>Significance of the internal resistance of a supply. | 1 | 2 | 1 |
| 3.7 *Resistance/Resistor*<br>(a) Resistance<br>Specific resistance;<br>Calculation of total resistance using series, parallel and series–parallel combinations;<br>Operation and use of potentiometers and rheostats;<br>Operation of Wheatstone Bridge. | — | 2 | 1 |
| (b) Resistor<br>Positive and negative temperature coefficient conductance;<br>Resistor colour code, values and tolerances, preferred values, wattage ratings;<br>Resistors in series and in parallel;<br>Fixed resistors, stability, tolerance and limitations, methods of construction;<br>Variable resistors, thermistors, voltage-dependent resistors;<br>Construction of potentiometers and rheostats;<br>Construction of Wheatstone Bridge. | — | 1 | — |

| MODULE 3 — ELECTRICAL FUNDAMENTALS | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B2 | B3 |
| 3.8 *Power*<br>Power, work, and energy (kinetic and potential);<br>Dissipation of power by a resistor;<br>Power formula;<br>Calculations involving power, work, and energy. | — | 2 | 1 |
| 3.9 *Capacitance/Capacitor*<br>Operation and function of a capacitor;<br>Factors that affect the capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating;<br>Capacitor types, construction, and function;<br>Capacitor colour-coding;<br>Calculations of capacitance and voltage in series and in parallel circuits;<br>Exponential charge and discharge of a capacitor, time constants; Testing of capacitors. | — | 2 | 1 |
| 3.10 *Magnetism*<br>(a) Theory of magnetism;<br>Properties of a magnet;<br>Action of a magnet suspended in the Earth's magnetic field;<br>Magnetisation and demagnetisation;<br>Magnetic shielding;<br>Various types of magnetic material;<br>Electromagnet construction and principles of operation;<br>Handclasp rules to determine magnetic field around current-carrying conductor. | — | 2 | 1 |
| (b) Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents;<br>Precautions for care and storage of magnets. | — | 2 | 1 |
| 3.11 *Inductance/Inductor*<br>Faraday's law;<br>Action of inducing a voltage in a conductor that moves in a magnetic field;<br>Induction principles;<br>Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns;<br>Mutual induction;<br>The effect that the rates of change of primary current and mutual inductance have on induced voltage;<br>Factors that affect mutual inductance: number of turns in the coil, physical size of the coil, permeability of the coil, position of coils with respect to each other;<br>Lenz's law and polarity determining rules;<br>Back EMF, self-induction;<br>Saturation point;<br>Principal uses of inductors. | — | 2 | 1 |

| MODULE 3 — ELECTRICAL FUNDAMENTALS | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B2 | B3 |
| 3.12 *DC motor/generator theory*<br>Basic motor and generator theory;<br>Construction and purpose of components in a DC generator;<br>Operation of and factors that affect the output and direction of the current in DC generators;<br>Operation of and factors that affect the output power, torque, speed, and direction of rotation of DC motors;<br>Series-wound, shunt-wound and compound motors;<br>Starter generator construction. | – | 2 | 1 |
| 3.13 *AC theory*<br>Sinusoidal waveform: phase, period, frequency, cycle;<br>Instantaneous, average, root mean square, peak, peak-to-peak current values and calculations of these values in relation to voltage, current and power;<br>Triangular/Square waves;<br>Single-phase/Three-phase principles. | 1 | 2 | 1 |
| 3.14 *Resistive (R), capacitive (C) and inductive (L) circuits*<br>Phase the relationship of voltage and current in L, C and R circuits, parallel, series and series–parallel;<br>Power dissipation in L, C and R circuits;<br>Impedance, phase angle, power factor and current calculations;<br>True power, apparent power, and reactive power calculations. | — | 2 | 1 |
| 3.15 *Transformers*<br>Transformer construction principles and operation;<br>Transformer losses and methods for overcoming them;<br>Transformer action under load and no-load conditions;<br>Power transfer, efficiency, polarity markings;<br>Line and phase voltages and currents;<br>Power in a three-phase system;<br>Primary and secondary current, voltage, turn ratio, power, efficiency;<br>Auto-transformers. | — | 2 | 1 |
| 3.16 *Filters*<br>Operation, application, and uses of the following filters: low pass, high pass, band pass, band stop. | — | 1 | — |
| 3.17 *AC generators*<br>Rotation of loop in a magnetic field and waveform produced;<br>Operation and construction of revolving armature and revolving field type AC generators;<br>Single-phase, two-phase, and three-phase alternators;<br>Three-phase star and delta connection advantages, and uses;<br>Permanent magnet generators. | — | 2 | 1 |

| | | | |
|---|---|---|---|
| 3.18 *AC motors*<br>Construction, principles of operation and characteristics of: AC synchronous and induction motors both single-phase and polyphase;<br>Methods of speed control and direction of rotation;<br>Methods of producing a rotating field: capacitor, shaded or split pole. | — | 2 | 1 |

## MODULE 4 — ELECTRONICS FUNDAMENTALS

| MODULE 4 — ELECTRONICS FUNDAMENTALS | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| 4.1 *Semiconductors*<br>4.1.1 *Diodes*<br>(a) Description and characteristics<br>Diode symbols;<br>Diode characteristics and properties;<br>Diodes in series and in parallel;<br>Materials, electron configuration, electrical properties;<br>P and N type materials: effects of impurities on conduction, majority and minority characters;<br>P–N junction in a semiconductor, development of a potential across a P–N junction in unbiased, forward-biased and reverse-biased conditions;<br>Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation;<br>Main characteristics and use of silicon-controlled rectifiers (thyristors), light-emitting diodes (LEDs), photo-conductive diodes, rectifier diodes. | — | 2 | 2 |
| (b) Operation and function<br>Operation and function of diodes in the following circuits: clippers, clampers, full- and half-wave rectifiers, bridge rectifiers, voltage doublers and triplers;<br>Detailed operation and characteristics of the following devices: silicon-controlled rectifier (thyristor), light-emitting diode (LED), Schottky diode, photo-conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.<br>Functional testing of diodes. | — | — | 2 |
| 4.1.2 *Transistors*<br>(a) Description and characteristics<br>Transistor symbols;<br>Component description and orientation;<br>Transistor characteristics and properties. | — | 1 | 2 |
| (b) Construction and operation<br>Construction and operation of PNP and NPN transistors;<br>Base, collector and emitter configurations;<br>Testing of transistors;<br>Basic appreciation of other transistor types, including types of FET and their uses;<br>Application of transistors: amplifier classes (A, B, C); | — | — | 2 |

| MODULE 4 — ELECTRONICS FUNDAMENTALS | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| Simple circuits including bias, decoupling, feedback and stabilisation;<br>Multistage circuit principles: cascades, push–pull, oscillators, multivibrators, flip-flop circuits;<br>Operation and amplifier stages connecting methods: resistive, capacitive, direct, inverting, non-inverting and adding. | | | |
| 4.1.3 *Integrated circuits*<br>(a) Description and operation of logic circuits and linear circuits/operational amplifiers; | — | 1 | 2 |
| (b) Introduction to the operation and function of an operational amplifier used as: an integrator, a differentiator, a voltage follower, a comparator;<br>Advantages and disadvantages of positive and negative feedback. | — | — | 2 |
| 4.2 *Printed circuit boards*<br>Description and use of printed circuit boards. | — | 1 | 2 |
| 4.3 *Servomechanisms*<br>(a) Principles<br>Understanding of the following principles: open- and closed-loop systems, servomechanism, feedback, follow-up, null, overshoot, damping, deadband, hunting, proximity switches, analogue transducers, synchro systems and components, digital tachometers and encoders, inductance, and capacitance transmitters; | — | 1 | 2 |
| (b) 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;<br>Construction, operation and use of servomechanism and PID controller;<br>Fault-finding of servo defects, reversal of synchro leads, hunting. | — | — | 2 |

## MODULE 5 — DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS

| MODULE 5 — DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS | LEVEL | | | |
|---|---|---|---|---|
| | A1 A2 A3 A4 | B3 | B1 | B2 |
| 5.1 *Electronic instrument systems*<br>Typical arrangements of systems and cockpit layout of electronic instrument systems. | 1 | 1 | 1 | 1 |
| 5.2 *Numbering systems*<br>Numbering systems: binary, octal, and hexadecimal;<br>Demonstration of conversions between the decimal and binary systems, octal and hexadecimal systems and vice versa. | — | — | 1 | 2 |
| 5.3 *Data conversion*<br>Analogue data, Digital data;<br>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*<br>Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications.<br>Aircraft network/Ethernet. | — | — | 2 | 2 |
| 5.5 *Logic circuits*<br>(a) Identification of common logic gate symbols, tables and equivalent circuits;<br>Applications used for aircraft systems, schematic diagrams. | — | — | 2 | 2 |
| (b) Interpretation of logic diagrams. | — | — | — | 2 |
| 5.6 *Basic computer structure*<br>(a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM);<br>Computer technology (as applied in aircraft systems). | 1 | 1 | 2 | 2 |
| (b) Computer operation, layout, and interface of the major components in a microcomputer, including their associated bus systems;<br>Information contained in single- and multi-address instruction words;<br>Memory-associated terms;<br>Operation of typical memory devices;<br>Operation, advantages, and disadvantages of the various data storage systems. | — | — | — | 2 |
| 5.7 *Microprocessors*<br>Functions performed and overall operation of a microprocessor;<br>Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit. | — | — | — | 2 |
| 5.8 *Integrated circuits*<br>Operation and use of encoders and decoders;<br>Function of encoder types. | — | — | — | 2 |

| MODULE 5 — DIGITAL TECHNIQUES / ELECTRONIC INSTRUMENT SYSTEMS | LEVEL | | | |
|---|---|---|---|---|
| | A1 A2 A3 A4 | B3 | B1 | B2 |
| 5.9 *Multiplexing*<br>Operation, application and identification in logic diagrams of multiplexers and demultiplexers. | — | — | — | 2 |
| 5.10 *Fibre optics*<br>Advantages and disadvantages of fibre optic data transmission over electrical wire propagation;<br>Fibre optic data bus;<br>Fibre-optic-related terms;<br>Terminations;<br>Couplers, control terminals, remote terminals;<br>Application of fibre optics in aircraft systems. | — | — | 1 | 2 |
| 5.11 *Electronic displays*<br>Principles of operation of common types of displays used in modern aircraft, including cathode-ray tubes (CRTs), light-emitting diodes (LEDs) and liquid crystal displays (LCDs). | 1 | 1 | 2 | 2 |
| 5.12 *Electrostatic-sensitive devices*<br>Special handling of components sensitive to electrostatic discharges; Awareness of risks and possible damage, component, and personnel antistatic protection devices. | 1 | 1 | 2 | 2 |
| 5.13 *Software management control*<br>Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programs. | — | 1 | 2 | 2 |
| 5.14 *Electromagnetic environment*<br>Influence of the following phenomena on maintenance practices for electronic systems:<br>EMC — Electromagnetic Compatibility,<br>EMI — Electromagnetic Interference,<br>HIRF — High-Intensity Radiated Field,<br>Lightning / lightning protection. | — | 1 | 2 | 2 |

| | | | | |
|---|---|---|---|---|
| 5.15 *Typical electronic/digital aircraft systems*<br>General arrangement of typical electronic/digital aircraft systems and associated BITE (Built-In Test Equipment), such as:<br>(a)<br>ACARS — ARINC Communication and Addressing and Reporting System, FBW — Fly-by-Wire,<br>FMS — flight management system,<br>IRS — inertial reference system;<br>(b)<br>ECAM — electronic centralised aircraft monitoring,<br>EICAS — engine indication and crew alerting system,<br>EFIS — electronic flight instrument system,<br>GNSS — global navigation satellite system,<br>TCAS — traffic alert collision avoidance system,<br>Integrated Modular Avionics,<br>Cabin Systems,<br>Information Systems. | 1 | 1 | 1 | 1 |

## MODULE 6 — MATERIALS AND HARDWARE

| MODULE 6 — MATERIALS AND HARDWARE | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| 6.1 *Aircraft materials — ferrous*<br>(a) Characteristics, properties and identification of common alloy steels used in aircraft;<br>Heat treatment and application of alloy steels. | 1 | 2 | 1 |
| (b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance. | — | 1 | 1 |
| (c) Repair and inspection procedures for ferrous materials, structures, and airframes. | — | 2 | 1 |
| 6.2 *Aircraft materials — non-ferrous*<br>(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft;<br>Heat treatment and application of non-ferrous materials. | 1 | 2 | 1 |
| (b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance. | — | 1 | 1 |
| (c) Repair and inspection procedures for non-ferrous materials, structures, and airframes. | — | 2 | 1 |
| 6.3 *Aircraft materials — composite and non-metallic*<br>6.3.1 *Composite and non-metallic materials other than wood and fabric*<br>(a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft;<br>Sealant and bonding agents. | 1 | 2 | 2 |
| (b) Detection of defects/deterioration in composite and non-metallic materials. | 1 | 2 | — |
| (c) Repair of and inspection procedures for composite and non-metallic materials, structures, and airframes. | — | 2 | 1 |
| 6.3.2 *Wooden structures*<br>Construction methods of wooden airframe structures;<br>Characteristics, properties and types of wood and glue used in aeroplanes;<br>Preservation and maintenance of wooden structures;<br>Types of defects in wood material and wooden structures;<br>Detection of defects in wooden structures;<br>Repair of wooden structures. | 1 | 1 | — |
| 6.3.3 *Fabric covering*<br>Characteristics, properties and types of fabrics used in aeroplanes;<br>Inspection methods for fabrics;<br>Types of defects in fabrics;<br>Repair of fabric covering. | — | 1 | — |

| MODULE 6 — MATERIALS AND HARDWARE | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| 6.4 *Corrosion*<br>(a) Chemical fundamentals;<br>Formation by galvanic action process, microbiological contamination, mechanical stress. | 1 | 1 | 1 |
| (b) Types of corrosion and their identification;<br>Causes of corrosion;<br>Material types, and their susceptibility to corrosion. | 2 | 3 | 2 |
| 6.5 *Fasteners*<br>6.5.1 *Screw threads*<br>Screw nomenclature;<br>Thread forms, dimensions and tolerances for standard threads used in aircraft;<br>Measuring screw threads. | 2 | 2 | 2 |
| 6.5.2 *Bolts, studs, and screws*<br>Bolt types: specification, identification and marking of aircraft bolts, international standards;<br>Nuts: self-locking, anchor, standard types;<br>Machine screws: aircraft specifications;<br>Studs: types and uses, insertion, and removal;<br>Self-tapping screws, dowels. | 2 | 2 | 2 |
| 6.5.3 *Locking devices*<br>Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick-release fasteners, keys, circlips, cotter pins. | 2 | 2 | 2 |
| 6.5.4 *Aircraft rivets*<br>Types of solid and blind rivets: specifications and identification, heat treatment. | 1 | 2 | 1 |
| 6.6 *Pipes and unions*<br>(a) Identification and types of rigid and flexible pipes and their connectors used in aircraft; | 2 | 2 | 2 |
| (b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes. | 2 | 2 | 1 |
| 6.7 *Springs*<br>Types of springs, materials, characteristics, and applications. | — | 2 | 1 |
| 6.8 *Bearings*<br>Purpose of bearings, loads, material, construction;<br>Types of bearings and their application. | 1 | 2 | 2 |
| 6.9 *Transmissions*<br>Gear types and their application;<br>Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns;<br>Belts and pulleys, chains and sprockets. | 1 | 2 | 2 |

| MODULE 6 — MATERIALS AND HARDWARE | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| 6.10 *Control cables*<br>Types of cables;<br>End fittings, turnbuckles and compensation devices;<br>Pulleys and cable system components;<br>Bowden cables;<br>Aircraft flexible control systems. | 1 | 2 | 1 |
| 6.11 *Electrical cables and connectors*<br>Cable types, construction and characteristics;<br>High-tension and coaxial cables;<br>Crimping;<br>Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes. | 1 | 2 | 2 |

