

II

(Non-legislative acts)

REGULATIONS

COMMISSION REGULATION (EU) No 1149/2011

of 21 October 2011

amending Regulation (EC) No 2042/2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, in particular Article 100(2) thereof,

Having regard to Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC ⁽¹⁾, and in particular Article 5(5) thereof,

Whereas:

- (1) In order to maintain a high uniform level of aviation safety in Europe, it is necessary to introduce changes to the existing requirements and procedures on the continuing airworthiness of aircraft and aeronautical products, parts and appliances and on the approval of organisations and personnel involved in these tasks, **in particular in order to update the training, examination, knowledge and experience requirements for the issuance of aircraft maintenance licences and to adapt these requirements to the complexity of the different categories of aircraft.**
- (2) Commission Regulation (EC) No 2042/2003 ⁽²⁾ should therefore be amended accordingly.
- (3) The measures provided for in this Regulation are based on the opinions ⁽³⁾ issued by the European Aviation

Safety Agency (hereinafter 'the Agency') in accordance with Articles 17(2)(b) and 19(1) of Regulation (EC) No 216/2008.

- (4) It is necessary to provide sufficient time for the personnel eligible to the new aircraft maintenance license category B3 introduced by this regulation, the training organisations and the maintenance organisations, as well as to the competent authorities of Member States, to adapt to the new regulatory framework.
- (5) Given the lower complexity of light aircraft, it may be appropriate to define a simple and proportionate system for the licensing of the personnel involved in the maintenance of such aircraft. The Agency should be allowed to continue working on this matter and the Member States to continue using the corresponding national licenses.
- (6) The measures provided for in this Regulation are in accordance with the opinion of the Committee established by Article 65 of Regulation (EC) No 216/2008,

HAS ADOPTED THIS REGULATION:

Article 1

Regulation (EC) No 2042/2003 is amended as follows:

- (1) in Article 5, the following paragraphs are added:

'3. Certifying staff holding a licence issued in accordance with Annex III (Part-66) in a given category/sub-category are deemed to have the privileges described in point 66.A.20(a) of this Annex corresponding to such a category/sub-category. The basic knowledge requirements corresponding to these new privileges shall be deemed as met for the purpose of extending such licence to a new category/sub-category.

⁽¹⁾ OJ L 79, 19.3.2008, p. 1.

⁽²⁾ OJ L 315, 28.11.2003, p. 1.

⁽³⁾ EASA Opinion No 05/2008 on 'Time limit for demonstrating compliance with knowledge and experience requirements', Opinion No 04/2009 on 'aircraft maintenance license for non-complex aircraft' and Opinion No 05/2009 on 'privileges of B1 and B2 aircraft maintenance licenses' and 'type and group ratings' and 'type rating training'.

4. Certifying staff holding a licence including aircraft which do not require an individual type rating may continue to exercise his/her privileges until the first renewal or change, where the licence shall be converted following the procedure described in point 66.B.125 of Annex III (Part-66) to the ratings defined in point 66.A.45 of this Annex.

5. Conversion reports and Examination credit reports complying with the requirements applicable before this Regulation applies shall be deemed to be in compliance with this Regulation.

6. Until such time as this Regulation specifies requirements for certifying staff:

- (i) for aircraft other than aeroplanes and helicopters;
- (ii) for components;

the requirements in force in the relevant Member State shall continue to apply, except for maintenance organisations located outside the European Union where the requirements shall be approved by the Agency.;

(2) in Article 6, the following paragraphs are added:

‘3. Basic training courses complying with the requirements applicable before this Regulation applies may be started until 1 year after date by which this Regulation applies. Basic knowledge examinations conducted as part of these courses may comply with the requirements applicable before this Regulation applies.

4. Basic knowledge examinations complying with the requirements applicable before this Regulation applies and conducted by the competent authority or conducted by a maintenance training organisation approved in accordance with Annex IV (Part-147) while not being part of a basic training course, may be conducted until 1 year after the date by which this Regulation applies.