## MODULE 7 — MAINTENANCE PRACTICES

| MODULE 7 — MAINTENANCE PRACTICES | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| 7.1 *Safety precautions — aircraft and workshop*<br>Aspects of safe working practices including precautions to be taken when working with electricity, gases (especially oxygen), oils, and chemicals.<br>Fuel tank safety and fuel tank entry procedures and precautions. Awareness and precautions regarding aircraft equipped with ballistic recovery systems. Also, instructions for the remedial action to be taken in the event of a fire or another accident with one or more of these hazards, including information on fire-extinguishing agents. | 3 | 3 | 3 |
| 7.2 *Workshop practices*<br>Care of tools, control of tools, use of workshop materials;<br>Dimensions, allowances and tolerances, workmanship standards;<br>Calibration of tools and equipment, calibration standards. | 3 | 3 | 3 |
| 7.3 *Tools*<br>Common hand-tool types;<br>Common power-tool types;<br>Operation and use of precision-measuring tools;<br>Lubrication equipment and methods;<br>Operation, function, and use of electrical general test equipment. | 3 | 3 | 3 |
| 7.4 *(Reserved)* | – | – | – |
| 7.5 *Engineering drawings, diagrams, and standards*<br>Drawing types and diagrams, their symbols, dimensions, tolerances and projections;<br>Identification of title block information;<br>Microfilm, microfiche, and computerised presentations; Specification 100 of the Air Transport Association (ATA) of America;<br>Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL;<br>Wiring diagrams and schematic diagrams. | 1 | 2 | 2 |
| 7.6 *Fits and clearances*<br>Drill sizes for bolt holes, classes of fits;<br>Common system for fits and clearances;<br>Schedule of fits and clearances for aircraft and engines;<br>Limits for bow, twist and wear;<br>Standard methods for checking shafts, bearings, and other parts. | 1 | 2 | 1 |
| 7.7 *Electrical wiring interconnection system (EWIS)*<br>Continuity, insulation and bonding techniques and testing;<br>Use of crimp tools: hand and hydraulic operated;<br>Testing of crimp joints;<br>Connector pin removal and insertion;<br>Coaxial cables: testing and installation precautions;<br>Identification of wire types, their inspection criteria and damage tolerance;<br>Wiring protection techniques: cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding; High-Intensity Radiated Fields (HIRF) and protection principles;<br>Soldering of electrical wires, EWIS installations, inspection, repair, maintenance, and cleanliness standards. | 1 | 3 | 3 |

| MODULE 7 — MAINTENANCE PRACTICES | LEVEL | | |
|---|---|---|---|
| | A1 A2 A3 A4 | B1 B3 | B2 |
| 7.8 *Riveting*<br>Riveted joints, rivet spacing and pitch;<br>Tools used for riveting and dimpling;<br>Inspection of riveted joints. | 1 | 2 | – |
| 7.9 *Pipes and hoses*<br>Bending and belling/flaring aircraft pipes;<br>Inspection and testing of aircraft pipes and hoses;<br>Installation and clamping of pipes. | 1 | 2 | – |
| 7.10 *Springs*<br>Inspection and testing of springs. | 1 | 2 | – |
| 7.11 *Bearings*<br>Testing, cleaning and inspection of bearings;<br>Lubrication requirements for bearings;<br>Defects in bearings and their causes. | 1 | 2 | – |
| 7.12 *Transmissions*<br>Inspection of gears, backlash;<br>Inspection of belts and pulleys, chains and sprockets; Inspection of screw jacks, lever devices, push–pull rod systems. | 1 | 2 | – |
| 7.13 *Control cables*<br>Swaging of end fittings;<br>Inspection and testing of control cables; Bowden cables; aircraft flexible control systems. | 1 | 2 | – |
| 7.14 *Material handlin*g<br>7.14.1 *Sheet metal*<br>Marking out and calculation of bend allowance; Sheet metal working, including bending and forming;<br>Inspection of sheet metal work. | – | 2 | – |
| 7.14.2 *Composite and non-metallic*<br>Bonding practices;<br>Environmental conditions;<br>Inspection methods. | – | 2 | – |
| 7.14.3 *Additive manufacturing*<br>Common additive manufacturing techniques and their influence on the mechanical properties of the finished part;<br>Inspection of additive manufactured parts and common production failures. | 1 | 1 | 1 |
| 7.15 *(Reserved)* | | | |
| 7.16 *Aircraft weight and balance*<br>(a) Calculation of centre-of-gravity / balance limits: use of relevant documents. | – | 2 | 2 |
| (b) Preparation of aircraft for weighing;<br>Aircraft weighing. | – | 2 | – |

| | | | |
|---|---|---|---|
| 7.17 *Aircraft handling and storage*<br>Aircraft taxiing/towing and associated safety precautions;<br>Aircraft jacking, chocking, securing and associated safety precautions;<br>Aircraft storage methods; | 2 | 2 | 2 |

| | LEVEL |
|---|---|

| MODULE 7 — MAINTENANCE PRACTICES | A1 A2 A3 A4 | B1 B3 | B2 |
|---|---|---|---|
| Refuelling/defuelling procedures;<br>De-icing/anti-icing procedures;<br>Electrical, hydraulic, and pneumatic ground supplies;<br>Effects of environmental conditions on aircraft handling and operation. | | | |
| 7.18 *Disassembly, inspection, repair, and assembly techniques*<br>(a) Types of defects and visual inspection techniques;<br>Corrosion removal, assessment and reprotection; | 2 | 3 | 3 |
| (b) General repair methods, structural repair manual;<br>Ageing, fatigue, and corrosion control programmes; | – | 2 | – |
| (c) Non-destructive inspection techniques including penetrant, radiographic, eddy current, magnetic particle, ultrasonic and borescope inspections; including practical training in colour contrast penetrant inspection; | – | 2 | 1 |
| (d) Disassembly and reassembly techniques; | 2 | 2 | 2 |
| (e) Troubleshooting techniques. | – | 2 | 2 |
| 7.19 *Abnormal events*<br>(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*<br>Maintenance planning;<br>Modification procedures;<br>Stores procedures;<br>Certification/release procedures;<br>Interface with aircraft operation;<br>Maintenance Inspection / Quality Control / Quality Assurance;<br>Additional maintenance procedures;<br>Control of life-limited components. | 1 | 2 | 2 |
| 7.21 Documentation and communication<br>Documentation: elements and criteria for writing work reports, troubleshooting reports, and shift handover instructions.<br>Communication: clear, comprehensive, and concise. | 1 | 2 | 2 |

## MODULE 8 — BASIC AERODYNAMICS

| MODULE 8 — BASIC AERODYNAMICS | LEVEL | |
|---|---|---|
| | A1 A2 A3 A4 B3 | B1 B2 |
| 8.1 *Physics of the atmosphere*<br>International Standard Atmosphere (ISA), and its application to aerodynamics. | 1 | 2 |
| 8.2 *Aerodynamics*<br>Airflow around a body;<br>Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation;<br>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;<br>Thrust, weight, aerodynamic resultant;<br>Generation of lift and drag angle of attack, lift coefficient, drag coefficient, polar curve, stall;<br>Aerofoil contamination including ice, snow, and frost. | 1 | 2 |
| 8.3 *Theory of flight*<br>Relationship between lift, weight, thrust and drag;<br>Glide ratio;<br>Steady-state flights, performance;<br>Theory of the turn;<br>Influence of load factor: stall, flight envelope, and structural limitations;<br>Lift augmentation. | 1 | 2 |
| 8.4 *High-speed airflow*<br>Speed of sound, subsonic flight, transonic flight, supersonic flight, Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule;<br>Factors that affect airflow in engine intakes of high-speed aircraft;<br>Effects of sweepback on critical Mach number. | 1 | 2 |
| 8.5 *Flight stability and dynamics*<br>Longitudinal, lateral, and directional stability (active and passive). | 1 | 2 |

## MODULE 9 — HUMAN FACTORS

| MODULE 9 — HUMAN FACTORS | LEVEL |
|---|---|
| | ALL |
| 9.1 *General*<br>The need to take human factors into account when performing maintenance;<br>Incidents attributable to human factors/human error;<br>Murphy's law. | 2 |
| 9.2 *Human performance and limitations*<br>Vision;<br>Hearing;<br>Information processing;<br>Attention and perception;<br>Memory;<br>Claustrophobia and physical access. | 2 |
| 9.3 *Social psychology*<br>Accountability and responsibility: individual and group;<br>Motivation and demotivation;<br>Peer pressure;<br>Cultural issues;<br>Teamwork;<br>Management, supervision, and leadership. | 1 |
| 9.4 *Factors that affect performance*<br>Fitness/health;<br>Stress: domestic and work related;<br>Time pressure and deadlines;<br>Workload: overload, underload, and workload management;<br>Sleep and fatigue, shift work;<br>Alcohol, medication, drug abuse;<br>Lack of manpower. | 2 |
| 9.5 *Physical environment*<br>Noise and fumes;<br>Illumination;<br>Climate and temperature;<br>Motion and vibration;<br>Working environment;<br>Situational awareness. | 1 |
| 9.6 *Tasks*<br>Physical work;<br>Repetitive tasks, complacency;<br>Visual inspection;<br>Complex systems;<br>Critical maintenance tasks and error-capturing methods;<br>Technical documentation: access, use, and quality. | 1 |
| 9.7 *Communication*<br>Within and between teams;<br>Work logging and recording;<br>Shift handover;<br>Keeping up to date, currency;<br>Dissemination of information. | 2 |
| 9.8 *Human error*<br>Error models and theories; | 2 |

| MODULE 9 — HUMAN FACTORS | LEVEL<br>ALL |
|---|---|
| Types of error in maintenance tasks;<br>Implications of errors (e.g. accidents);<br>Organisational errors;<br>Avoiding and managing errors. | |
| 9.9 *Safety management*<br>Risk management;<br>Occurrence reporting;<br>Safety culture<br>Just culture;<br>Identifying, avoiding, and reporting hazards;<br>Organisational human-factors programme: professionalism and integrity, error-provoking behaviour, reporting errors, disciplinary policy, error investigation, action to address problems, feedback, assertiveness;<br>Dealing with emergencies. | 2 |
| 9.10 *The 'Dirty Dozen' and risk-mitigation*<br>The 'Dirty Dozen': the twelve most common human-factors errors in maintenance:<br>Lack of communication,<br>Lack of teamwork,<br>Lack of<br>assertiveness,<br>Complacency,<br>Fatigue,<br>Stress,<br>Lack of knowledge,<br>Lack of resources,<br>Lack of awareness,<br>Distraction,<br>Pressure,<br>Norms.<br>Risk-mitigation methods. | 2 |

## MODULE 10 — AVIATION LEGISLATION

| MODULE 10 — AVIATION LEGISLATION | LEVEL | |
|---|---|---|
| | **A1 A2 A3 A4** | **B1 B2 B3** |
| 10.1 *Regulatory framework*<br>Role of:<br>— the International Civil Aviation Organization (ICAO);<br>— the Kuwait DGCA;<br>— the European Union Aviation Safety Agency (EASA);<br>— Relationship between KCASR 8-Part145, KCASR 1-Part 66,<br>— KCASR 1- Part 147, KCASR 8- Part M and KCASR 8 – Part 21<br>— General Requirement for Airworthiness;<br>— Relationship with other Aviation Authorities. | 1 | 1 |
| 10.2 *Certifying staff — maintenance*<br>Deep understanding of KCASR 1 Part-66 maintenance licences with the associated privileges and authorisations, and how to exercise them properly for the different aircraft categories | 2 | 2 |
| 10.3 *Approved maintenance organisations*<br>General understanding of KCASR 8 Part-145. | 2 | 2 |
| 10.4 *Independent certifying staff*<br>Privileges, responsibilities, record-keeping, limitations, and oversight according to KCASR 8 Part-M and KCASR 1 Part-66. | — | 3 |
| 10.5 *Air operations*<br>General understanding of KCASR 6- Operation of Aircraft; Differences between commercial and non-commercial air operations, and their influence on aircraft maintenance;<br>Air Operator Certificates (AOCs) and self-declaration authorisations;<br>Air operator responsibilities, in particular regarding continuing airworthiness and maintenance;<br>Specialised operations / specific approvals: ETOPS, CAT I/II/III, and BRNAV. Minimum Equipment List (MEL) and Configuration Deviation List (CDL); Aircraft placarding and markings;<br>Documents to be carried on board:<br>— Certificate of Airworthiness / Restricted Certificate of Airworthiness;<br>— Airworthiness Review Certificate;<br>— Permit to Fly;<br>— Certificate of Registration;<br>— Noise Certificate;<br>— Weight and Balance report;<br>— Radio Station Licence. | 1 | 1 |

| MODULE 10 — AVIATION LEGISLATION | LEVEL | |
|---|---|---|
| | **A1 A2 A3 A4** | **B1 B2 B3** |
| 10.6 *Certification of aircraft and parts*<br>Basic understanding of KCASR 8 Part 21. | 2 | 2 |
| 10.7 *Continuing airworthiness*<br>General understanding of KCASR 8 Part 21 requirements on continuing airworthiness; General understanding of KCASR 8 Part-M;<br>Aircraft Maintenance Programme. | 2 | 2 |
| 10.8 *Oversight principles in continuing airworthiness* | 1 | 1 |
| 10.9 *Maintenance and certification beyond current DGCA regulations*<br>Applicable national and international requirements for component maintenance, welding, painting, NDT, etc. (if not superseded by EU requirements). | – | 1 |
| 10.10 *Cybersecurity in aviation maintenance*<br>Regulation on the introduction of organisation requirements for the management of information security risks related to aeronautical information systems used in civil aviation. | 1 | 1 |

## MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | **A1** | **A2** | **B1.1** | **B1.2** | **B3** |
| 11.1 *Theory of flight*<br>(a) Aeroplane aerodynamics and flight controls<br>Operation and effect of:<br>— roll control: ailerons and spoilers;<br>— pitch control: elevators, stabilators, variable incidence stabilisers and canards;<br>— yaw control, rudder limiters;<br>— elevons, ruddervators;<br>— high-lift devices, slots, slats, flaps, flaperons;<br>— drag-inducing devices, spoilers, lift dumpers, speed brakes;<br>— trim tabs, servo tabs, control surface bias. | 1 | 1 | 2 | 2 | 1 |
| (b) Aeroplane: other aerodynamic devices<br>Operation and effect of:<br>— balance and antibalance (leading) tabs;<br>— spring tabs, mass balance, aerodynamic balance panels;<br>— mass balance, aerodynamic balance panels;<br>— effects of wing fences, saw tooth leading edges;<br>— boundary layer control using vortex generators, stall wedges or leading-edge devices. | 1 | 1 | 2 | 2 | 1 |
| 11.2 *Airframe structures (ATA 51)*<br>(a) General concepts:<br>— Zonal and station identification systems;<br>— Electrical bonding;<br>— Lightning strike protection provisions. | 2 | 2 | 2 | 2 | 2 |
| (b) Airworthiness requirements for structural strength:<br>— Structural classification: primary, secondary, and tertiary;<br>— Fail-safe, safe-life, damage-tolerance concepts;<br>— Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;<br>— Drains and ventilation provisions;<br>— System installation provisions. | 2 | 2 | 2 | 2 | 2 |
| (c) Construction methods<br>— Stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, skinning, anticorrosive protection, wing, empennage and engine attachments;<br>— Structure assembly techniques: riveting, bolting, bonding;<br>— Methods of surface protection, such as chromating, anodising, painting;<br>— Surface cleaning;<br>— Airframe symmetry: methods of alignment and symmetry checks. | 1 | 1 | 2 | 2 | 2 |

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | B1.1 | B1.2 | B3 |
| 11.3 *Airframe structures — aeroplanes*<br>11.3.1 *Fuselage, doors, windows (ATA 52/53/56)*<br>(a) Construction principles<br>— Construction and pressurisation sealing;<br>— Wing, stabiliser, pylon, and undercarriage attachments;<br>— Seat installation and cargo loading system;<br>— Doors and emergency exits: construction, mechanisms, operation and safety devices;<br>— Windows and windscreen construction and mechanisms. | 1 | 1 | 2 | 2 | 1 |
| (b) Airborne towing devices (glider, banner, target). | 1 | 1 | 1 | 1 | 1 |
| (c) Doors<br>— Doors and emergency exits: safety devices;<br>— Cargo loading system. | 1 | 1 | 2 | 1 | — |
| 11.3.2 *Wings (ATA 57)*<br>Construction;<br>Fuel storage;<br>Landing gear, pylon, control surface and high lift/drag attachments. | 1 | 1 | 2 | 2 | 1 |
| 11.3.3 *Stabilisers (ATA 55)*<br>Construction;<br>Control surface attachment. | 1 | 1 | 2 | 2 | 1 |
| 11.3.4 *Flight control surfaces (ATA 55/57)*<br>Construction and attachments;<br>Balancing — mass and aerodynamics. | 1 | 1 | 2 | 2 | 1 |
| 11.3.5 *Nacelles/pylons (ATA 54)*<br>Nacelles/Pylons:<br>— Construction,<br>— Firewalls,<br>— Engine mounts. | 1 | 1 | 2 | 2 | 1 |
| 11.4 *Air conditioning and cabin pressurisation (ATA 21)*<br>(a) Pressurisation<br>Pressurisation systems;<br>Cabin pressure controllers, control, and safety valves;<br>Control and indication. | 1 | 1 | 3 | 3 | — |
| (b) Air supply<br>Sources of air supply including engine bleed, APU and ground cart;<br>Distribution systems. | 1 | - | 3 | - | — |
| (c) Air conditioning<br>Air-conditioning systems;<br>Air cycle and vapour cycle machines;<br>Flow, temperature and humidity control system;<br>Control and indication control valves. | 1 | — | 3 | - | — |
| (d) Safety and warning devices<br>Protection and warning devices. | 1 | 1 | 3 | 3 | — |
| (e) Heating and ventilation systems. | — | 1 | - | 3 | 1 |

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | B1.1 | B1.2 | B3 |
| 11.5 *Instruments / avionics systems*<br>11.5.1 *Instrument systems (ATA 31)*<br>Pitot-static:<br>Airspeed indicators,<br>Vertical speed indicators,<br>Altimeters;<br>Gyroscopic:<br>Gyroscopic principles,<br>Artificial horizons,<br>Attitude directors,<br>Direction indicators,<br>Horizontal situation indicators (HSI),<br>Slip indicators, Turn indicators, Turn coordinators;<br>Compass systems: systems, direct reading, remote reading,<br>Stall-warning systems and angle-of-attack indicating systems,<br>Glass cockpit,<br>Indications of other aircraft systems. | 1 | 1 | 2 | 2 | 2 |
| 11.5.2 *Avionics systems*<br>Fundamentals of system layouts and operation of:<br>Autoflight **(ATA 22)**;<br>Communication systems **(ATA 23)**:<br>— Very High Frequency (VHF) communications,<br>— High Frequency (HF) communications,<br>— Satellite Communications (SATCOM),<br>— Controller–pilot data link communications (CPDLC),<br>— Audio systems,<br>— Emergency Locator Transmitters (ELTs),<br>— Cockpit Voice Recorder<br>(CVR); Navigation systems **(ATA 34)**:<br>— Very high frequency omnidirectional range (VOR),<br>— Automatic direction finder (ADF),<br>— Instrument landing system (ILS),<br>— Microwave landing system (MLS),<br>— Flight director systems (FDSs), distance-measuring equipment (DME),<br>— Area navigation (RNAV) systems,<br>— Flight management systems (FMSs),<br>— Satellite navigation systems,<br>— Air traffic control transponder, secondary surveillance radar,<br>— Traffic alert and collision avoidance system (TCAS),<br>— Weather avoidance radar,<br>— Radio altimeter,<br>— Inertial navigation system (INS),<br>— ARINC (Aeronautical Radio Incorporated) communication and reporting.<br>Types and uses of avionics general test equipment. | 1 | 1 | 1 | 1 | 1 |