5. Type training courses and type examinations complying with the requirements applicable before this Regulation applies shall be started and finished not later than 1 year after the date by which this Regulation applies.;

(3) Article 7 is modified as follows:

(i) in paragraph 3, the following points (h) and (i) are added:

‘(h) for the maintenance of piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below not involved in commercial air transport:

- (i) until 28 September 2012, the requirement for the competent authority to issue aircraft maintenance licences in accordance with Annex III (Part-66), as new or as converted pursuant to point 66.A.70 of this Annex;
- (ii) until 28 September 2014, the requirement to have certifying staff qualified in accordance with Annex III (Part-66) contained in the following provisions:

— M.A.606(g) and M.A.801(b)2 of Annex I (Part-M),

— 145.A.30(g) and (h) of Annex II (Part-145);

(i) for the maintenance of ELA1 aeroplanes not involved in commercial air transport, until 28 September 2015:

(i) the requirement for the competent authority to issue aircraft maintenance licences in accordance with Annex III (Part-66), as new or as converted pursuant to point 66.A.70 of this Annex;

(ii) the requirement to have certifying staff qualified in accordance with Annex III (Part-66) contained in the following provisions:

— M.A.606(g) and M.A.801(b)2 of Annex I (Part-M),

— 145.A.30(g) and (h) of Annex II (Part-145).;

(ii) point 7(e) is deleted;

(iii) the following paragraphs 8 and 9 are added:

‘8. For the purpose of time limits contained in points 66.A.25, 66.A.30 and Appendix III of Annex III (Part-66) related to basic knowledge examinations, basic experience, theoretical type training and examinations, practical training and assessment, type examinations and on the job training completed before this Regulation applies, the origin of time shall be the date by which this Regulation applies.

9. The Agency shall submit an opinion to the Commission including proposals for a simple and proportionate system for the licensing of certifying staff involved in the maintenance of ELA1 aeroplanes as well as aircraft other than aeroplanes and helicopters.;

(4) the following Article 8 is added:

‘Article 8

Agency measures

1. The Agency shall develop acceptable means of compliance (hereinafter called “AMC”) that competent authorities, organisations and personnel may use to demonstrate compliance with the provisions of the Annexes to this Regulation.

2. The AMC issued by the Agency shall neither introduce new requirements nor alleviate the requirements of the Annexes to this Regulation.

3. Without prejudice to Articles 54 and 55 of Regulation (EC) No 216/2008, when the acceptable means of compliance issued by the Agency are used, the related requirements of the Annexes to this Regulation shall be considered as met without further demonstration.;

(5) Annex I (Part-M), Annex II (Part-145), Annex III (Part-66) and Annex IV (Part-147) are amended in accordance with the Annex to this Regulation.

Article 2

This Regulation shall enter into force on the first day following its publication in the *Official Journal of the European Union*.

This Regulation shall apply from the first day of the ninth month following its publication in the *Official Journal of the European Union*, except for point 3(i) of Article 1 that shall apply on the first day following its publication.

Certificates issued in accordance with Annex I (Part-M), Annex II (Part-145), Annex III (Part-66) or Annex IV (Part-147) before this Regulation applies shall remain valid until they are changed, suspended or revoked.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 21 October 2011.

For the Commission

The President

José Manuel BARROSO

ANNEX

1. In Annex I (Part-M) to Regulation (EC) No 2042/2003, point M.B.103 is deleted.
2. Annex II (Part-145) to Regulation (EC) No 2042/2003 is amended as follows:

(1) The table of contents is replaced by the following:

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Appendix III — Maintenance Organisation Approval referred to in Annex II (Part-145)

Appendix IV — Conditions for the use of staff not qualified in accordance with Annex III (Part-66) referred to in points 145.A.30(j) 1 and 2;

(2) point 145.A.30 is modified as follows:

(i) in point (f), 'qualified in Part-66 category B1' is replaced by 'qualified in category B1 or B3 in accordance with Annex III (Part-66)';

(ii) point (g) is replaced by the following:

'(g) Any organisation maintaining aircraft, except where stated otherwise in point (j), shall in the case of aircraft line maintenance, have appropriate aircraft rated certifying staff qualified as category B1, B2, B3, as appropriate, in accordance with Annex III (Part-66) and point 145.A.35.

In addition such organisations may also use appropriately task trained certifying staff holding the privileges described in points 66.A.20(a)(1) and 66.A.20(a)(3)(ii) and qualified in accordance with Annex III (Part-66) and point 145.A.35 to carry out minor scheduled line maintenance and simple defect rectification. The availability of such certifying staff shall not replace the need for category B1, B2, B3 certifying staff, as appropriate.;

(iii) in point (h)1, the mention 'qualified as category B1 and B2' is replaced by 'qualified as category B1, B2 as appropriate';

(iv) point (h)2 is replaced by the following:

'2. in the case of base maintenance of aircraft other than large aircraft have either:

(i) appropriate aircraft rated certifying staff qualified as category B1, B2, B3, as appropriate, in accordance with Annex III (Part-66) and point 145.A.35; or

(ii) appropriate aircraft rated certifying staff qualified in category C assisted by support staff as specified in point 145.A.35(a)(i).';

(v) in point (j), the mention 'By derogation to paragraphs (g) and (h)' is replaced by 'By derogation to paragraphs (g) and (h), in relation to the obligation to comply with Annex III (Part-66)';

(3) point 145.A.35 is modified as follows:

(i) the title is replaced by '**145.A.35 Certifying staff and support staff**;

(ii) point (a) is replaced by the following:

'(a) In addition to the appropriate requirements of 145.A.30(g) and (h), the organisation shall ensure that certifying staff and support staff have an adequate understanding of the relevant aircraft and/or components to be maintained together with the associated organisation procedures. In the case of certifying staff, this shall be accomplished before the issue or re-issue of the certification authorisation.

(i) "Support staff" means those staff holding a Part-66 aircraft maintenance licence in category B1, B2 and/or B3 with the appropriate aircraft ratings, working in a base maintenance environment while not necessarily holding certification privileges.

(ii) "Relevant aircraft and/or components", means those aircraft or components specified in the particular certification authorisation.

(iii) "Certification authorisation" means the authorisation issued to certifying staff by the organisation and which specifies the fact that they may sign certificates of release to service within the limitations stated in such authorisation on behalf of the approved organisation.;

(iii) point (b) is replaced by the following:

'(b) Excepting those cases listed in points 145.A.30(j) and 66.A.20(a)3(ii) the organisation may only issue a certification authorisation to certifying staff in relation to the basic categories or subcategories and any type rating listed on the aircraft maintenance licence as required by Annex III (Part-66), subject to the licence remaining valid throughout the validity period of the authorisation and the certifying staff remaining in compliance with Annex III (Part-66).';

(iv) point (c) is replaced by the following:

'(c) The organisation shall ensure that all certifying staff and support staff are involved in at least 6 months of actual relevant aircraft or component maintenance experience in any consecutive 2-year period.

For the purpose of this paragraph "involved in actual relevant aircraft or component maintenance" means that the person has worked in an aircraft or component maintenance environment and has either exercised the privileges of the certification authorisation and/or has actually carried out maintenance on at least some of the aircraft type or aircraft group systems specified in the particular certification authorisation.;

(v) in points (d), (e), (j) and (m), 'category B1 and B2 support staff' is replaced by 'support staff';

(vi) the following points are added:

(n) The holder of a category A aircraft maintenance licence may only exercise certification privileges on a specific aircraft type following the satisfactory completion of the relevant category A aircraft task training carried out by an organisation appropriately approved in accordance with Annex II (Part-145) or Annex IV (Part-147). This training shall include practical hands on training and theoretical training as appropriate for each task authorised. Satisfactory completion of training shall be demonstrated by an examination or by workplace assessment carried out by the organisation.

(o) The holder of a category B2 aircraft maintenance licence may only exercise the certification privileges described in point 66.A.20(a)3(ii) of Annex III (Part-66) following the satisfactory completion of (i) the relevant category A aircraft task training and (ii) **6 months of documented practical experience** covering the scope of the authorisation that will be issued. The task training shall include practical hands on training and theoretical training as appropriate for each task authorised. Satisfactory completion of training shall be demonstrated by an examination or by workplace assessment. Task training and examination/assessment shall be carried out by the maintenance organisation issuing the certifying staff authorisation. **The practical experience shall be also obtained within such maintenance organisation.;**

(4) in point 145.A.70(a)6, 'category B1 and B2 support staff' is replaced by 'support staff';

(5) point 145.B.17 is deleted;

(6) Appendix IV to Part-145 is amended as follows:

'Appendix IV

Conditions for the use of staff not qualified in accordance with Annex III (Part-66) referred to in points 145.A.30(j)1 and 2

1. Certifying staff in compliance with all the following conditions are deemed to meet the intent of point 145.A.30(j)(1) and (2):

(a) The person shall hold a licence or a certifying staff authorisation issued under national regulations in full compliance with ICAO Annex 1.