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | **A1** | **A2** | **B1.1** | **B1.2** | **B3** |
| 11.6 *Electrical power* ***(ATA 24)*** | 1 | 1 | 3 | 3 | 3 |
| — Installation and operation of batteries;<br>— DC power generation;<br>— AC power generation;<br>— Emergency power generation;<br>— Voltage regulation;<br>— Power distribution;<br>— Inverters, transformers, rectifiers;<br>— Circuit protection;<br>— External/ground power. | | | | | |
| 11.7 *Equipment and furnishings* ***(ATA 25)*** | | | | | |
| (a) Emergency equipment:<br>Emergency equipment requirements. | 2 | 2 | 2 | 2 | 2 |
| (b) Cabin and cargo layout: | 1 | 1 | 1 | 1 | — |
| — Seats, harnesses, and belts;<br>— Cabin layout;<br>— Equipment layout;<br>— Cabin furnishing installation;<br>— Galley installation;<br>— Cargo handling and retention equipment;<br>— Airstairs. | | | | | |
| 11.8 *Fire protection* ***(ATA 26)*** | | | | | |
| (a) Fire and smoke detection system, and fire-extinguishing systems:<br>— Fire and smoke detection and warning systems;<br>— Fire-extinguishing systems;<br>— System tests. | 1 | 1 | 1 | 1 | — |
| (b) Portable fire extinguisher. | 1 | 1 | 1 | 1 | 1 |
| *11.9 Flight controls* ***(ATA 27)*** | | | | | |
| (a) Primary and secondary flight controls:<br>— Primary controls: aileron, elevator, rudder, spoiler;<br>— Trim control, trim tabs;<br>— High-lift devices;<br>— System operation: manual;<br>— Gust locks and gust lock systems;<br>— Artificial feel, yaw damper, Mach trim, rudder limiter;<br>— Stall-warning systems. | 1 | 1 | 3 | 3 | 2 |
| (b) Actuation and protection:<br>— Active load control;<br>— Lift dump, speed brakes;<br>— Hydraulic, pneumatic systems;<br>— Stall-protection systems. | 1 | — | 3 | — | — |
| (c) System operation:<br>Electrical systems, fly-by-wire systems. | 1 | — | 3 | — | — |
| (d) Balancing and rigging. | 1 | 1 | 3 | 3 | 2 |

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | B1.1 | B1.2 | B3 |
| *11.10 Fuel systems (ATA 28, ATA 47)*<br>(a) Systems:<br>— System layout;<br>— Fuel tanks;<br>— Supply systems. | 1 | 1 | 3 | 3 | 1 |
| (b) Fuel handling:<br>— Cross-feed and transfer;<br>— Refuelling and defuelling. | 1 | 1 | 3 | 3 | 1 |
| (c) Indication and warnings. | 1 | 1 | 3 | 3 | 1 |
| (d) Special systems:<br>— Dumping, venting, and draining;<br>— Inert gas systems. | 1 | — | 3 | — | — |
| (e) Balancing:<br>Longitudinal balance fuel systems. | 1 | — | 3 | — | — |
| 11.11 *Hydraulic power* ***(ATA 29)***<br>(a) System description:<br>System layout;<br>Hydraulic fluids;<br>Hydraulic reservoirs and accumulators;<br>Filters;<br>Power distribution. | 1 | 1 | 3 | 3 | 2 |
| (b) System operation (1):<br>Pressure generation: electric and mechanical; Pressure control;<br>Indication and warning systems; Servicing. | 1 | 1 | 3 | 3 | 2 |
| (c) System operation (2):<br>Pressure generation: pneumatic; Emergency pressure generation; Interface with other systems. | 1 | — | 3 | — | — |
| 11.12 *Ice and rain protection* ***(ATA 30)***<br>(a) Principles:<br>Ice formation, classification, and detection. | 1 | 1 | 3 | 3 | 1 |
| (b) De-icing:<br>De-icing systems: electrical, hot-air, pneumatic, chemical;<br>Probe and drain heating. | 1 | 1 | 3 | 3 | 1 |
| (c) Anti-icing:<br>Anti-icing systems: electrical, hot-air, chemical. | 1 | — | 3 | — | — |
| (d) Wipers:<br>Wiper systems. | 1 | 1 | 3 | 3 | 1 |
| (e) Rain-repellent systems. | 1 | — | 3 | — | — |
| 11.13 *Landing gear* ***(ATA 32)***<br>(a) Description:<br>Construction, shock absorbing;<br>Tyres. | 2 | 2 | 3 | 3 | 2 |

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | B1.1 | B1.2 | B3 |
| (b) Systems:<br>Extension and retraction systems: normal and emergency;<br>Indications and warnings;<br>Wheels, brakes, antiskid, and autobraking;<br>Steering. | 2 | 2 | 3 | 3 | 2 |
| (c) Air–ground sensing. | 2 | — | 3 | — | — |
| (d) Tail protection:<br>Skids. | 2 | 2 | 3 | 3 | 2 |
| 11.14 *Lights* ***(ATA 33)***<br>External: navigation, anticollision, landing, taxiing, ice;<br>Internal: cabin, cockpit, cargo;<br>Emergency. | 2 | 2 | 3 | 3 | 2 |
| 11.15 *Oxygen* ***(ATA 35)***<br>System layout: cockpit, cabin;<br>Sources, storage, charging and distribution;<br>Supply regulation;<br>Indications and warnings. | 1 | 1 | 3 | 3 | 2 |
| 11.16 *Pneumatic / vacuum* ***(ATA 36)***<br>(a) Systems:<br>System layout;<br>Sources: engine / APU (Auxiliary Power Unit), compressors, reservoirs, ground supply;<br>Pressure control;<br>Distribution;<br>Indications and warnings;<br>Interface with other systems. | 1 | 1 | 3 | 3 | 2 |
| (b) Pumps:<br>Pressure and vacuum pumps. | 1 | 1 | 3 | 3 | 2 |
| 11.17 *Water / waste* ***(ATA 38)***<br>(a) Systems:<br>Water system layout, supply, distribution, servicing and draining;<br>Toilet system layout, flushing and servicing. | 2 | 2 | 3 | 3 | 2 |
| (b) Corrosion:<br>Corrosion aspects. | 2 | 2 | 3 | 3 | 2 |
| 11.18 *Onboard maintenance systems* ***(ATA 45)***<br>Central maintenance computers;<br>Data-loading system;<br>Electronic library system;<br>Printing systems;<br>Structure monitoring (damage-tolerance monitoring). | 1 | — | 2 | — | — |
| 11.19 *Integrated modular avionics (IMA)* ***(ATA 42)***<br>(a) Overall system description and theory:<br>Core system; network components;<br>Functions that may be typically integrated in the integrated modular avionics (IMA) modules are, among others: | 1 | — | 2 | — | — |

| MODULE 11 — AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | B1.1 | B1.2 | B3 |
| 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. | | | | | |
| (b) Typical system layout. | 1 | — | 2 | — | — |
| 11.20 *Cabin systems* ***(ATA 44)*** | 1 | — | 2 | — | — |
| System architecture, operation, and control of systems for:<br>— passenger in-flight entertainment;<br>— communication within the aircraft (Cabin intercommunication data system (CIDS);<br>— communication between the aircraft cabin and ground stations;<br>— including voice, data, music, and video transmission.<br>CIDS interface between cockpit/cabin crew and cabin systems.<br>Data exchange between the different related line replaceable units (LRUs).<br>Flight attendant panels (FAPs).<br>Cabin network server (CNS) and interfaces with the following systems:<br>— Data/radio communication;<br>— Cabin core system (CCS);<br>— In-flight entertainment system (IFES);<br>— External communication system (ECS);<br>— Cabin mass memory system (CMMS);<br>— Cabin monitoring system (CMS);<br>— Miscellaneous cabin systems (MCSs); and<br>— Other systems.<br>Cabin network server (CNS) hosting functions:<br>— Access to predeparture/departure reports;<br>— Email/intranet/internet access; passenger database;<br>— In-flight entertainment system;<br>— External communication system;<br>— Cabin mass memory system;<br>— Cabin monitoring system;<br>— Miscellaneous cabin system. | | | | | |
| 11.21 *Information systems* ***(ATA 46)*** | 1 | — | 2 | — | — |
| System architecture, operation, and control of:<br>— Storage and electronic library;<br>— Updating;<br>— Retrieving of digital information;<br>— Air traffic and information management systems (ATIMS) and network server systems;<br>— Aircraft general information system;<br>— Flight deck information system;<br>— Maintenance information system;<br>— Passenger cabin information system;<br>— Miscellaneous information systems;<br>— Other linked systems. | | | | | |

## MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

| MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | |
|---|---|---|
| | **A3<br>A4** | **B1.3<br>B1.4** |
| 12.1 *Theory of flight — rotary wing aerodynamics*<br>Terminology;<br>Effects of gyroscopic precession;<br>Torque reaction and directional control;<br>Dissymmetry of lift, blade tip stall;<br>Translating tendency and its correction;<br>Coriolis effect and compensation;<br>Vortex ring state, power setting, overpitching;<br>Auto-rotation;<br>Ground effect. | 1 | 2 |
| 12.2 *Flight control systems* ***(ATA 67)***<br>Cyclic control;<br>Collective control;<br>Swashplate;<br>Yaw control: antitorque control, tail rotor, bleed air;<br>Main-rotor head: design and operation features;<br>Blade dampers: function and construction;<br>Rotor blades: main- and tail-rotor blade construction and attachment;<br>Trim control, fixed and adjustable stabilisers;<br>System operation: manual, hydraulic, electrical, fly-by-wire;<br>Artificial feel;<br>Balancing and rigging. | 2 | 3 |
| 12.3 *Blade tracking and vibration analysis* ***(ATA 18)***<br>Rotor alignment;<br>Main-rotor and tail-rotor tracking;<br>Static and dynamic balancing;<br>Vibration types, and vibration reduction methods;<br>Ground resonance. | 1 | 3 |
| 12.4 *Transmission*<br>Gear boxes, main and tail rotors;<br>Clutches, free wheel units and rotor brake;<br>Tail-rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers. | 1 | 3 |
| 12.5 *Airframe structures*<br>(a) General concept<br>Airworthiness requirements for structural strength;<br>Structural classification: primary, secondary, tertiary;<br>Fail-safe, safe-life, damage-tolerance concepts;<br>Zonal and station identification systems;<br>Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;<br>Drains and ventilation provisions;<br>System installation provisions;<br>Lightning strike protection provisions. | 2 | 2 |

| MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | |
|---|---|---|
| | A3<br>A4 | B1.3<br>B1.4 |
| (b) Construction methods for the principal elements<br><br>Stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, skinning and anticorrosive protection;<br>Pylon, stabiliser and undercarriage attachments;<br>Seat installation;<br>Doors: construction, mechanisms, operation, and safety devices;<br>Windows and windscreen construction;<br>Fuel storage;<br>Firewalls;<br>Engine mounts;<br>Structure assembly techniques: riveting, bolting, bonding;<br>Methods for surface protection, such as chromating, anodising, painting;<br>Surface cleaning;<br>Airframe symmetry: methods for alignment and symmetry checks. | 1 | 2 |
| 12.6 *Air conditioning* ***(ATA 21)***<br>12.6.1 *Air supply*<br>Sources of air supply, including engine bleed and ground cart. | 1 | 2 |
| 12.6.2 *Air conditioning*<br>Air-conditioning systems;<br>Distribution systems;<br>Flow and temperature control systems;<br>Protection and warning devices. | 1 | 3 |
| 12.7 *Instruments / avionics systems*<br>12.7.1 *Instrument systems* ***(ATA 31)***<br>Pitot-static: altimeter, airspeed indicator, vertical speed indicator; Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;<br>Compasses: direct reading, remote reading;<br>Vibration indicating systems / health and usage monitoring systems (HUMSs);<br>Glass cockpit;<br>Indications of other aircraft systems. | 1 | 2 |
| 12.7.2 *Avionics systems*<br>Fundamentals of system layouts and operation of:<br>Autoflight **(ATA 22)**;<br>Communications **(ATA 23)**:<br>— Very high frequency (VHF) communications,<br>— High-frequency (HF) communications,<br>— Satellite communications (SATCOM),<br>— Controller–pilot data link communications (CPDLC),<br>— Audio systems,<br>— Emergency locator transmitters (ELTs),<br>— Cockpit voice recorder (CVR);<br>Navigation systems **(ATA 34)**: | 1 | 1 |

| MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | |
|---|---|---|
| | A3<br>A4 | B1.3<br>B1.4 |
| — Very high frequency omnidirectional range (VOR),<br>— Automatic direction finding (ADF),<br>— Instrument landing system (ILS),<br>— Microwave landing system (MLS),<br>— Flight director systems (FDSs), distance-measuring equipment (DME),<br>— Area navigation (RNAV) systems,<br>— Flight management systems (FMSs),<br>— Satellite navigation systems,<br>— Inertial navigation system (INS),<br>— Air traffic control transponder, secondary surveillance radar,<br>— Traffic alert and collision avoidance system (TCAS),<br>— Weather avoidance radar,<br>— Radio altimeter,<br>— ARINC communication and reporting.<br>Types and uses of general test equipment for avionics. | | |
| 12.8 *Electric power* ***(ATA 24)***<br>Installation and operation of batteries;<br>DC power generation, AC power generation;<br>Emergency power generation;<br>Voltage regulation, circuit protection;<br>Power distribution;<br>Inverters, transformers, rectifiers;<br>External/Ground power. | 1 | 3 |
| 12.9 *Equipment and furnishings* ***(ATA 25)***<br>(a) Emergency equipment requirements;<br>Seats, harnesses, and belts;<br>Lifting systems. | 2 | 2 |
| (b) Emergency flotation systems;<br>Cabin layout, cargo retention;<br>Equipment layout;<br>Cabin furnishing installation. | 1 | 1 |
| 12.10 *Fire protection* ***(ATA 26)***<br>(a) Fire and smoke detection and warning systems;<br>Fire-extinguishing systems;<br>System tests. | 1 | 3 |
| (b) Portable fire extinguishers. | 1 | 1 |
| 12.11 *Fuel systems* ***(ATA 28)***<br>System layout;<br>Fuel tanks;<br>Supply<br>systems;<br>Dumping, venting, and draining;<br>Cross-feed and transfer;<br>Indications and warnings;<br>Refuelling and defuelling. | 1 | 3 |

| MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | |
|---|---|---|
| | **A3<br>A4** | **B1.3<br>B1.4** |
| 12.12 *Hydraulic power* ***(ATA 29)***<br>System layout;<br>Hydraulic fluids;<br>Hydraulic reservoirs and accumulators;<br>Pressure generation: electric, mechanical, pneumatic;<br>Emergency pressure generation;<br>Filters;<br>Pressure control;<br>Power distribution;<br>Indication and warning systems;<br>Interface with other systems;<br>Servicing. | 1 | 3 |
| 12.13 *Ice and rain protection (ATA 30)*<br>Ice formation, classification, and detection;<br>Anti-icing and de-icing systems: electrical, hot-air, and chemical;<br>Rain repellent and removal;<br>Probe and drain heating;<br>Wiper system. | 1 | 3 |
| 12.14 *Landing gear* ***(ATA 32)***<br>(a) System description and operation:<br>Construction, shock absorbing;<br>Extension and retraction systems: normal and emergency;<br>Wheels, tyres, brakes;<br>Steering;<br>Skids, floats. | 2 | 3 |
| (b) Sensors:<br>Indications and warning;<br>Air–ground sensing. | 2 | 3 |
| 12.15 *Lights* ***(ATA 33)***<br>External: navigation, landing, taxiing;<br>Internal: cabin, cockpit, cargo;<br>Emergency. | 2 | 3 |
| 12.16 *(Reserved)* | | |

| MODULE 12 — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL | |
|---|---|---|
| | A3<br>A4 | B1.3<br>B1.4 |
| 12.17 *Integrated modular avionics (IMA)* ***(ATA 42)***<br>(a) Overall system description and theory<br>Functions that may be typically integrated in the integrated modular avionics (IMA) modules:<br>Bleed management, air pressure control, air ventilation and control, avionics and cockpit ventilation control, temperature control, air traffic communication, avionics communication router, electrical load management, circuit breaker monitoring, electrical system BITE, fuel management, steering control, landing gear extension and retraction, tyre pressure indication, oleo pressure indication, brake temperature monitoring, etc.;<br>Core System;<br>Network Components. | 1 | 2 |
| (b) Typical system layouts. | 1 | 2 |
| 12.18 *Onboard maintenance systems* ***(ATA 45)***<br>Central maintenance computers;<br>Data-loading system;<br>Electronic library system. | 1 | 2 |
| 12.19 *Information systems* ***(ATA 46)***<br>The units and components which furnish a means of storing, updating, and retrieving digital information traditionally provided on paper, microfilm or microfiche. They include units that are dedicated to the information storage and retrieval function, such as the electronic library mass storage and controller. They do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general-use display.<br>Typical examples include air traffic and information management systems and network server systems.<br>Aircraft general information system.<br>Flight deck information system.<br>Maintenance information system.<br>Miscellaneous information system. | 1 | 2 |

## MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL |
|---|---|
| | B2 |
| 13.1 *Theory of flight*<br>(a) Aeroplane aerodynamics and flight controls Operation and effect of:<br>— roll control: ailerons and spoilers;<br>— pitch control: elevators, stabilators, variable incidence stabilisers and canards; and<br>— yaw control: rudder limiters;<br>— control using elevons, ruddervators;<br>— high-lift devices: slots, slats, flaps;<br>— drag-inducing devices: spoilers, lift dumpers, speed brakes;<br>— trim tabs, servo tabs, and control surface bias. | 1 |
| (b) Rotary wing aerodynamics Terminology;<br>Operation and effect of cyclic, collective, and antitorque controls. | 1 |
| 13.2 *Structures — general concepts*<br>(a) General concepts;<br>Zonal and station identification systems; Electrical bonding; Lightning strike protection provisions. | 2 |
| (b) Fundamentals of structural systems. | 1 |
| 13.3 *Autoflight* ***(ATA 22)***<br>(a) Fundamentals of automatic flight control:<br>— Working principles and current terminology;<br>— Command signal processing;<br>— Modes of operation: roll, pitch, and yaw channels;<br>— Yaw dampers;<br>— Stability augmentation system in helicopters;<br>— Automatic trim control;<br>— Autopilot navigation aids interface. | 3 |
| (b) Autothrottle systems and automatic landing systems:<br>— Principles and categories;<br>— Modes of operation;<br>— Approach;<br>— Glideslope;<br>— Land, go-around;<br>— System monitors and failure conditions. | 3 |

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL |
|---|---|
| | B2 |
| 13.4 *Communication/navigation (ATA 23/34)*<br><br>(a) Fundamentals of communication and navigation systems:<br>— Radio wave propagation, antennas, transmission lines, communication, receiver, and transmitter;<br>Working principles of the following systems:<br>— Very high frequency (VHF) communications;<br>— High-frequency (HF) communications;<br>— Satellite communications (SATCOM);<br>— Controller–pilot data link communications (CPDLC);<br>— Audio systems;<br>— Emergency locator transmitters (ELTs);<br>— Cockpit voice recorder (CVR);<br>— Very high frequency omnidirectional range (VOR);<br>— Automatic direction finding (ADF);<br>— Instrument landing system (ILS);<br>— Flight director systems (FDSs), distance- measuring equipment (DME);<br>— Area navigation (RNAV) systems;<br>— Flight management systems (FMSs);<br>— Global navigation satellite systems (GNSSs), Global Positioning System (GPS), ground-based augmentation system (GBAS), satellite-based augmentation system (SBAS) such as the European geostationary navigation overlay service (EGNOS) and the wide area augmentation system (WAAS);<br>— Data link and two-way data link. | 3 |
| (b) Fundamentals of aircraft surveillance systems:<br>— Air traffic control transponder, secondary surveillance radar;<br>— Traffic alert and collision avoidance system (TCAS);<br>— Weather avoidance radar;<br>— Radio altimeter;<br>— Automatic dependent surveillance — broadcast (ADS-B) and its other associated services such as FIS-B, TIS-B and multilink;<br>— Inertial navigation system (INS);<br>— ARINC (Aeronautical Radio Incorporated) communication and reporting. | 3 |
| 13.5 *Electric power* ***(ATA 24)*** | |

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL<br>B2 |
|---|---|
| — Installation and operation of batteries;<br>— DC power generation;<br>— AC power generation;<br>— Emergency power generation;<br>— Voltage regulation;<br>— Power distribution;<br>— Inverters, transformers, rectifiers;<br>— Circuit protection;<br>— External/ground power. | 3 |
| 13.6 *Equipment and furnishings **(ATA 25)***<br>Electronic emergency equipment requirements. | 3 |
| 13.7 *Flight controls*<br>(a) Primary and secondary flight controls **(ATA 27)**:<br>— Primary controls: aileron, elevator, rudder, spoiler;<br>— Trim control: trim tabs;<br>— High-lift devices;<br>— System operation: manual;<br>— Gust locks and gust lock systems;<br>— Artificial feel, yaw damper, Mach trim, rudder limiter;<br>— Stall-warning systems. | 2 |
| (b) Actuation and protection:<br>— Active load control;<br>— Lift dump, speed brakes;<br>— Hydraulic, pneumatic systems;<br>— Stall-protection systems. | 2 |
| (c) System operation:<br>— System operation: electrical, fly-by-wire. | 3 |
| (d) Rotorcraft flight controls **(ATA 67)**:<br>Rotorcraft controls: cyclic control, collective control, swashplate, yaw control. | 2 |
| 13.8 *Instruments **(ATA 31)***<br>— Classification;<br>— Atmosphere;<br>— Terminology;<br>— Pressure-measuring devices and systems;<br>— Pitot-static systems;<br>— Altimeters;<br>— Vertical speed indicators;<br>— Airspeed indicators;<br>— Machmeters;<br>— Altitude-reporting/-alerting systems;<br>— Air-data computers;<br>— Instrument pneumatic systems;<br>— Direct-reading pressure and temperature gauges;<br>— Temperature-indicating systems; | 3 |

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL |
|---|---|
| | B2 |
| — Gyroscopic principles;<br>— Artificial horizons;<br>— Slip indicators;<br>— Directional gyros;<br>— Ground proximity warning systems (GPWSs);<br>— Compass systems;<br>— Flight data recording systems (FDRSs);<br>— Electronic flight instrument systems (EFISs) — typical system arrangements and cockpit layout;<br>— Instrument warning systems, including master warning systems and centralised warning panels;<br>— Stall-warning systems and angle-of-attack indicating systems;<br>— Vibration measurement and indication;<br>— Glass cockpit;<br>— Types and uses of general test equipment for avionics. | |
| 13.9 *Lights* ***(ATA 33)***<br>External: navigation, anticollision, landing, taxiing, ice; Internal: cabin, cockpit, cargo;<br>Emergency. | 3 |
| 13.10 *Onboard maintenance systems* ***(ATA 45)***<br>Central maintenance computers; Data-loading system;<br>Electronic library system; Printing system;<br>Structure monitoring system (damage-tolerance monitoring). | 3 |
| 13.11 *Air conditioning and cabin pressurisation* ***(ATA 21)***<br>(a) Pressurisation:<br>— Pressurisation systems;<br>— Cabin pressure controllers, control and safety valves;<br>— Control and indication. | 3 |
| (b) Air supply:<br>Sources of air supply including engine bleed, APU and ground cart;<br>Distribution systems. | 1 |
| (c) Air conditioning. | 3 |
| (d) Safety and warning devices. | 3 |
| 13.12 Fire protection **(ATA 26)**<br>(a) Fire and smoke detection system and fire- extinguishing systems;<br>— Fire and smoke detection and warning systems;<br>— Fire-extinguishing systems;<br>— System tests. | 3 |
| (b) Portable fire extinguisher. | 1 |

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL |
|---|---|
| | B2 |
| 13.13 *Fuel systems* ***(ATA 28, ATA 47)*** | |
| (a) System layout:<br>System layout; Fuel tanks; Supply systems. | 1 |
| (b) Fuel handling;<br>Cross-feed and transfer; Refuelling and defuelling. | 2 |
| (c) Indications and warnings. | 3 |
| (d) Special systems:<br>Dumping, venting and draining; Inert gas systems. | 1 |
| (e) Balancing:<br>Longitudinal balance fuel systems. | 3 |
| 13.14 *Hydraulic power* ***(ATA 29)*** | |
| (a) System layout:<br>System layout; Hydraulic fluids; Hydraulic reservoirs and accumulators; Filters; Power distribution. | 1 |
| (b) System operation (1):<br>Pressure generation: electric and mechanical; Pressure control; Indication and warning systems; Servicing. | 3 |
| (c) System operation (2):<br>Pressure generation: pneumatic; Emergency pressure generation; Interface with other systems. | 3 |
| 13.15 *Ice and rain protection* ***(ATA 30)*** | |
| (a) Principles:<br>Ice formation, classification, and detection. | 2 |
| (b) De-icing:<br>De-icing systems: electrical, hot-air, pneumatic, and chemical; Probe and drain heating. | 3 |
| (c) Anti-icing:<br>Anti-icing systems: electrical, hot-air, and chemical. | 2 |
| (d) Wiper systems. | 1 |
| (e) Rain repellent. | 1 |
| 13.16 *Landing gear* ***(ATA 32)*** | |
| (a) Description:<br>Construction, shock absorbing; Tyres. | 1 |
| (b) Systems:<br>Extension and retraction systems: normal and emergency;<br>Indications and warnings;<br>Wheels, brakes, antiskid, and autobraking; Steering. | 3 |

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL |
|---|---|
| | B2 |
| (c) Air–ground sensing. | 3 |
| 13.17 *Oxygen (ATA 35)*<br>System layout: cockpit, cabin;<br>Sources, storage, charging, and distribution; Supply regulation;<br>Indications and warnings. | 3 |
| 13.18 *Pneumatic/vacuum* ***(ATA 36)***<br>— System layout;<br>— Sources: engine/APU, compressors, reservoirs, ground supply;<br>— Pressure control;<br>— Distribution;<br>— Indications and warnings;<br>— Interfaces with other systems. | 2 |
| 13.19 *Water/waste* ***(ATA 38)***<br>— Water system layout, supply, distribution, servicing, and draining;<br>— Toilet system layout, flushing and servicing. | 2 |
| 13.20 *Integrated modular avionics (IMA)* ***(ATA 42)***<br>(a) Overall system description and theory: Core system;<br>Network components.<br>Note: Functions that may be typically integrated into the integrated modular avionics (IMA) modules are, among others:<br>— Bleed management;<br>— Air pressure control;<br>— Air ventilation and control;<br>— Avionics and cockpit ventilation control, temperature control;<br>— Air traffic communication;<br>— Avionics communication router;<br>— Electrical load management;<br>— Circuit breaker monitoring;<br>— Electrical system built-in test equipment (BITE);<br>— Fuel management;<br>— Braking control;<br>— Steering control;<br>— Landing gear extension and retraction;<br>— Tyre pressure indication;<br>— Oleo pressure indication;<br>— Brake temperature monitoring. | 3 |
| (b) Typical system layouts. | 3 |

| MODULE 13 — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS | LEVEL |
|---|---|
| | B2 |
| 13.21 *Cabin systems* ***(ATA 44)***<br>System architecture, operation and control of systems for:<br>— passenger in-flight entertainment;<br>— communication within the aircraft (cabin intercommunication data system (CIDS);<br>— communication between the aircraft cabin and ground stations, including voice, data, music and video transmission. CIDS interface between cockpit/cabin crew and cabin systems;<br>Data exchange between the different related line replaceable units (LRUs);<br>Flight attendant panels (FAPs).<br>CNS server and interfaces with the following systems:<br>— Data/radio communication system;<br>— Cabin core system (CCS);<br>— In-flight entertainment system (IFES);<br>— External communication system (ECS);<br>— Cabin mass memory system (CMMS);<br>— Cabin monitoring system (CMS);<br>— Miscellaneous cabin systems (MCSs). The CNS may host functions such as:<br>— access to predeparture/departure reports;<br>— email/intranet/internet access;<br>— passenger database. | 3 |
| 13.22 *Information systems* ***(ATA 46)***<br>The units and components which furnish a means of storing, updating, and retrieving digital information traditionally provided on paper, microfilm or microfiche. They include units that are dedicated to the information storage and retrieval function, such as the electronic library mass storage and controller, but they do not include units or components installed for other uses and shared with other systems, such as flight deck printer or general-use display.<br>Typical examples include:<br>— air traffic and information management systems and network server systems;<br>— aircraft general information system;<br>— flight deck information system;<br>— maintenance information system;<br>— passenger cabin information system;<br>— miscellaneous information systems;<br>— other linked systems. | 3 |

## MODULE 14 — PROPULSION

| MODULE 14 — PROPULSION | LEVEL |
|---|---|
| | B2 |
| 14.1 *Engines*<br>(a) Constructional arrangement and operation of turbojet, turbofan, turboshaft, and turboprop engines. | 1 |
| (b) Constructional arrangement and operation of auxiliary power units (APUs). | 1 |
| (c) Constructional arrangement and operation of piston engines. | 1 |
| (d) Constructional arrangement and operation of electric and hybrid engines, their electric energy storage and control systems. | 2 |
| (e) Electronic engine control and fuel-metering systems (full authority digital engine control (FADEC)). | 2 |
| 14.2 *Electric/electronic engine indication systems*<br>— Exhaust gas temperature / interstage turbine temperature systems;<br>— Cylinder head temperature, engine coolant temperature, engine speed;<br>— Engine thrust indication: engine pressure ratio, engine turbine discharge pressure or jet pipe pressure systems;<br>— Vibration measurement systems;<br>— Oil pressure and temperature;<br>— Fuel pressure, temperature, and flow;<br>— Manifold pressure;<br>— Engine torque. | 2 |
| 14.3 *Propeller systems*<br>— Propeller speed indication;<br>— Speed control and pitch change methods — electrical/electronic;<br>— Synchronising and synchrophasing equipment;<br>— Electrical anti-icing/de-icing equipment. | 2 |
| 14.4 *Starting and ignition systems*<br>— Operation of engine start systems and components;<br>— Ignition systems and components;<br>— Maintenance safety requirements. | 2 |

## MODULE 15 — GAS-TURBINE ENGINE

| MODULE 15 — GAS-TURBINE ENGINE | LEVEL | |
|---|---|---|
| | **A1 A3** | **B1.1 B1.3** |
| 15.1 *Fundamentals*<br>— Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle;<br>— The relationship between force, work, power, energy, velocity, and acceleration;<br>— Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop, and geared turbofan engines. | 1 | 2 |
| 15.2 *Engine performance*<br>— Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption;<br>— Engine efficiencies;<br>— By-pass ratio and engine pressure ratio;<br>— Pressure, temperature, and velocity of the gas flow;<br>— Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations. | – | 2 |
| 15.3 *Inlet*<br>— Compressor inlet ducts;<br>— Effects of various inlet configurations;<br>— Ice protection. | 2 | 2 |
| 15.4 *Compressors*<br>— Axial and centrifugal types;<br>— Constructional features, operating principles, and applications;<br>— Fan balancing;<br>— Operation:<br>— Causes and effects of compressor stall and surge;<br>— Methods of air-flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades;<br>— Compressor ratio. | 1 | 2 |
| 15.5 *Combustion section*<br>Constructional features and principles of operation. | 1 | 2 |
| 15.6 *Turbine section*<br>— Operation and characteristics of different turbine blade types;<br>— Blade-to-disk attachment;<br>— Nozzle guide vanes;<br>— Causes and effects of turbine blade stress and creep. | 2 | 2 |
| 15.7 *Exhaust*<br>— Constructional features and principles of operation;<br>— Convergent, divergent, and variable area nozzles;<br>— Engine noise reduction;<br>— Thrust reversers. | 1 | 2 |
| 15.8 *Bearings and seals*<br>Constructional features and principles of operation. | — | 2 |
| 15.9 *Lubricants and fuels*<br>— Properties and specifications of standard, alternate, and drop-in fuel;<br>— Properties and specifications of lubricants;<br>— Fuel additives;<br>— Safety precautions. | 1 | 2 |

| MODULE 15 — GAS-TURBINE ENGINE | LEVEL | |
|---|---|---|
| | A1<br>A3 | B1.1<br>B1.3 |
| 15.10 *Lubrication systems*<br>System operation/layout and components. | 1 | 2 |
| 15.11 *Fuel systems*<br>— Operation of engine control and fuel-metering systems, including electronic engine control (full authority digital engine control (FADEC)) and electronic power augmentation;<br>— System layout and components. | 1 | 2 |
| 15.12 *Air systems*<br>Operation of engine air distribution and anti-icing control systems, including internal cooling and sealing, and external air services. | 1 | 2 |
| 15.13 *Starting and ignition systems*<br>— Operation of engine start systems and components;<br>— Ignition systems and components;<br>— Maintenance safety requirements. | 1 | 2 |
| 15.14 *Engine indication systems*<br>— Exhaust gas temperature / interstage turbine temperature;<br>— Engine thrust indication: engine pressure ratio, engine turbine discharge pressure or jet pipe pressure systems;<br>— Oil pressure and temperature;<br>— Fuel pressure and flow;<br>— Engine speed;<br>— Vibration measurement and indication;<br>— Torque;<br>— Power. | 1 | 2 |
| 15.15 *Alternate turbine constructions*<br>— Geared turbofan (GTF);<br>— Variable fan blades;<br>— Open rotor/propfan;<br>— Hybrid turbine-electric concepts and electric power augmentation;<br>— Future trends and developments. | — | 1 |
| 15.16 *Turboprop engines*<br>— Gas-coupled/free-turbine and gear-coupled turbines;<br>— Reduction gears;<br>— Integrated engine and propeller controls;<br>— Overspeed safety devices. | 1 | 2 |
| 15.17 *Turboshaft engines*<br>Arrangements, drive systems, reduction gearing, couplings, control systems. | 1 | 2 |
| 15.18 *Auxiliary power units (APUs)*<br>Purpose, operation, protective systems. | 1 | 2 |
| 15.19 *Power plant installation*<br>Configuration of firewalls, cowlings, acoustic panels, engine mounts, antivibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains. | 1 | 2 |
| 15.20 *Fire protection systems*<br>Operation of fire-detection and fire-extinguishing systems. | 1 | 2 |

| MODULE 15 — GAS-TURBINE ENGINE | LEVEL | |
|---|---|---|
| | A1<br>A3 | B1.<br>1<br>B1 |
| 15.21 *Engine monitoring and ground operation*<br>— Procedures for starting and ground run-up;<br>— Interpretation of engine power output and parameters;<br>— Trend (including oil analysis, vibration and borescope) monitoring;<br>— Inspection of engine and components to criteria, tolerances and data specified by the engine manufacturer;<br>— Compressor washing/cleaning;<br>— Foreign object damage (FOD). | 1 | 3 |
| 15.22 *Engine storage and preservation*<br>Preservation and depreservation for the engine and its accessories/systems. | — | 2 |