- (b) The scope of work of the person shall not exceed the scope of work defined by the national licence or the certifying staff authorisation, whatever is the most restrictive.
- (c) The person shall demonstrate he/she received the training on human factors and aviation legislation referred to in modules 9 and 10 of Appendix I to Annex III (Part-66).
- (d) The person shall demonstrate 5 years maintenance experience for line maintenance certifying staff and 8 years for base maintenance certifying staff. However, those persons whose authorised tasks do not exceed those of a Part-66 category A certifying staff, need to demonstrate 3 years maintenance experience only.
- (e) Line maintenance certifying staff and base maintenance support staff shall demonstrate he/she received type training and passed examination at the category B1, B2 or B3 level, as applicable, referred to in Appendix III to Annex III (Part-66) for each aircraft type in the scope of work referred to in point (b). Those persons whose scope of work does not exceed those of a category A certifying staff may however receive task training in lieu of a complete type training.
- (f) Base maintenance certifying staff shall demonstrate he/she received type training and passed examination at the category C level referred to in Appendix III to Annex III (Part-66) for each aircraft type in the scope of work referred to in point (b), except that for the first aircraft type, training and examination shall be at the category B1, B2 or B3 level of Appendix III.

2. Protected rights

- (a) The personnel having privileges before the entry into force of the relevant requirements of Annex III (Part-66) may continue to exercise them without the need to comply with points 1(c) to 1(f).
- (b) However after that date any certifying staff willing to extend the scope of their authorisation to include additional privileges shall comply with point 1.
- (c) Notwithstanding subparagraph 2(b) above, in the case of additional type training, compliance with points 1(c) and 1(d) is not required.

3. Annex III (Part-66) to Regulation (EC) No 2042/2003 is replaced by the following:

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(Part-66)

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66.1 Competent authority

- (a) For the purpose of this Annex (Part-66), the competent authority shall be:
1. the authority designated by the Member State to whom a person first applies for the issuance of an aircraft maintenance licence; or
 2. the authority designated by another Member State, in case it would be different, subject to agreement with the authority referred to in point 1. In that case, the licence referred to in point 1 shall be revoked, all the records mentioned in point 66.B.20 shall be transferred and a new licence shall be issued on the basis of these records.
- (b) The Agency 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.

SECTION A

TECHNICAL REQUIREMENTS

SUBPART A

AIRCRAFT MAINTENANCE LICENCE

66.A.1 Scope

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

66.A.3 Licence categories

- (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 B3 is applicable to piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below.**

66.A.5 Aircraft groups

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 Agency.

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 change to such licence shall be made on an EASA Form 19 (see Appendix V) in a manner established by the competent authority and submitted thereto.
- (b) An application for the change to an aircraft maintenance licence shall be made to the competent authority of the Member State 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 competent authority together with the EASA Form 19.
- (d) Where the applicant for change of the basic categories qualifies for such change via the procedure referred to in point 66.B.100 in a Member State other than the Member State which issued the license, the application shall be sent to the competent authority referred to in point 66.1.
- (e) Where the applicant for change of the basic categories qualifies for such change via the procedure referred to in point 66.B.105 in a Member State other than the Member State which issued the license, the maintenance organisation approved in accordance with Annex II (Part-145) shall send the aircraft maintenance licence together with the EASA Form 19 to the competent authority referred to in point 66.1 for stamp and signature of the change or reissue of the licence, as appropriate.
- (f) Each application shall be supported by documentation to demonstrate compliance with the applicable theoretical knowledge, practical training and experience requirements at the time of application.

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 Annex II (Part-145). The certification privileges shall be restricted to work that the licence holder has personally performed in the maintenance organisation that issued the certification authorisation.
 2. A category B1 aircraft maintenance licence shall permit the holder to issue certificates of release to service and to act as B1 support staff following:
 - maintenance performed on aircraft structure, powerplant and mechanical and electrical systems,

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

Category B1 includes the corresponding A subcategory.