## MODULE 16 — PISTON ENGINE

| MODULE 16 — PISTON ENGINE | LEVEL | |
|---|---|---|
| | A2<br>A4 | B1.2<br>B1.4<br>B3 |
| 16.1 *Fundamentals*<br>— Mechanical, thermal, and volumetric efficiencies;<br>— Operating principles: 2-stroke, 4-stroke, Otto, diesel, and rotary (Wankel);<br>— Piston displacement and compression ratio;<br>— Engine configuration and firing order. | 1 | 2 |
| 16.2 *Engine performance*<br>— Power calculation and measurement;<br>— Factors that affect engine power;<br>— Mixtures/leaning, pre-ignition. | 1 | 2 |
| 16.3 *Engine construction*<br>— Crank case, crank shaft, cam shafts, sumps;<br>— Accessory gearbox;<br>— Cylinder and piston assemblies;<br>— Connecting rods, inlet and exhaust manifolds;<br>— Valve mechanisms;<br>— Propeller reduction gearboxes. | 1 | 2 |
| 16.4 *Engine fuel systems* | | |
| 16.4.1 *Carburettors*<br>— Types, construction, and principles of operation;<br>— Icing and heating. | 1 | 2 |
| 16.4.2 *Fuel injection systems*<br>Types, construction, and principles of operation. | 1 | 2 |
| 16.4.3 *Electronic engine control*<br>— Operation of engine control and fuel-metering systems including electronic engine control (full authority digital engine control (FADEC));<br>— System layout and components. | 1 | 2 |
| 16.5 *Starting and ignition systems*<br>— Starting systems, preheat systems;<br>— Magneto types, construction, and principles of operation;<br>— Ignition harnesses, spark plugs;<br>— Low- and high-tension systems. | 1 | 2 |
| 16.6 *Induction, exhaust, and cooling systems*<br>— Construction and operation of induction systems, including alternate air systems;<br>— Exhaust systems, engine cooling systems — air and liquid. | 1 | 2 |
| 16.7 *Supercharging/turbocharging*<br>— Principles and purpose of supercharging and its effects on engine parameters;<br>— Construction and operation of supercharging/turbocharging systems;<br>— System terminology;<br>— Control systems;<br>— System protection. | 1 | 2 |
| 16.8 *Lubricants and fuels*<br>— Properties and specifications of standard, alternate, and drop-in fuel;<br>— Properties and specifications of lubricants;<br>— Fuel additives;<br>— Safety precautions. | 1 | 2 |

| MODULE 16 — PISTON ENGINE | LEVEL | |
|---|---|---|
| | A2<br>A4 | B1.2<br>B1.4<br>B3 |
| 16.9 *Lubrication systems*<br>System operation/layout and components. | 1 | 2 |
| 16.10 *Engine indication systems*<br>— Engine speed;<br>— Cylinder head temperature;<br>— Coolant temperature;<br>— Oil pressure and temperature;<br>— Exhaust gas temperature;<br>— Fuel pressure and flow;<br>— Manifold pressure. | 1 | 2 |
| 16.11 *Power plant installation*<br>Configuration of firewalls, cowlings, acoustic panels, engine mounts, antivibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains. | 1 | 2 |
| 16.12 *Engine monitoring and ground operation*<br>— Procedures for starting and ground run-up;<br>— Interpretation of engine power output and parameters;<br>— Inspection of engine and components: criteria, tolerances, and data specified by the engine manufacturer. | 1 | 3 |
| 16.13 *Engine storage and preservation*<br>Preservation and depreservation for the engine and its accessories/systems. | — | 2 |
| 16.14 *Alternate piston-engine constructions*<br>Hybrid piston–electric concepts and electric power augmentation. | 1 | 1 |

## MODULE 17 — PROPELLER

| MODULE 17 — PROPELLER | LEVEL | |
|---|---|---|
| | A1<br>A2 | B1.1<br>B1.2<br>B3 |
| 17.1 *Fundamentals*<br>— Blade element theory;<br>— High/low blade angle, reverse angle, angle of attack, rotational speed;<br>— Propeller slip;<br>— Aerodynamic, centrifugal, and thrust forces;<br>— Torque;<br>— Relative airflow on blade angle of attack;<br>— Vibration and resonance. | 1 | 2 |
| 17.2 *Propeller construction*<br>— Construction methods and materials used in wooden, composite and metal propellers;<br>— Blade station, blade face, blade shank, blade back / thrust face and hub assembly;<br>— Fixed pitch, controllable pitch, constant speeding propeller;<br>— Propeller/spinner installation. | 1 | 2 |
| 17.3 *Propeller pitch control*<br>— Speed control and pitch change methods — mechanical and electrical/electronic;<br>— Feathering and reverse pitch;<br>— Overspeed protection. | 1 | 2 |
| 17.4 *Propeller synchronising*<br>Synchronising and synchrophasing equipment. | — | 2 |
| 17.5 *Propeller ice protection*<br>Fluid and electrical de-icing equipment. | 1 | 2 |
| 17.6 *Propeller maintenance*<br>— Static and dynamic balancing;<br>— Blade tracking;<br>— Assessment of blade damage, erosion, corrosion, impact damage, delamination;<br>— Propeller treatment/repair schemes;<br>— Propeller engine running. | 1 | 3 |
| 17.7 *Propeller storage and preservation*<br>Propeller preservation and depreservation. | 1 | 2 |

# Appendix II - Basic Examination Standard

## 1. Standardization Basics for Examinations

1.1 All basic examinations must be carried out using the multi-choice question format and essay questions as specified below.

The incorrect alternatives shall seem equally plausible (acceptable) to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.

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

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

1.4 Suitable essay questions shall be drafted and evaluated using the knowledge syllabus in KCASR 1 - Part 66 Appendix I, Module 7.

1.5 Each question will have a model answer drafted for it, which will also include any known alternative answers that may be relevant for other subdivisions.

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

1.7 The pass mark for each KCASR 1 - Part 66 module and sub-module multi-choice part of the examination is 75%.

1.8 The pass mark for each essay question is 75% in that the candidates answer shall contain 75% of the required key points addressed by the question and no significant error related to any required key point.

1.9 If either the multi-choice part only or the essay part only is failed, then it is only necessary to retake the multiple choice or essay part, as appropriate.

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

1.11 An examination in a module may not be retaken earlier than 90 days following the date of the failed module examination, except in the case of a maintenance training organisation approved in accordance with KCASR 1 - Part 147 which conducts a course of retraining tailored to the failed subjects in the particular module, the failed module may be retaken after 30 days.

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

Each partial exam shall:

(a) be complementary to the other partial exam or exams taken by the candidate, ensuring that the combination of partial exams meets the examination requirements for the subject module;

(b) be of similar allowed time;

(c) be passed with 75 % or more of the questions answered correctly;

(d) contain a number of questions that is multiple of four;

(e) be listed on the same certificate of recognition issued after the last partial exam has been successfully passed. That certificate of recognition shall list the dates and the results of the partial exams – without averaging the results;

(f) be taken within the same organisation, following the normal examination provisions for retaking failed exams.

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

The applicant shall confirm in writing to the approved maintenance training organisation or the Kuwait DGCA to which they apply for an examination, the number and dates of attempts during the the 12 months preceeding the examination, and the organisation or the Kuwait DGCA where these attempts took place. The approved maintenance training organisation or the Kuwait DGCA is responsible for checking the number of attempts within the applicable time frames.

## 2. Question Numbers for the KCASR 1 - Part 66 Appendix I Modules

2.1 **Subject Module 1** - Mathematics:

Category A:16 multi-choice and 0 essay questions. Time allowed 20 minutes.

Category B1: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B2: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B3: 32 multi-choice and 0 essay questions. Time allowance 40 Minutes.

2.2 **Subject Module 2** - Physics:

Category A: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

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

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

Category B3: 32 multi-choice and 0 essay questions. Time allowed 40 Minutes.

2.3 **Subject Module 3** - Electrical Fundamentals:

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

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

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

Category B3: 24 multi-choice and 0 essay questions. Time allowed 30 Minutes.

2.4 **Subject Module 4** - Electronic Fundamentals:

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

2.5 **Subject Module 5** - Digital Techniques/Electronic Instrument Systems:

Category A:20 multi-choice and 0 essay questions. Time allowed 25 minutes.
Category B1: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B2: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.
Category B3: 20 multi-choice and 0 essay questions. Time allowed 25 Minutes.

2.6 **Subject Module 6 -** Materials and Hardware:

Category A: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.
Category B1: 80 multi-choice and 0 essay questions. Time allowed 100 minutes.
Category B2: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.
Category B3: 80 multi-choice and 0 essay questions. Time allowed 100 Minutes.

2.7 **Subject Module 7** - Maintenance Practices:

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

Category B3: 80 multi-choice and 2 essay questions. Time allowed 100 minutes plus 40 minutes.

2.8 **Subject Module 8** - Basic Aerodynamics:

Category A: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.
Category B1: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.
Category B2: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.
Category B3: 24 multi-choice and 0 essay questions. Time allowed 30 minutes.

2.9 **Subject Module 9** - Human factors:

Category A: 28 multi-choice and 0 essay question. Time allowed 35 minutes.

Category B1: 28 multi-choice and 0 essay question. Time allowed 35 minutes.

Category B2: 28 multi-choice and 0 essay question. Time allowed 35 minutes.

Category B3: 28 multi-choice and 0 essay questions. Time allowed 35 minutes.

2.10 **Subject Module 10** - Aviation Legislation:

Category A: 32 multi-choice and 0 essay question. Time allowed 40 minutes.

Category B1: 44 multi-choice and 0 essay question. Time allowed 55 minutes.

Category B2: 44 multi-choice and 0 essay question. Time allowed 55 minutes.

Category B3: 44 multi-choice and 0 essay questions. Time allowed 55 minutes.

2.11 **Subject Module 11** - Turbine Aeroplane Aerodynamics, Structures and Systems:

Category A1: 108 multi-choice and 0 essay questions. Time allowed 135 minutes.

Category A2: 72 multi-choice and 0 essay questions. Time allowed 90 minutes

Category B1.1: 140 multi-choice and 0 essay questions. Time allowed 175 minutes.

Category B1.2: 100 multi-choice and 0 essay questions. Time allowed 125 minutes.

Category B3: 60 multi-choice and 0 essay questions. Time allowed 75 minutes

2.12 **Subject Module 12 -** Helicopter Aerodynamics, Structures and Systems:

Category A3 and A4: 100 multi-choice and 0 essay questions. Time allowed 125 minutes.

Category B1.3 and B1.4: 128 multi-choice and 0 essay questions. Time allowed 160 minutes.

2.13 **Subject Module 13** - Aircraft Aerodynamics, Structures and Systems:

Category B2: 188 multi-choice and 0 essay questions. Time allowed 235 minutes.

2.14 **Subject Module 14 -** Propulsion:

Category B2: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

2.15 Subject Module 15 Gas Turbine Engine:

Category A1 and A3: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

Category B1.1 and B1.3: 92 multi-choice and 0 essay questions. Time allowed 115 minutes.

2.16 Subject Module 16 Piston Engine:

Category A2 and A4: 52 multi-choice and 0 essay questions. Time allowed 65 minutes.

Category B1.2 and B1.4: 76 multi-choice and 0 essay questions. Time allowed 95 minutes.

Category B3: 76 multi-choice and 0 essay questions. Time allowed 95 minutes.

2.17 **Subject Module 17 Propeller:**

Category A1 and A2: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

Category B1.1 and B1.2: 32 multi-choice and 0 essay questions. Time allowed 40 minutes.

Category B3: 32 multi-choice and 0 essay questions. Time allowed 40 minutes

# Appendix III - Type Training and Examination Standard – On-the-Job-Training (OJT)

## 1. General

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

(a) Theoretical training and examination shall comply with the following requirements:

(i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with KCASR 1 - Part 147 or, when conducted by other organisations, as directly approved by the Kuwait DGCA.

(ii) Shall comply with the standard described in paragraph 3.1 and 4 of this Appendix III, except as permitted by the differences training described below.

(iii) In the case of a category C person qualified by holding an academic degree as specified in point 66.A.30(a)(5), the first relevant aircraft type theoretical training shall be at the category B1 or B2 level.

(iv) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement. In the case where training and examination completion exceeds 3 years the training and examination must be retaken.

(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 KCASR 1 - Part 147 or, when conducted by other organisations, as directly approved by the Kuwait DGCA.

(ii) Shall comply with the standard described in paragraph 3.2 and 4 of this Appendix III, except as permitted by the differences training described below.

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

(iv) Shall include demonstrations using equipment, components, maintenance simulation training devices (MSTDs), maintenance training devices (MTDs) or real aircraft.

(v) Shall have been started and completed within the 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 Kuwait 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.

(iv) shall have been started and completed within 3 years preceding the application for the new type rating in the same category or in another category.

## 2. Aircraft type training levels

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

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

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

(a) provide a simple description of the whole subject, using common words and examples, using typical terms and identify safety precautions related to the airframe, its systems and powerplant;

(b) identify aircraft manuals, maintenance practices important to the airframe, its systems and powerplant;

(c) define the general layout of the aircraft's major systems;

(d) define the general layout and characteristics of the powerplant;

(e) identify special tooling and test equipment used with the aircraft.

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

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

(a) understand the theoretical fundamentals; apply knowledge in a practical manner using detailed procedures;

(b) recall the safety precautions to be observed when working on or near the aircraft, powerplant and systems;

(c) describe systems and aircraft handling particularly access, power availability and sources;

(d) identify the locations of the principal components;

(e) explain the normal functioning of each major system, including terminology and nomenclature;

(f) perform the procedures for servicing associated with the aircraft for the following systems: Fuel, Power Plants, Hydraulics, Landing Gear, Water/Waste, and Oxygen;

(g) demonstrate proficiency in use of crew reports and on-board reporting systems (minor troubleshooting) and determine aircraft airworthiness per the MEL/CDL;

(h) demonstrate the use, interpretation and application of appropriate documentation including instructions for continued airworthiness, maintenance manual, illustrated parts catalogue, etc.

– Level 3: Detailed description, operation, component location, removal/installation and bite and troubleshooting procedures to maintenance manual level.

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

(a) demonstrate a theoretical knowledge of aircraft systems and structures and interrelationships with other systems, provide a detailed description of the subject using theoretical fundamentals and specific examples and to interpret results from various sources and measurements and apply corrective action where appropriate;

(b) perform system, powerplant, component and functional checks as specified in the aircraft maintenance manual;

(c) demonstrate the use, interpret and apply appropriate documentation including structural repair manual, troubleshooting manual, etc.;

(d) correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level;

(e) describe procedures for replacement of components unique to aircraft type.

## 3. Aircraft type training standard

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

3.1 Theoretical element

(a) Objective:

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

(b) Level of training:

Training levels are those levels defined in point 2 above.

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

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

(c) Duration:

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

| Category | Hours |
|---|---|
| Aeroplanes with a maximum take-off mass above 30000 kg: | |
| B1.1 | 150 |
| B1.2 | 120 |
| B2 | 100 |
| C | 30 |
| Aeroplanes with a max take-off mass equal or less than 30 000 kg and above 5700 kg: | |
| B1.1 | 120 |
| B1.2 | 100 |
| B2 | 100 |
| C | 25 |
| Aeroplanes with a maximum take-off mass of 5700 kg and below (*) | |
| B1.1 | 80 |
| B1.2 | 60 |
| B2 | 60 |
| C | 15 |
| Helicopters(**) | |
| B1.3 | 120 |
| B1.4 | 100 |
| B2 | 100 |
| C | 25 |

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

*(**) For helicopters in group 2 (as defined in point 66.A.42) the minimum duration can be reduced by 30 %.*

For the purpose of the table above, a tuition hour means 60 minutes of teaching and excludes 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 Kuwait DGCA.