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

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

- maintenance performed on avionic and electrical systems, and
- electrical and avionics tasks within powerplant and mechanical systems, requiring only simple tests to prove their serviceability; and

(ii) to issue certificates of release to service following minor scheduled line maintenance and simple defect rectification within the limits of tasks specifically endorsed on the certification authorisation referred to in point 145.A.35 of Annex II (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:

- maintenance performed on aeroplane structure, powerplant and mechanical and electrical systems,
- work on avionic 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.

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

1. in compliance with the applicable requirements of Annex I (Part-M) and Annex II (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 appropriate subject modules in accordance with the Appendix I to Annex III (Part-66). The examination shall be conducted either by a training organisation appropriately approved in accordance with Annex IV (Part-147) or by the competent authority.
- (b) The training courses and examinations shall be passed within 10 years prior to the application for an aircraft maintenance licence or the addition of a category or subcategory to such aircraft maintenance licence. Should this not be the case, examination credits may however be obtained in accordance with point (c).

(c) The applicant may apply to the competent authority for full or partial examination credit to the basic knowledge requirements for:

1. basic knowledge examinations that do not meet the requirement described in point (b) above; and
2. any other technical qualification considered by the competent authority to be equivalent to the knowledge standard of Annex III (Part-66).

Credits shall be granted in accordance with Subpart E of Section B of this Annex (Part-66).

(d) Credits expire 10 years after they were granted to the applicant by the competent authority. The applicant may apply for new credits after expiration.

66.A.30 Basic experience requirements

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

1. for category A, subcategories B1.2 and B1.4 and category B3:
 - (i) 3 years of practical maintenance experience on operating aircraft, if the applicant has no previous relevant technical training; or
 - (ii) 2 years of practical maintenance experience on operating aircraft and completion of training considered relevant by the competent authority as a skilled worker, in a technical trade; or
 - (iii) 1 year of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with Annex IV (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 competent authority as a skilled worker, in a technical trade; or
 - (iii) 2 years of practical maintenance experience on operating aircraft and completion of a basic training course approved in accordance with Annex IV (Part-147);
3. for category C with respect to large aircraft:
 - (i) 3 years of experience exercising category B1.1, B1.3 or B2 privileges on large aircraft or as support staff according to point 145.A.35, or, a combination of both; or
 - (ii) 5 years of experience exercising category B1.2 or B1.4 privileges on large aircraft or as support staff according to point 145.A.35, or a combination of both;
4. for category C with respect to other than large aircraft: 3 years of experience exercising category B1 or B2 privileges on other than large aircraft or as support staff according to point 145.A.35(a), or a combination of both;
5. for category C obtained through the academic route: an applicant holding an academic degree in a technical discipline, from a university or other higher educational institution recognised by the competent authority, 3 years of experience working in a civil aircraft maintenance environment on a representative selection of tasks directly associated with aircraft maintenance including 6 months of observation of base maintenance tasks.

- (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 Annex (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 paragraph (a), aircraft maintenance experience gained outside a civil aircraft maintenance environment shall be accepted when such maintenance is equivalent to that required by this Annex (Part-66) as established by the competent authority. Additional experience of civil aircraft maintenance shall, however, be required to ensure adequate understanding of the civil aircraft maintenance environment.
- (f) Experience shall have been acquired within the 10 years preceding the application for an aircraft maintenance licence or the addition of a category or subcategory to such a licence.

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 competent authority that issued it, in order to verify that the information contained in the licence is the same as that contained in the competent authority records, pursuant to point 66.B.120.
- (b) The holder of an aircraft maintenance licence shall complete the relevant parts of EASA Form 19 (see Appendix V) and submit it with the holder's copy of the licence to the competent authority that issued the original aircraft maintenance licence, unless the holder works in a maintenance organisation approved in accordance with Annex II (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 a 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 competent authority and (ii) when the holder has signed the document.