(d) Justification of course duration:

Training courses carried out in a maintenance training organisation approved in accordance with KCAR 1 Part 147 and courses directly approved by the Kuwait 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 Kuwait 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.

| Chapter\Level | Aeroplane turbine | | Aeroplane piston | | Helicopters turbine | | Helicopter piston | | Avionics |
|---|---|---|---|---|---|---|---|---|---|
| **Licence Category** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B2** |
| **Introduction module:** | | | | | | | | | |
| 05 Time limits/maintenance checks | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 06 Dimensions/Areas (MTOM, etc.) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 07 Lifting and Shoring | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 08 Levelling and Weighing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 09 Towing and Taxiing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 10 Parking/mooring, Storing and Return to Service | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 11 Placards and Markings | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 12 Servicing | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 20 Standard practices – only type particular | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Helicopters** | | | | | | | | | |
| 18 Vibration and Noise Analysis (Blade tracking) | - | - | - | - | 3 | 1 | 3 | 1 | - |
| 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 |

| Chapter\Level | Aeroplane turbine | | Aeroplane piston | | Helicopters turbine | | Helicopter piston | | Avionics |
|---|---|---|---|---|---|---|---|---|---|
| **Licence Category** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B2** |
| **Airframe structures** | | | | | | | | | |
| 51 Standard practices and structures (damage classification, assessment and repair) | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| 53 Fuselage | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| 54 Nacelles/Pylon | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| 55 Stabilisers | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| 56 Windows | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| 57 Wings | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| 52 Doors | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| **Zonal and Station Identification System** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **Airframe systems** | | | | | | | | | |
| 21 Air Conditioning | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| 21A Air Supply | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2 |
| 21B Pressurisation | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| 21C Safety and Warning Devices | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| 22 Autoflight | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 3 |
| 23 Communications | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 3 |
| **24 Electrical Power** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| **25 Equipment and Furnishing** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 1 |
| 25A Electronic Equipment including emergency equipment | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| **26 Fire Protection** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| **27 Flight Controls** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2 |
| 27A Sys Operation: Electrical/Fly-by-Wire | 3 | 1 | - | - | - | - | - | - | 3 |
| **28 Fuel Systems** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2 |
| 28A Fuel Systems – Monitoring and indicating | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| **29 Hydraulic Power** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2 |
| 29A Hydraulic Power – Monitoring and indicating | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |

| Chapter\Level | Aeroplane turbine | | Aeroplane piston | | Helicopters turbine | | Helicopter piston | | Avionics |
|---|---|---|---|---|---|---|---|---|---|
| **Licence Category** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B2** |
| **30 Ice and Rain Protection** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| **31 Indicating/Recording Systems** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| 31A Instrument Systems | 3 | 1 | 3 | 1 | 3 | 1 | 1 | 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 |
| **36 Pneumatic — Monitoring and indicating** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 |
| **37 Vacuum** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2 |
| **38 Water/Waste** | 3 | 1 | 3 | 1 | - | - | - | - | 2 |
| **41 Water Ballast** | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| **42 Integrated Modular Avionics** | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 3 |
| **44 Cabin Systems** | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 3 |
| **45 On Board Maintenance System (or covered in 31)** | 3 | 1 | 3 | 1 | 3 | 1 | - | - | 3 |
| **46 Information Systems** | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 3 |
| **47 Nitrogen generation system** | 3 | 1 | 3 | 1 | - | - | - | - | 2 |
| **50 Cargo and Accessory Compartments** | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 1 |
| **55/57 Flight control surfaces (All)** | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| **Turbine Engine** | | | | | | | | | |
| **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 |

| Chapter\Level | Aeroplane turbine | | Aeroplane piston | | Helicopters turbine | | Helicopter piston | | Avionics |
|---|---|---|---|---|---|---|---|---|---|
| **Licence Category** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B2** |
| **78 Exhaust** | 3 | 1 | - | - | 3 | 1 | - | - | 1 |
| **79 Oil** | 3 | 1 | - | - | 3 | 1 | - | - | 1 |
| **80 Starting** | 3 | 1 | - | - | 3 | 1 | - | - | 1 |
| **82 Water Injections** | 3 | 1 | - | - | 3 | 1 | - | - | 1 |
| **83 Accessory Gear Boxes** | 3 | 1 | - | - | 3 | 1 | - | - | 1 |
| **84 Propulsion Augmentation** | 3 | 1 | - | - | 3 | 1 | - | - | 1 |
| **73A FADEC** | 3 | 1 | - | - | 3 | 1 | - | - | 3 |
| **74 Ignition** | 3 | 1 | - | - | 3 | 1 | - | - | 3 |
| **77 Engine indicating systems** | 3 | 1 | - | - | 3 | 1 | - | - | 3 |
| **49 Auxiliary Power Units (APU)** | 3 | 1 | - | - | - | - | - | - | 2 |
| **Piston Engine** | | | | | | | | | |
| **70 Standard Practices – Engines** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **70A Constructional arrangement and operation (Installation, Carburettors, Fuel injection systems, Induction, Exhaust and Cooling Systems, Supercharging/Turbocharging , Lubrication Systems).** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **70B Engine Performance** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **71 Powerplant** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **73 Engine Fuel and Control** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **76 Engine Controls** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **79 Oil** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **80 Starting** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **81 Turbines** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **82 Water Injections** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **83 Accessory Gear Boxes** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **84 Propulsion Augmentation** | - | - | 3 | 1 | - | - | 3 | 1 | 1 |
| **73A FADEC** | - | - | 3 | 1 | - | - | 3 | 1 | 3 |
| **74 Ignition** | - | - | 3 | 1 | - | - | 3 | 1 | 3 |
| **77 Engine indication Systems** | - | - | 3 | 1 | - | - | 3 | 1 | 3 |

| Chapter\Level | Aeroplane turbine | | Aeroplane piston | | Helicopters turbine | | Helicopter piston | | Avionics |
|---|---|---|---|---|---|---|---|---|---|
| **Licence Category** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B1** | **C** | **B2** |
| **Propellers** | | | | | | | | | |
| **60A Standard Practices – Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| **61 Propellers/Propulsion** | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| **61A Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | - |
| **61B Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | - |
| **61C Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | 1 |
| **61D Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | 3 |
| **61E Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | - |
| **61F Propeller** | 3 | 1 | 3 | 1 | - | - | - | - | 1 |

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

3.2 Practical element

(a) Objective:

The objective of practical training is to gain the required competence in performing safe maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks. It includes the awareness of the use of all technical literature and documentation for the aircraft, the use of specialist/special tooling and test equipment for performing removal and replacement of components and modules unique to type, including any on-wing maintenance activity. The practical training is conducted under the control of a Part 147 approved organisation.

(b) Content:

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

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

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

Glossary of the table: LOC: Location; FOT: Functional/Operational 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** | | | | | | | | | | | |
| 5 Time limits/maintenance checks | X/X | - | - | - | - | - | - | - | - | - | - |
| 6 Dimensions/Areas (MTOM, etc.) | X/X | - | - | - | - | - | - | - | - | - | - |
| 7 Lifting and Shoring | X/X | - | - | - | - | - | - | - | - | - | - |
| 8 Levelling and weighing | X/X | - | X | - | - | - | - | X | - | - | - |
| 9 Towing and Taxiing | X/X | - | X | - | - | - | - | X | - | - | - |
| 10 Parking/mooring, Storing and Return to Service | X/X | - | X | - | - | - | - | X | - | - | - |
| 11 Placards and Markings | X/X | - | - | - | - | - | - | - | - | - | - |
| 12 Servicing | X/X | - | X | - | - | - | - | X | - | - | - |
| 20 Standard Practices-only type particular | XX | - | X | - | - | - | - | X | - | - | - |
| **Helicopters** | | | | | | | | | | | |
| 18 Vibration and Noise Analysis (Blade tracking) | X/- | - | - | - | - | X | - | - | - | - | - |
| 60 Standard Practices Rotor — only type specific | X/X | - | X | - | - | - | - | X | - | - | - |
| 62 Rotors | X/- | - | X | X | - | X | - | - | - | - | - |
| 62A Rotors- Monitoring and Indicating | X/X | X | X | X | X | X | - | - | X | - | X |
| 63 Rotor Drives | X/- | X | - | - | - | X | - | - | - | - | - |
| 63A Rotor Drives- Monitoring and Indicating | X/X | X | - | X | X | X | - | - | X | - | X |
| 64 Tail Rotor | X/- | - | X | - | - | X | - | - | - | - | - |
| 64A Tail Rotor- Monitoring and Indicating | X/X | X | - | X | X | X | - | - | X | - | X |
| 65 Tail Rotor Drive | X/- | X | - | - | - | X | - | - | - | - | - |
| 65A Tail Rotor Drive- Monitoring and Indicating | X/X | X | - | X | X | X | - | - | X | - | X |
| 66 Folding Blades/Pylon | X/- | X | X | - | - | X | - | - | - | - | - |
| 67 Rotors Flight Control | X/- | X | X | - | X | X | - | - | - | - | - |
| 53 Airframe Structure (Helicopter)<br>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 | | | | | | | | | | | |

| Chapters | B1/B2 | B1 | | | | | B2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOC | FOT | SGH | R/I | MEL | TS | FOT | SGH | R/I | MEL | TS |
| classification, assessment and repair) | | | | | | | | | | | |
| 53 Fuselage | X/- | - | - | - | - | X | - | - | - | - | - |
| 54 Nacelles/Pylons | X/- | - | - | - | - | - | - | - | - | - | - |
| 55 Stabilisers | X/- | - | - | - | - | - | - | - | - | - | - |
| 56 Windows | X/- | - | - | - | - | X | - | - | - | - | - |
| 57 Wings | X/- | - | - | - | - | - | - | - | - | - | - |
| 52 Doors | X/- | X | X | - | - | - | - | X | - | - | - |

| Chapters | B1/B2 | B1 | | | | | B2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOC | FOT | SGH | R/I | MEL | TS | FOT | SGH | R/I | MEL | TS |
| **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 including Emergency Equipment | X/X | X | X | X | - | - | X | X | X | - | - |
| 26 Fire Protection | X/X | X | X | X | X | X | X | X | X | X | X |
| 27 Flight Controls | X/X | X | X | X | X | X | X | - | - | - | - |
| 27A Sys operation: Electrical/Fly by wire | X/X | X | X | X | X | - | X | - | X | - | X |
| 28 Fuel Systems | X/X | X | X | X | X | X | X | X | X | X | X |
| 28A Fuel Systems – Monitoring and Indicating | X/X | X | - | - | - | - | X | X | - | X | - |
| 29 Hydraulic Power | X/X | X | X | X | X | X | X | - | X | - | X |
| 29A Hydraulic Power– Monitoring and Indicating | X/X | X | - | X | X | X | X | - | X | X | X |
| 30 Ice and Rain Protection | X/X | X | X | - | X | X | X | X | - | X | X |
| 31 Indicating/Recording Systems | X/X | X | X | X | X | X | X | X | X | X | X |
| 31A Instrument Systems | X/X | X | X | X | X | X | X | X | X | X | X |
| 32 Landing Gear | X/X | X | X | X | X | X | X | X | X | X | - |
| 32A Landing Gear- Monitoring and Indicating | X/X | X | - | X | X | X | X | - | X | X | X |
| 33 Lights | X/X | X | X | - | X | - | X | X | X | X | - |
| 34 Navigation | X/X | - | X | - | X | - | X | X | X | X | X |
| 35 Oxygen | X/- | X | X | X | - | - | X | X | - | - | - |
| 36 Pneumatic | X/- | X | - | X | X | X | X | - | X | X | X |
| 36A Pneumatic- Monitoring and Indicating | X/X | X | X | X | X | X | X | X | X | X | X |
| 37 Vacuum | X/- | X | - | X | X | X | - | - | - | - | - |
| 38 Water /Waste | X/- | X | X | - | - | - | X | X | - | - | - |
| 41 Water Ballast | X/- | - | - | - | - | - | - | - | - | - | - |
| 42 Integrated Modular Avionics | X/X | - | - | - | - | - | X | X | X | X | X |
| 44 Cabin Systems | X/X | - | - | - | - | - | X | X | X | X | X |
| 45 On Board Maintenance System (or covered in 31) | X/X | X/X | X | X | X | X | X | X | X | X | X |
| 46 Information Systems | X/X | - | - | - | - | - | X | - | X | X | X |
| 47 Nitrogen generation system | X/X | X | X | X | X | X | X | - | - | - | X |
| 50 Cargo and Accessory Compartments | X/X | - | X | - | - | - | - | - | - | - | - |
| 55/57 Flight control surfaces | X/- | - | - | - | - | X | - | - | - | - | - |

| Chapters | B1/B2 | B1 | B2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOC | FOT | SGH | R/I | MEL | TS | FOT | SGH | R/I | MEL | TS |
| **Turbine/Piston Engine Module** | | | | | | | | | | | |
| 70 Standard Practices — Engines — only type particular | - | - | X | - | - | - | - | X | - | - | - |
| 70A Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems) | X/X | - | - | - | - | - | - | - | - | - | - |
| Turbine Engines | | | | | | | | | | | |
| 70B Engine performance | - | - | - | - | - | X | - | - | - | - | - |
| 71 Power Plant | X/- | X | X | - | - | - | - | X | - | - | - |
| 72 Engine Turbine/Turbo Prop/Ducted Fan/ Unducted fan | X/- | - | - | - | - | - | - | - | - | - | - |
| 73 Engine Fuel and Control | X/X | X | - | - | - | - | - | - | - | - | - |
| 73A FADEC System | X/X | X | - | X | X | X | X | - | X | X | X |
| 74 Ignition | X/X | X | - | - | - | - | X | - | - | - | - |
| 75 Air | X/- | - | - | X | - | X | - | - | - | - | - |
| 76 Engine Controls | X/- | X | - | - | - | X | - | - | - | - | - |
| 77 Engine Indicating | X/X | X | - | - | X | X | X | - | - | X | X |
| 78 Exhaust | X/- | X | - | - | X | - | - | - | - | - | - |
| 79 Oil | X/- | - | X | X | - | - | - | - | - | - | - |
| 80 Starting | X/- | X | - | - | X | X | - | - | - | - | - |
| 82 Water Injection | X/- | X | - | - | - | - | - | - | - | - | - |
| 83 Accessory Gearboxes | X/- | - | X | - | - | - | - | - | - | - | - |
| 84 Propulsion Augmentation | X/- | X | - | - | - | - | - | - | - | - | - |
| **Auxiliary Power Units (APUs)** | | | | | | | | | | | |
| 49 Auxiliary Power Units (APUs) | X/- | X | X | - | - | X | - | - | - | - | - |
| **Piston Engines** | | | | | | | | | | | |
| 70 Standard Practices — Engines — only type particular | - | - | X | - | - | - | - | X | - | - | - |
| 70A Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Sys | X/X | - | - | - | - | - | - | - | - | - | - |

| Chapters | B1/B2 | B1 | | | | | B2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LOC | FOT | SGH | R/I | MEL | TS | FOT | SGH | R/I | MEL | TS |
| 70B Engine Performance | - | - | - | - | - | X | - | - | - | - | - |
| 71 Power Plant | X/- | X | X | - | - | - | - | X | - | - | - |
| 73 Engine Fuel and Control | X/X | X | - | - | - | - | - | - | - | - | - |
| 73A FADEC System | 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 | - | - | - | - | - | - | - | - | - |
| 83 Accessory Gearboxes | X/- | - | X | X | - | - | - | - | - | - | - |
| 84 Propulsion Augmentation | X/- | X | - | - | - | - | - | - | - | - | - |
| **Propellers** | | | | | | | | | | | |
| 60A Standard Practices – Propeller | - | - | - | X | - | - | - | - | - | - | - |
| 61 Propellers/Propulsion | X/X | X | X | - | X | X | - | - | - | - | - |
| 61A Propeller Construction | X/X | - | X | - | - | - | - | - | - | - | - |
| 61B Propeller Pitch Control | X/- | X | - | X | X | X | - | - | - | - | - |
| 61C Propeller Synch | X/- | X | - | - | - | X | - | - | - | X | - |
| 61D Propeller Electronic Control | X/X | X | X | X | X | X | X | X | X | X | X |
| 61E Propeller Ice Protection | X/- | X | - | X | X | X | - | - | - | - | - |
| 61F Propeller Maintenance | X/X | X | X | X | X | X | X | X | X | X | X |

## 4. Type training examination and assessment standard

4.1 Theoretical element examination standard

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

(a) Format of the examination is of the multi-choice type. Each multi-choice question shall have 3 alternative answers of which only one shall be the correct answer. The total time is based on the total number of questions and the time for answering is based upon a nominal average of 90 seconds per question.

(b) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.

(c) In numerical questions, the incorrect answers shall correspond to procedural errors such as the use of incorrect sense (+ versus -) or incorrect measurement units. They shall not be mere random numbers.

(d) The level of examination for each chapter (*) shall be the one defined in point 2 "Aircraft type training levels". However, the use of a limited number of questions at a lower level is acceptable.

(e) The examination shall be of the closed book type. No reference material is permitted. An exception will be made for the case of examining a B1 or B2 candidate's ability to interpret technical documents.

(f) The number of questions shall be at least 1 question per hour of instruction. The number of questions for each chapter and level shall be proportionate to:

- the effective training hours spent teaching at that chapter and level,
- the learning objectives as given by the training needs analysis.

The Kuwait 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 is split in several examinations, each examination shall be passed with at least a 75% mark. In order to be possible to achieve exactly a 75% pass mark, the number of questions in the examination shall be a multiple of 4.

(h) Penalty marking (negative points for failed questions) is not to be used.

(i) End of module phase examinations cannot be used as part of the final examination unless they contain the correct number and level of questions required.

*(*) For the purpose of this point 4, a "chapter" means each one of the rows preceded by a number in the table contained in point 3.1(e).*

4.2 Practical element assessment standard

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

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

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

## 5. Type examination standard

Type examination shall be conducted by training organisations appropriately approved under KCASR 1 - Part 147 or by the Kuwait DGCA.

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

(a) Oral examination questions shall be on a sample of chapters drawn from point 3. 'Aircraft type training standard', at the indicated level in point 3.1.(e)..

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

(c) Practical assessment shall determine the candidate's competence to perform maintenance tasks applicable to the particular aircraft type.

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

***Note:*** *(**) for the purpose of this Item 5, a "Chapter" means each one of the rows preceded by a number in the table contained in item 3.1 (e) and 3.1 (b).*

(e) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.

(f) In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.

(g) Both examination and practical assessments 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 type examination:

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

   The applicant shall confirm in writing to the maintenance training organisation or the Kuwait DGCA to which they apply for an examination, the number and dates of attempts during the last year and the maintenance training organisation or the Kuwait DGCA where these attempts took place. The maintenance training organisation or the Kuwait 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. The examiner(s) shall not have been involved in the applicant's training.

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

## 6. On the Job Training

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

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

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

(a) Objective:

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

(b) Content:

OJT shall cover a cross section of tasks acceptable to the Kuwait DGCA. The OJT tasks to be completed shall be representative of the aircraft and systems both in complexity and in the technical input required to complete that task. While relatively simple tasks may be included, other more complex maintenance tasks shall also be incorporated and undertaken as appropriate to the aircraft type.

Each task shall be signed off by the student and countersigned by a designated supervisor. The tasks listed shall refer to an actual job card/work sheet, etc.