66.A.45 Endorsement with aircraft ratings

- (a) In order to be entitled to exercise certification privileges on a specific aircraft type, the holder of an aircraft maintenance licence need to have his/her licence endorsed with the relevant aircraft ratings.
 - For category B1, B2 or C the relevant aircraft ratings are the following:
 1. For group 1 aircraft, the appropriate aircraft type rating.
 2. For group 2 aircraft, the appropriate aircraft type rating, manufacturer sub-group rating or full sub-group rating.
 3. For group 3 aircraft, the appropriate aircraft type rating or full group rating.
 - For category B3, the relevant rating is 'piston-engine non-pressurised aeroplanes of 2 000 kg MTOM and below'.
 - For category A, no rating is required, subject to compliance with the requirements of point 145.A.35 of Annex II (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 Annex III (Part-66).

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

- satisfactory completion of the relevant category B1, B2 or C aircraft type examination described in Appendix III to this Annex (Part-66), and
- in the case of B1 and B2 category, demonstration of practical experience on the aircraft type. In that case, the practical experience shall include a representative cross section of maintenance activities relevant to the licence category.

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:
 - pressurised aeroplanes
 - metal structure aeroplanes
 - composite structure aeroplanes
 - wooden structure aeroplanes
 - 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 2 000 kg 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:

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

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 competent authority.
- (c) For limitations referred to in point 66.A.70, limitations shall be removed upon satisfactory completion of examination on those modules/subjects defined in the applicable conversion report referred to in point 66.B.300.

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 a Member State, prior to the date of entry into force of Annex III (Part-66) shall be issued an aircraft maintenance licence by the competent authority of this Member State without further examination subject to the conditions specified in Section B Subpart D.
- (b) A person undergoing a certifying staff qualification process valid in a Member State, prior to the date of entry into force of Annex III (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 competent authority of this Member State 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 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 Annex (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 Member State before the entry into force of this Regulation and the privileges of the converted Part-66 aircraft maintenance licence remain the same.

SECTION B

PROCEDURES FOR COMPETENT AUTHORITIES

SUBPART A

GENERAL

66.B.1 Scope

This section establishes the procedures including the administrative requirements to be followed by the competent authorities in charge of the implementation and the enforcement of Section A of this Annex (Part-66).

66.B.10 Competent authority(a) *General*

The Member State shall designate a competent authority with allocated responsibilities for the issuance, continuation, change, suspension or revocation of aircraft maintenance licences.

This competent authority shall establish an adequate organisational structure to ensure compliance with this Annex (Part-66).

(b) *Resources*

The competent authority shall be appropriately staffed to ensure the implementation of the requirements of this Annex (Part-66).

(c) *Procedures*

The competent authority shall establish documented procedures detailing how compliance with this Annex (Part-66) is accomplished. These procedures shall be reviewed and amended to ensure continued compliance.

66.B.20 Record-keeping

(a) The competent authority 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 competent authority;
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 point (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 point (b) shall be kept for an unlimited period.

66.B.25 Mutual exchange of information

(a) In order to implement the requirement of this Regulation, the competent authorities shall participate in a mutual exchange of information in accordance with Article 15 of Regulation (EC) No 216/2008.

(b) Without prejudice to the competencies of the Member States, in the case of a potential safety threat involving several Member States, the concerned competent authorities shall assist each other in carrying out the necessary oversight action.

66.B.30 Exemptions

All exemptions granted in accordance with Article 14.4 of Regulation (EC) No 216/2008 shall be recorded and retained by the competent authority.

SUBPART B

ISSUE OF AN AIRCRAFT MAINTENANCE LICENCE

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

66.B.100 Procedure for the issue of an aircraft maintenance licence by the competent authority

- (a) On receipt of EASA Form 19 and any supporting documentation, the competent authority shall verify EASA Form 19 for completeness and ensure that the experience claimed meets the requirement of this Annex (Part-66).
- (b) The competent authority 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 Annex (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 Annex (Part-66), the competent authority shall issue the relevant aircraft maintenance licence to the applicant. The same information shall be kept on competent authority 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 competent authority 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 Annex II (Part-145)