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

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

(1) Name of Trainee;

(2) Date of Birth;

(3) Approved Maintenance Organisation;

(4) Location;

(5) Name of supervisor(s) and assessor, (including licence number if applicable);

(6) Date of task completion;

(7) Description of task and job card/work order/tech log, etc.;

(8) Aircraft type and aircraft registration;

(9) Aircraft rating applied for.

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

# Appendix IV - Experience Requirements for extending a KCASR 1 - Part 66 Aircraft Maintenance Engineer Licence

The table below shows the experience requirements for adding a new category or subcategory to an existing KCASR 1 - Part 66 licence.

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

The experience requirement will be reduced by 50% if the applicant has completed an approved KCASR 1 - Part 147 course relevant to the subcategory.

| To: From: | A1 | A2 | A3 | A4 | B1.1 | B1.2 | B1.3 | B1.4 | B2 | B3 |
|---|---|---|---|---|---|---|---|---|---|---|
| **A1** | | 6 months | 6 months | 6 months | 2 years | 6 months | 2 years | 1 year | 2 years | 6 months |
| **A2** | 6 months | | 6 months | 6 months | 2 years | 6 months | 2 years | 1 year | 2 years | 6 months |
| **A3** | 6 months | 6months | | 6 months | 2 years | 1year | 2 years | 6 months | 2 years | 1 year |
| **A4** | 6 months | 6months | 6months | | 2 years | 1year | 2 years | 6 months | 2 years | 1 year |
| **B1.1** | None | 6 months | 6 months | 6 months | | 6 months | 6 months | 6 months | 1 year | 6 months |
| **B1.2** | 6 months | None | 6 months | 6 months | 2 years | | 2 years | 6 months | 2 years | None |
| **B1.3** | 6 months | 6 months | None | 6 months | 6 months | 6 months | | 6 months | 1 year | 6 months |
| **B1.4** | 6 months | 6 months | 6 months | None | 2 years | 6 months | 2 years | | 2 years | 6 months |
| **B2** | 6 months | 6 months | 6 months | 6 months | 1 year | 1year | 1 year | 1 year | | 1 year |
| **B3** | 6 months | None | 6 months | 6 months | 2 years | 6 Months | 2 years | 1 year | 2 years | |

# Appendix V - Application Form

This appendix contains an example of the KCASR 1 Part 66 aircraft maintenance engineer licence and the relevant application form for such licence.

Directorate General of Civil Aviation
Aviation Safety Department
State of Kuwait

P.O. Box 17, Safat 13001, Kuwait
Tel. (965) 2474-3940 Fax (965) 2476-5796
Email: airworthiness@dgca.gov.kw

**ation for Initial/Amendment/Renewal of KCASR 1 - Part 66 Aircraft Maintenance License (AML)**

s Details:
……
……..
……

Nationality:…….. Date and Place of Birth:……..

KCASR 1 - Part 66 AMEL Details (if applicable):

License No:…… Date of issue:……

Employers Details: ……
Name:……..
Address:……
……
……

AMO Approval Reference:……

Tel:..... Fax:……..

n For: [Tick (√) relevant box(es)]

Initial AML ☐ Amendment of AML ☐ Renewal of AML ☐

| Rating: | A | B1 | B2 | C |
|---|---|---|---|---|
| Aeroplane Turbine | ☐ | ☐ | - | - |
| Aeroplane Piston | ☐ | ☐ | - | - |
| Helicopter Turbine | ☐ | ☐ | - | - |
| Helicopter Piston | ☐ | ☐ | - | - |
| Avionics | - | - | ☐ | - |
| Large Aircraft | - | - | - | ☐ |
| Aircraft other than large aircraft | - | - | - | ☐ |

Type endorsements/Rating endorsement/Limitation Removal (if applicable):
……
……

I wish to apply for initial / amendment / renewal / of KCASR 1 - Part 66 AMEL as indicated and confirm that the information contained in this form was correct at the time of application.

ith confirm that:

1. I am not holding any KCASR 1 - Part 66 AMEL.
2. I have never held a KCASR 1 - Part 66 AMEL in the State of Kuwait which was revoked or suspended.

I also understand that any incorrect information could disqualify me from holding a KCASR 1 Part 66 AMEL.

Signed:……. Name: ……

Date: ……

**Application for Initial/Amendment/Renewal of KCASR 1 - Part 66 Aircraft Maintenance Engineer License (AMEL)**

I wish to claim the following credits ( if applicable ) :

……..
……..
……..

Experience credit due KCASR 1 - Part 147 training
……..
……..
……..

Examination credit due equivalent exam certificates
……..
……..
……..

Please Enclose relevant certificates

endation (if applicable): It is hereby certified that the applicant has met the relevant maintenance knowledge and experience requirements of KCASR 1 Part 66 and it is recommended that the Kuwait DGCA grants or endorses the KCASR 1 Part 66 AMEL.

Signed: …… Name:……

Position:…….. Date: ……

# Appendix VI - KCASR 1 Part 66 Aircraft Maintenance Engineer Licence

4. An example of the KCASR 1 Part 66 aircraft maintenance licence can be found on the following pages.
5. The document must be printed in the standardized form shown but may be reduced in size to accommodate its computer generation if desired. When the size is reduced care should be exercised to ensure sufficient space is available in those places where official seals/stamps are required. Computer generated documents need not have all the boxes incorporated when any such box remains blank so long as the document can clearly be recognized as the KCASR 1 Part 66 aircraft maintenance engineer licence.
6. The document must be printed in English.
7. Each licence holder must have a unique licence number based on an alpha- numeric designator.
8. The document may have the pages in any order and need not have some or any divider lines as long as the information contained is positioned such that each page layout can clearly be identified with the format of the example KCASR 1 Part 66 aircraft maintenance engineer licence contained herein. The aircraft type rating page need not be issued until the first type endorsement is included.
9. The document may be prepared by the Kuwait DGCA or by any KCASR 8 - Part 145 approved maintenance organisation in accordance with a procedure approved by the Kuwait DGCA and contained in the KCASR 8 - Part 145 maintenance organisation exposition except that in all cases the Kuwait DGCA will issue the document.
10. The preparation of any variation to an existing KCASR 1 Part 66 aircraft maintenance engineer licence may be carried out by the Kuwait DGCA or by any KCASR 8 - Part 145 approved maintenance organisation in accordance with a procedure approved by the Kuwait DGCA and contained in the KCASR 8 - Part 145 maintenance organisation exposition except that in all cases the Kuwait DGCA will issue the document with the variation.
11. The KCASR 1 Part 66 aircraft maintenance engineer licence once issued is required to be kept by the person to whom it applies in good condition and who shall remain accountable for ensuring that no unauthorized entries are made.
12. Failure to comply with paragraph 8 may invalidate the document and could lead to the holder not being permitted to hold any KCASR 8 - Part 145 certification authorization and may result in prosecution under National law.
13. The KCASR 1 Part 66 aircraft maintenance engineer licence is issued by the Kuwait DGCA.
14. An appendix IX to DGCA Form 26 is optional and may only be used to include National Privileges not covered by KCASR 1 - Part 66, where such privileges were covered by the national regulation in force prior to the implementation of KCASR 1 - Part 66.
15. For information, the actual KCASR 1 Part 66 aircraft maintenance engineer licence issued by the Kuwait DGCA may have the pages in a different order and may not have the divider lines.
16. With regard to the aircraft type rating page the Kuwait DGCA may choose not to issue this page until the first aircraft type rating needs to be endorsed and will need to issue more than one aircraft type rating page when there are a number to be listed.
17. Notwithstanding 13, each page issued will be in this format and contain the specified information for that page.
18. If there are no limitations applicable, the LIMITATIONS page will be issued stating ‘No limitations’.
19. Where a pre-printed format is used, any category, subcategory or type rating box which does not contain a rating entry shall be marked to show that the rating is not held.

***Kuwait Civil Aviation Safety Regulation – Part 66 – Aircraft Maintenance Engineer Licenses***

STATE OF KUWAIT

Directorate General of Civil Aviation

Part-66

Aircraft Maintenance License

*DGCA Form 26*

Conditions:

1. This license shall be signed by the holder and be accompanied by an identity document containing a photograph of the license holder.
2. Endorsement of any categories on the page(s) entitled KCASR 1 Part 66 CATEGORIES only, does not permit the holder to issue a certificate of release to service for an aircraft.
3. The privileges of the holder of this license are prescribed by KCASR 1 Part 66 and the applicable requirements of KCASR 8 Part M and KCASR 8 Part 145.
4. The license remains valid until the date specified on the limitation page unless previously suspended or revoked.
5. The privilege of this license may not be exercised unless in the preceding two year period the holder has had either six months of maintenance experience in accordance with the privileges granted by the license, or met the provision for the issue of the appropriate privileges.

**NOTE:** This license when endorsed with an aircraft type rating meets the intent of ICAO Annex I.

1. State of issue:
2. License No:
3. Full name of holder:
4. Date and place of birth:
5. Address of holder:
6. Nationality of holder:
7. Signature of holder:

LIC NO:

KCASR Part-66 CATEGORIES

| Validity | A | B1 | B2 | C |
|---|---|---|---|---|
| Aeroplanes Turbine | | | X | X |
| Aeroplanes Piston | | | X | X |
| Helicopters Turbine | | | X | X |
| Helicopters Piston | | | X | X |
| Avionics | X | X | | X |
| Aircraft | X | X | X | |
| Aircraft other than Large | | | | |

8. Signature of issuing officer & date:
9. Seal or stamp of the DGCA

LIC NO:

*Kuwait Civil Aviation Safety Regulation – Part 66 – Aircraft Maintenance Licenses*

| KCASR 1 Part 66 AIRCRAFT TYPE RATINGS | | |
|---|---|---|
| A/C Type or Group | Category | Official Stamp & Date |
| | | |
| LIC NO: | | |

| KCASR 1 PART 66 LIMITATIONS |
|---|
| |
| Valid until: |
| LIC NO: |

| |
|---|
| Annex to<br>DGCA<br>Form 26<br><br>National Privileges outside the Scope of KCASR 1 Part 66, |
| Official Stamp & date<br><br>LIC NO: |

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# APPENDIX VII: 66.A.70 Conversion Provisions

## 1- Application For a DGCA Part-66 Licence On The Basis of a Foreign Licence

(a) Kuwait DGCA may consider grant of exemptions on examination and/or experience requirements for a DGCA Part-66 AMEL on the basis of another ICAO contracting state's aircraft maintenance engineer licence of the applicant if he/she meets the eligibility criteria.

(b) The reviewing licensing inspector will thoroughly evaluate the application and workout equivalence of the foreign licence with appropriate category of Part-66 AMEL. If such an application for grant of licence is approved, the candidate will be required to successfully pass DGCA Air Legislation examination, and other full/part modular examinations considered necessary by DGCA to convert the foreign licence to a DGCA Part-66 AMEL.

(c) Requests for a licence on the basis of a foreign licence with unreasonably large number of limitations or with limitations that severely restricts the corresponding Part-66 privileges will not be accepted.

(d) It is the responsibility of the applicant to provide all supporting evidence in support of the application that the original licence was issued against equivalent/comparable standards and requirements. The DGCA would need to conduct a detailed assessment of the standards and requirements against which the original licence was issued, which will require co-operation of the regulatory authority concerned.

(e) In cases where DGCA finds it difficult to assess the standards of the issuing authority, the application will be rejected and the applicant will be requested to raise a fresh application in accordance with Part-66. Because of the detailed evaluation and assessment of applications involving foreign licences.

(f) Among other applicable responsibilities, the employers have the following responsibilities:

1. Ensure that all documents submitted to DGCA for the purpose of a licence conversion are genuine, up to date, valid and free from any kind of falsification.
2. Ensure the applicant is fully knowledgeable in all aspects of DGCA rules and regulations related to aircraft airworthiness and maintenance.
3. Ensure that the applicant is legally allowed to work in Kuwait or country of deployment.
4. Ensure that in the preceding two years period, the applicant has had either six months of maintenance experience in accordance with the privileges granted by the original licence or met the provision for the issue of the appropriate privileges.
5. Ensure that the applicant is duly assessed and authorised as competent to exercise the privileges of the converted licence in accordance with the companies approved procedures.

The following pre-requisites and eligibility criteria for the conversion of a foreign licence shall be met:

i. The foreign licence shall be endorsed with at least one type rating.
ii. Had the privileges to issue Certificate of Release to Service (CRS) under a maintenance/certification authorisation granted by his previous organisation.

iii. The foreign licence shall be verified by the issuing authority and addressed to DGCA.

iv. Must successfully complete the DGCA Air Legislation examination.

## 2- Temporary Validation of a Foreign Licence

(g) To permit a foreign licence holder to exercise the privileges of their licence in Kuwait, a foreign licence can be validated by issuance of a validation certificate, with initial validity of 12 months and may be further extended upon request.

(h) Only those foreign aircraft maintenance licences that meet the intent of ICAO Annex 1 and whose scope of privileges are considered commensurate with B1 or B2 licences under Part-66, will be considered for further evaluation for grant of temporary validation. Validation for grant of privileges of Category A licence under Part-66 will not be considered. Licences issued by ICAO signatory states that have not furnished any response to ICAO for compliance with Annex 1 or who have filed related major differences on the requirements of Annex 1 will also not be considered for grant of temporary validation. This also applies to states that have major findings against them in the latest ICAO audit of their national civil aviation authorities.

(i) The pre-requisites and eligibility criteria for the issue of a temporary validation are detailed in paragraph 1 (Application For a DGCA Part-66 Licence On The Basis Of a Foreign Licence) above.

## 3- ICAO Licences Eligible for Conversion

(a) EASA Part-66 and UAE GCAA CAR-66 licences are acceptable for conversion, following an air legislation examination. Aircraft types endorsed on the applicant's existing EASA or GCAA licence will be transferred directly to a KCASR Part-66 licence at the time of conversion.

(b) Candidates applying for conversion of foreign licences issued by ICAO contracting states other than (a) above, may be required to sit additional Part-66 full/part modular examination that are considered necessary by the DGCA.

## 4- Removing Limitations from a Basic Licence

(a) Part-66 Licence is not a progressive Licence and therefore, applications received for the removal of limitations from a Category/Sub- Category must have met the requirements to remove all the limitations endorsed on their Licence as it is not permissible to lift limitations singularly.

(b) The applicant must complete the relevant modules applicable to the limitations on the Basic Category/Sub-Category,

(c) Part modules can be completed within an organisation appropriately approved to conduct the DGCA limitation removal examinations.

(d) The applicant will be required to demonstrate the minimum relevant practical maintenance experience as detailed in the table below or has completed a DGCA approved training programme, appropriate to the limitations he is applying for to remove from the Category/Sub-Category. This can be demonstrated in the form of a logbook and / or worksheets ensuring the tasks have been signed off by the appropriate signatory.

(e) Licence holders are advised to apply for the removal of all limitations in a single application.

(f) Applications for removal of partial limitations will be rejected and the applicants will be advised to apply when ready to undertake all of the applicable examinations for removing all limitations on the licence.

| Limitation Code | Minimum Experience as required by Appendix 1 to 66.A.70 Conversion Provisions, the highest number of days will count for multiple limitation removal | |
|---|---|---|
| 1 | 90 days | May be combined with limitation 9 |
| 2 | 90 days | |
| 3 | 90 days | |
| 4 | | Limitation may be removed with exam only |
| 5 | 90 days | |
| 6 | 180 days | |
| 7 | 90 days | |
| 9 | 10 days | May be combined with limitation 1 |
| 10 | 180 days | |
| 11 | 180 days | |
| 12 | 180 days | |
| 14 | 180 days | |
| 15 | 90 days | |
| 16 | 90 days | |
| 17 | 30 days | |
| 18 | 30 days | |

| | | |
|---|---|---|
| 20 | | Limitation may be removed with exam only |
| 25 | 90 days | |
| 26 | 10 days | |
| 28 | 90 days | |

(g) Refer to Para 9 and 10 for applicable modules/part module examinations required for the removal of limitations.

The following table lists the codes for limitations that may be applied on a converted Part-66 Licence

| Limitation Code | Translation of the Code |
|---|---|
| 1 | Excluding electrical power generation & distribution systems. |
| 2 | Excluding instrument systems, INS/IRS and Flight Directors systems |
| 3 | Excluding autopilot systems on aeroplanes |
| 4 | Excluding autopilot systems on helicopters |
| 5 | Excluding automatic landing and autothrottle systems on aeroplanes |
| 6 | Excluding radio communication/navigation and radar systems |
| 7 | Excluding radio radar systems |
| 8 | Reserved |
| 9 | Excluding avionic LRUs |
| 10 | Excluding airframe |
| 11 | Excluding engine |
| 12 | Excluding all pressurised aeroplanes |
| 13 | Reserved |
| 14 | Excluding pressurised aeroplanes above 5700 Kg MTOM |
| 15 | Excluding supercharged piston engines in aeroplanes |
| 16 | Excluding navigational and electronic instrument systems, FDR, GPWS and vibration monitoring systems |
| 17 | Excluding radio-coupled autopilot systems in aeroplanes |
| 18 | Excluding radio-coupled autopilot systems in helicopters |
| 19 | Excluding all tasks with the exception of Compass Compensation and adjustment only |
| 20 | Excluding propeller-turbine engines |
| 21 | Excluding all tasks with the exception of minor scheduled line maintenance up to and including Daily Inspections |
| 22 | Excluding all tasks with the exception of Cabin Maintenance tasks |
| 23 | Excluding all tasks with the exception of DC electrical components in mechanical systems |
| 24 | Excluding all systems with the exception of LRUs within In-flight Entertainment systems |
| 25 | Excluding electrical power generation and distribution systems on aircraft above 5700 kg MTOM |
| 26 | Excluding Avionic LRU replacement and BITE checks on aircraft above 5700 Kg MTOM |
| 27 | Excluding Antenna and Antenna Feeder Systems relating to radio and radar systems |
| 28 | Excluding maintenance tasks on Wooden Structures and Fabric Coverings |

## 5- Removing Limitations From a Type Rating

**When an application is made to remove limitations from a type rating on a Part-66 licence, the Type Ratings will have the appropriate exclusions from the certification privileges lifted. Partial limitations may be removed from a type rating.**

**(a) The applicant shall ensure the relevant Basic Category/Sub-Category does not hold any of the limitations that he wishes to be removed from type(s) applied for. The applicant shall be unable to lift any limitations from type rating(s) if the Basic Category/Sub-Category holds the same restrictions.**

**(b) If the type requires type training then evidence of completing the appropriately approved Part-147 course, the Certificate of Recognition will be required which can cover theoretical and practical elements.**

(c) If the type requires type examination, DGCA can assess the experience submitted without evidence of any course being completed.

(d) Currently, for the removal of limitations from type rating(s), a Part-147 Certificate of Recognition will be acceptable, or evidence of completing a DGCA approved course.

(e) If the practical element is not completed at an approved Part-147 training organisation or completed at an approved Part-145 maintenance organisation, then the practical experience should be gained within an approved maintenance organisation acceptable to the DGCA. See Appendix III to Part-66 Aircraft Type Training and Examination Standard (Paragraph 1 (a) (i) & 1 (b) (i)). which can be considered for the removal of limitations from type rating(s) applied for.

## 6. Basic Knowledge/Examination Requirements

(j) The Part-66 syllabus normally requires different levels of knowledge for different licence categories (A, B1 and B2) within a module; therefore, appropriate conversion examinations applicable to certain modules for licence holders wishing to include another category, have to be completed. The most common cases of category conversion are given in Para 7.

(k) The DGCA, or its approved designated Part-147 organisation on its behalf, will conduct module/part module examinations for extension of an existing Part-66 licence to have further categories.

## 7. Common Scenarios for the Extension of a Licence

**Extension of a Part-66 – B2 licence to include Mechanical Category A**

**Note:** Module 7 is common to all Category 'A' sub-categories. Modules 11 to 17 must be taken as shown according to the sub-category required.

**Examples:** Requirements for conversion of full B2 to include Category A1 are:

Modules 7.8 – 7.13 and 7.19b (Required for any applied Category A in addition to the particular requirements of the category applied) – 35 Questions

+

Modules 11.2 – 11.4, 11.7, 11.8, 11.10 – 11.13, 11.15 – 11.17 – 70 Questions

+

Full Modules 15 – 50 Questions

+

Full Module 17 – 20 Questions

| Category/Limitation Held | Category | Modules or part modules required | No of questions |
|---|---|---|---|
| **Full B2** or **B2 with limitation 3 (excluding autopilot systems on aeroplanes)or 4(excluding autopilot systems on helicopters)** | Any category A | **Mod 7.8** to **7.13** , 7.19b | **35** |
| **Full B2** or **B2 with limitation** 4 **(excluding autopilot systems on helicopters)** | A1,A2 | **Mod 11.2** to **11.4** , 11.7, 11.8, 11.10 to 11.13, 11.15 to 11.17 | **70** |
| **Full B2** or **B2 with limitation 3 (excluding autopilot systems on aeroplanes)** | A3, A4 | **Mod 12.1** to **12.6, 12.9** to 12.14 , 12.16 | **70** |
| **Full B2** or **B2 with limitation 3 (excluding autopilot systems on aeroplanes)or 4(excluding autopilot systems on helicopters)** | A1,A3 | 15 | **60** |
| **Full B2** or **B2 with limitation 3 (excluding autopilot systems on aeroplanes)or 4(excluding autopilot systems on helicopters)** | A2,A4 | 16 | **50** |
| **Full B2** or **B2 with limitation** 4 **(excluding autopilot systems on helicopters)** | A1,A2 | 17 | **20** |

Extension of Category B1 to include Category B2

The following table normally applies to full Category B1 AMEL holders. If the licence holder has only one limitation that excludes Avionics LRUs only, full B2 level Module 5 examination will be required instead of the Module 5 conversion examination as shown below. Successful qualification of Module5 in this case will qualify the holder for removal of the Avionics LRU limitation from B1 category.

If B1 licence holder previously held X Electrical Basic DGCA licence, Module 4 will not be required and the applicant must apply for exemption on application for B2 and a copy of the old licence should be attached with the application.

Modular requirements for extension of B1 to include B2 category

| Category Held | Modules | Modules or part modules required | No of Questions |
|---|---|---|---|
| **B1.1 or B1.2 or B 1.3 or B1.4** | 4 | Module 4.1.1b, 4.1.2, 4.1.3b, 4.2, 4.3b | **20** |
| | 5 | Module 5.1 to 5.3,5.6b, 5.7 to 5.10, Module 7.4 | **40** |
| | 13 | Module 13.1c, 13.3 & 13.4, 13.6, 13.8 | **100** |

**Extension of Category B2 to include Category B1**

The following table is applicable only to Category B2 AMEL holders without any limitations. Licence holders with any limitations should apply for removal of the limitation first.

| To Category | Module | Modules or part module required | No of Questions |
|---|---|---|---|
| B1.1 | 2 | Module 2.2.1, 2.2.2, 2.2.3, 2.2.4 b | **18** |
| | 6 | Module 6.3.b , 6.4 b , 6.5.4 , 6.6.b , 6.7 , 6.10 | **20** |
| | 7 | Module 7.6 , 7.8 , 7.9 to 7.15 , 7.16 b , 7.18 b & c, 7.19 b | **40** |
| | 11 | Module 11.1 to 11.4, 11.7 to 11.13, 11.15 to 11.17 | **90** |
| | 15 | Module 15.1 to 15.13, 15.15 to 15.22 | **70** |
| | 17 | Module 17 | **30** |
| B1.2 | 2 | Module 2.2.1, 2.2.2, 2.2.3, 2.2.4 b | **18** |
| | 6 | Module 6.3.b, 6.4 b, 6.5.4, 6.6.b, 6.7, 6.10 | **20** |
| | 7 | Module 7.6 , 7.8 , 7.9 to 7.15, 7.16 b , 7.18 b & c, 7.19 b | **40** |
| | 11 | Module 11.1 to 11.4 , 11.7 to 11.13, 11.15 to 11.17 | **90** |
| | 16 | Module 16.1 to 16.9, 16.11 to 16.13 | **55** |
| | 17 | Module 17 | **30** |

| | | | |
|---|---|---|---|
| **B1.3** | 2 | Module 2.2.1, 2.2.2, 2.2.3, 2.2.4 b | **18** |
| | 6 | Module 6.3.b, 6.4 b, 6.5.4, 6.6.b, 6.7, 6.10 | **20** |
| | 7 | Module 7.6, 7.8, 7.9 to 7.15, 7.16 b, 7.18 b & c , 7.19 b | **40** |
| | 12 | Module 12.1 to 12.6 , 12.9 to 12.14 , 12.16 | **80** |
| | 15 | Module 15.1 to 15.13, 15.15 to 15.22 | **70** |
| **B1.4** | 2 | Module 2.2.1, 2.2.2, 2.2.3, 2.2.4 b | **18** |
| | 6 | Module 6.3.b, 6.4 b, 6.5.4, 6.6.b, 6.7, 6.10 | **20** |
| | 7 | Module 7.6, 7.8, 7.9 to 7.15, 7.16 b, 7.18 b & c , 7.19 b | **40** |
| | 12 | Module 12.1 to 12.6, 12.9 to 12.14, 12.16. | **80** |
| | 16 | Module 16.1 to 16.9, 16.11 to 16.13 | **55** |

**Extension of any Category A to include Category B1 or B2**

Full examination applicable to the relevant category B1 or B2 will apply**.**

## 8- Common Part-66 Conversion Scenarios

(a) The following tables give most common licence conversion scenarios. Applicants, whose applications do not fall into any of the common scenario as given, need to personally take up their case with the DGCA licensing Division by requesting personal interview.

(b) Holders of a B1 sub category will automatically be issued with a Category A licence in the same sub category except where the applicant receives Limitation 10 or 11 on the B1 licence.

DGCA will determine Part-66 licence category and sub-category into which the present licence will be converted on the basis of ratings already held by the applicant on his previous/present licence**.**

**DGCA Mechanical Licences.**

| DGCA Licence Excludes | Applicable Part-66 Limitation(s) | Limitation means |
|---|---|---|
| Airframe | 10 | Excluding airframe |
| Engine | 11 | Excluding engine |
| Electrical | 1 | Excluding electrical power generation & distribution systems |
| Electrical | 25 | Excluding electrical power generation and distribution systems on aircraft above 5700 kg MTOW |
| Avionic Extension | 9 | Excluding avionic LRUs |
| Avionic Extension | 26 | Excluding Avionic LRU replacement and BITE checks on aircraft above 5700 kg MTOM |

**DGCA Avionics Licence**

| Existing Licence Excludes | Applicable Part-66 Limitation(s) | Limitation means |
|---|---|---|
| Electrical | 1 | Excluding electrical power generation and distribution systems |
| Instrument Systems | 2 | Excluding instrument systems, INS/IRS and Flight Directors systems |
| Autopilot Systems (Aeroplanes) | 3 | Excluding autopilot systems on aeroplanes |
| Autopilot Systems (Helicopters) | 4 | Excluding autopilot systems on helicopters |
| Combined Category | 5 | Excluding automatic landing and auto throttle systems on aeroplanes |
| Radio Communication/Navigation & Radar Systems | 6 | Excluding radio communication/navigation and radar systems |
| Radio Radar (only) | 7 | Excluding radio radar systems |

**If Limitation 3 is applied, Limitation 5 is also applicable.**
**Use either limitation 6 or 7.**

## 9- Removal Of Limitations From a Part-66 Category B1 Licence

| Ratings held on Existing DGCA LICENCE | B1 Sub-cat | Part-66 Limitation to be removed | | Part-66 Modules and/or Part-Modules Required (F = Full Modules) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 | 4 | 5 | 6 | 7 | | 11 | | | | |
| Aeroplanes 2 + Turb-Eng (Aeros) + Av Ext | B1.1 | 1 | 3.9 to 3.18 | F | | | 7.7 | | 11.5<br>11.6<br>11.14 | | | | |
| Aeroplanes 2 + Turb-Eng (Aeros) + Electrical | B1.1 | 9 | | | F | | | | | | | | |
| Aeroplanes 2 + Turb-Eng (Aeros) | B1.1 | 1,9 | 3.9 to 3.18 | F | F | | 7.7 | | 11.5<br>11.6<br>11.14 | | | | |
| Aeroplanes 2 Jet/Turb-Eng (Aeros) | B1.1 | 1,9,20 | 3.9 to 3.18 | F | F | | 7.7 | | 11.5<br>11.6<br>11.14 | | | | F |
| Aeroplanes 2 | B1.1 | 1,9,11, 20 | 3.9 to 3.18 | F | F | | 7.7 | F | 11.5<br>11.6<br>11.8<br>11.101<br>11.14 | | F | | F |
| Turb-Eng (Aeros) | B1.1 | 1,9,10 | 3.9 to 3.18 | F | F | | 7.4<br>7.7<br>7.8<br>7.14<br>7.16 to 7.19 | F | F | | | | |
| Aeroplanes 1 + Pist-Eng (Aeros) + Av Ext | B1.2 | 1 | 3.9 to 3.18 | F | | | 7.7 | | 11.5<br>11.6<br>11.14 | | | | |
| Aeroplanes 1 + Pist-Eng (Aeros) + Electrical | B1.2 | 9 | | | F | | | | | | | | |
| Aeroplanes 1 + Pist-Eng (Aeros) | B1.2 | 1,9 | 3.9 to 3.18 | F | F | | 7.7 | | 11.5<br>11.6<br>11.14 | | | | |
| Pist Eng (Aeros) | B1.2 | 1,9,10 | 3.9 to 3.18 | F | F | | 7.4<br>7.7<br>7.8<br>7.14 | | F(11B) | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 7.16 to 7.19 | | | | | | |
| Aeroplanes 1 | B1.2 | 1,9,11 | 3.9 to 3.18 | F | F | | 7.7 | | 11.5 11.6 11.8 11.10 11.14 | | | | |
| A&C (Heli): Turb-Eng Av Ext | B1.3 | 1 | 3.9 to 3.18 | F | | 6.3.2 6.3.3 | 7.7 | | | 12.8 12.15 | | | |
| A &C (Heli): Turb-Eng | B1.3 | 9 | | | F | 6.3.2 6.3.3 | | | | | | | |
| A & C (Heli): Turb-Eng | B1.3 | 1, 9 | 3.9 to 3.18 | F | F | 6.3.2 6.3.3 | 7.7 | | | 12.8 12.15 | | | |
| A & C (Heli): Pist-Eng Av Ext | B1.4 | 1 | 3.9 to 3.18 | F | | 6.3.2 6.3.3 | 7.7 | | | 12.8 12.15 | | | |
| A&C (Heli): Pist-Eng | B1.4 | 9 | | | F | 6.3.2 6.3.3 | | | | | | | |
| A & C (Heli): | B1.4 | 1, 9 | 3.9 to | F | F | 6.3.2 | 7.7 | | | 12.8 | | | |

## 10- Removal of Limitations from a Part-66 Category B2 Licence

| Existing DGCA Licence | Limitations to be removed | Part-66 Modules and/or Part-Modules Required (F = Full Modules) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 4 | 5 | 8 | 9 | 10 | 13 | 14 |
| Radio Comm/Nav<br>Radio Radar | 1,2,3,4,5 | | | F | | | 13.1<br>13.3 to 13.5<br>13.7 to 13.9 | F |
| Combined Cat<br>(Inst/Autopilots) | 1,2,3,4,6 | | | | | | 13.1<br>13.3 to 13.6<br>13.8,13.9 | |
| Radio Comm/Nav | 1,2,3,4,5,7 | | | F | | | 13.1<br>13.3 to 13.9 | F |
| Autopilots (Heli) | 1,2,3,5,6 | | | | | | 13.1<br>13.3 to 13.8 | |
| Autopilots (Aeros)<br>Radio Comm/Nav<br>Radio Radar | 1,2,4,5 | | | | | | 13.1<br>13.3 to 13.6<br>13.8<br>13.9 | |
| Autopilots (Aeros) | 1,2,4,5,6 | | | | | | 13.1<br>13.3 to 13.9 | F |
| Instruments | 1,3,4,5,6 | | | F | | | 13.1<br>13.3 to 13.9 | |
| Instruments<br>Radio Comm/Nav<br>Radio Radar | 1,3,4,5 | | | F | | | 13.1<br>13.3<br>13.5 to 13.9 | |
| Instruments<br>Autopilots (Heli) | 1,3,5,6 | | | | | | 13.1<br>13.3<br>13.4 to 13.9 | |
| Instruments<br>Autopilots (Aeros)<br>Radio Comm/Nav<br>Radio Radar | 1,4,5 | | | | | | 13.1<br>13.3<br>13.5<br>13.6<br>13.8<br>13.9 | |
| Instruments<br>Autopilots (Aeros) | 1,4,5,6 | | | | | | 13.1<br>13.3<br>13.4 to 13.6<br>13.8<br>13.9 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Electrical | 2,3,4,5 | | | F | | | 13.1 | F |
| Radio<br>Comm/Nav<br>Radio Radar | | | | | | | 13.<br>3<br>13.<br>4 | |
| Electrical | 2,3,4,5,6 | | F | F | | | 13.1<br>13.3<br>13.4<br>13.6 to 13.8 | F |
| Electrical<br>Autopilots (Heli) | 2,3,5,6 | | | | | | 13.1<br>13.3<br>13.4<br>13.6 to 13.8 | F |
| Electrical<br>Autopilots (Aeros)<br>Radio Comm/Nav<br>Radio Radar | 2,4,5 | | | | | | 13.1<br>13.3<br>13.8 | F |
| Electrical<br>Autopilots (Aeros) | 2,4,5,6 | | | | | | 133.1<br>13.3<br>13.4<br>13.6<br>13.8 | F |
| Electrical<br>Instruments<br>Radio Comm/Nav<br>Radio Radar | 3,4,5 | | | F | | | 13.1<br>13.3<br>13.7<br>13.8 | |
| Electrical<br>Instruments | 3,4,5,6 | | | F | | | 13.1<br>13.3<br>13.4<br>13.6<br>13.7<br>13.8 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Electrical<br>Instruments<br>Autopilots (Heli)<br>Radio Comm/Nav<br>Radio Radar | 3,5 | | | | | | 13.1<br>13.3<br>13.7<br>13.8 | |
| Electrical<br>Instruments<br>Autopilots (Heli) | 3,5,6 | | | | | | 13.1<br>13.3<br>13.4<br>13.6,13.7<br>13.8 | |
| Instruments | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Combined Cat (inst/autopilot) Radio Comm/Nav | | | | | | | 13.8 | |
| Electrical Instruments Autopilots (Aeros) Radio Comm/Nav Radio Radar | 4,5 | | | | | | 13.1 13.3 13.8 | |
| Electrical Instruments Autopilots (Aeros) | 4,5,6 | | | | | | 13.1 13.3 13.4 13.6 13.8 | |
| Electrical Combined Cat (inst/autopilots) | 4,6 | | | | | | 13.1 13.3 13.4 13.6 13.8 | |
| Electrical Instruments Autopilots (Aeros) Autopilots (Heli) | 5,6 | | | | | | 13.3 13.4 13.6 13.8 | |
| Electrical Combined Cat (inst/autopilots) Autopilots (Heli) | 6 | | | | | | 13.4 13.6 13.8 | |
| Electrical Combined Cat (inst/autopilots) Autopilots (Heli) Radio Comm/Nav | 7 | | | | | | 13.4 | |

**END**