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

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 competent authority shall endorse the additional basic category or subcategory on the aircraft maintenance licence by stamp and signature or reissue the licence.
- (b) The competent authority 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 EASA Form 19 and any supporting documentation demonstrating compliance with the requirements of the applicable rating together with the accompanying aircraft maintenance licence, the competent authority 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 competent authority 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 Annex IV (Part-147), the competent authority shall be satisfied that all type training requirements are complied with before the type rating is issued.
- (c) In the case where the On the Job Training is not required, the aircraft type rating shall be endorsed based on a Certificate of Recognition issued by a maintenance training organisation approved in accordance with Annex IV (part-147).
- (d) In the case where the aircraft type training is not covered by a single course, the competent authority 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 competent authority shall be satisfied that (i) the applicant's previous qualification, supplemented by (ii) either a course approved in accordance with Annex IV (Part-147) or a course directly approved by the competent authority, 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 Annex II (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 Annex IV (part-147).
- (g) Aircraft type endorsement shall use the aircraft type ratings specified by the Agency.

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

- (a) The competent authority shall compare the holder's aircraft maintenance licence with the competent authority 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 competent authority records are different from the aircraft maintenance licence held by the licence holder:
 - 1. the competent authority shall investigate the reasons for such differences and may choose not to renew the aircraft maintenance licence.
 - 2. the competent authority shall inform the licence holder and any known maintenance organisation approved in accordance with Annex I (Part-M) Subpart F or Annex II (Part-145) that may be directly affected of such fact.
 - 3. the competent authority 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 referred to in point 4 of Article 5 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 Annex (Part-66) for the corresponding group/sub-group ratings.
- (b) The conversion shall be performed in accordance with the following conversion table:
 - 1. for category B1 or C:
 - helicopter piston engine, full group: converted to "full 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". 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". For the B1 licence the following limitations shall be included: composite structure aeroplanes, wooden structure aeroplanes and metal tubing and fabric aeroplanes,
- aeroplane single piston engine — wooden structure, either full group or manufacturer group: converted to "full group 3". For the B1 licence the following limitations shall be included: 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". 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". 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". 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;

2. for category B2:

- aeroplane: converted to "full sub-group 2a" and "full group 3", plus the aircraft type ratings for those aeroplanes which did not require an aircraft type rating in the previous system and are in group 1,

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

3. for category C:

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

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

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

The competent authority may approve aircraft type training not conducted by a maintenance training organisation approved in accordance with Annex IV (Part-147), pursuant to point 1 of Appendix III to this Annex (part-66). In such case the competent authority shall have a procedure to ensure the aircraft type training complies with Appendix III of this Annex (Part-66).

SUBPART C

EXAMINATIONS

This Subpart provides the procedures to be followed for the examinations conducted by the competent authority.

66.B.200 Examination by the competent authority

- (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 competent authority 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 Annex (Part-66).
- (d) Type training examinations and type examinations shall follow the standard specified in Appendix III to this Annex (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 paper 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 competent authority may only convert qualifications (i) obtained in the Member State 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 Annex (Part-66).
- (b) The competent authority 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 competent authority or (ii) approved by the competent authority to ensure compliance with this Annex (Part-66).
- (d) Conversion reports together with any change of these shall be kept on record by the competent authority in accordance with point 66.B.20.

66.B.305 Conversion report for national qualifications

- (a) The conversion report for national 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 national 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 Annex (Part-66) not covered by the national qualification.

66.B.310 Conversion report for approved maintenance organisations authorisations

- (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 Annex (Part-66) not covered by the national qualification.

SUBPART E

EXAMINATION CREDITS

This Subpart provides the procedures for granting examination credits referred to in point 66.A.25(c).

66.B.400 General

- (a) The competent authority may only grant credit on the basis of a credit report prepared in accordance with point 66.B.405.

- (b) The credit report shall be either (i) developed by the competent authority or (ii) approved by the competent authority to ensure compliance with this Annex (Part-66).
- (c) Credit reports together with any change of these shall be dated and kept on record by the competent authority in accordance with point 66.B.20.

66.B.405 Examination credit report

- (a) The credit report shall include a comparison between:
 - (i) the modules, sub-modules, subjects and knowledge levels contained in Appendix I to this Annex (Part-66), as applicable; and
 - (ii) the syllabus of the technical qualification concerned relevant to the particular category being sought.

This comparison shall state if compliance is demonstrated and contain the justifications for each statement.

- (b) Credit for examinations, other than basic knowledge examinations carried out in maintenance training organisations approved in accordance with Annex IV (Part-147), can only be granted by the competent authority of the Member State in which the qualification has been obtained, without prejudice to bilateral agreements.
- (c) No credit can be granted unless there is a statement of compliance against each module and sub-module, stating where, in the technical qualification, the equivalent standard can be found.
- (d) The competent authority shall check on a regular basis whether (i) the national qualification standard or (ii) Appendix I to this Annex (Part-66) have changed and assess if changes to the credit report are consequently required. Such changes shall be documented, dated and recorded.

66.B.410 Examination credit validity

- (a) The competent authority shall notify to the applicant in writing any credits granted together with the reference to the credit report used.
- (b) Credits shall expire 10 years after they are granted.
- (c) Upon expiration of the credits, the applicant may apply for new credits. The competent authority shall continue the validity of the credits for an additional period of 10 years without further consideration if basic knowledge requirements defined in Appendix I to this Annex (Part-66) have not been changed.

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

The competent authority 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 Annex I (Part-M), Annex II (Part-145) or Annex III (Part-66).
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*Appendix I***Basic Knowledge Requirements****1. Knowledge levels for Category A, B1, B2, B3 and C Aircraft Maintenance Licence**

Basic knowledge for categories A, B1, 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. Modularisation

Qualification on basic subjects for each aircraft maintenance licence category or subcategory should be in accordance with the following matrix, where applicable subjects are indicated by an "X":

Subject module	A or B1 aeroplane with:		A or B1 helicopter with:		B2	B3
	Turbine engine(s)	Piston engine(s)	Turbine engine(s)	Piston engine(s)	Avionics	Piston-engine non-pressurised aeroplanes 2 000 kg MTOM and below
1	X	X	X	X	X	X
2	X	X	X	X	X	X
3	X	X	X	X	X	X
4	X	X	X	X	X	X
5	X	X	X	X	X	X
6	X	X	X	X	X	X
7A	X	X	X	X	X	
7B						X
8	X	X	X	X	X	X
9A	X	X	X	X	X	
9B						X
10	X	X	X	X	X	X
11A	X					
11B		X				
11C						X
12			X	X		
13					X	
14					X	
15	X		X			
16		X		X		X
17A	X	X				
17B						X

MODULE 1. MATHEMATICS

	LEVEL			
	A	B1	B2	B3
1.1 Arithmetic	1	2	2	2
Arithmetical terms and signs, methods of multiplication and division, fractions and decimals, factors and multiples, weights, measures and conversion factors, ratio and proportion, averages and percentages, areas and volumes, squares, cubes, square and cube roots.				

	LEVEL			
	A	B1	B2	B3
1.2 Algebra				
(a) Evaluating simple algebraic expressions, addition, subtraction, multiplication and division, use of brackets, simple algebraic fractions;	1	2	2	2
(b) Linear equations and their solutions; Indices and powers, negative and fractional indices; Binary and other applicable numbering systems; Simultaneous equations and second degree equations with one unknown; Logarithms.	—	1	1	1
1.3 Geometry				
(a) Simple geometrical constructions;	—	1	1	1
(b) Graphical representation; nature and uses of graphs, graphs of equations/functions;	2	2	2	2
(c) Simple trigonometry; trigonometrical relationships, use of tables and rectangular and polar coordinates.	—	2	2	2

MODULE 2. PHYSICS

	LEVEL			
	A	B1	B2	B3
2.1 Matter	1	1	1	1
Nature of matter: the chemical elements, structure of atoms, molecules; Chemical compounds; States: solid, liquid and gaseous; Changes between states.				
2.2 Mechanics				
2.2.1 Statics	1	2	1	1
Forces, moments and couples, representation as vectors; Centre of gravity; Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Nature and properties of solid, fluid and gas; Pressure and buoyancy in liquids (barometers).				
2.2.2 Kinetics	1	2	1	1
Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity); Rotational movement: uniform circular motion (centrifugal/centripetal forces); Periodic motion: pendular movement;				

	LEVEL			
	A	B1	B2	B3
Simple theory of vibration, harmonics and resonance;				
Velocity ratio, mechanical advantage and efficiency.				
2.2.3 Dynamics				
(a) Mass; Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency;	1	2	1	1
(b) Momentum, conservation of momentum; Impulse; Gyroscopic principles; Friction: nature and effects, coefficient of friction (rolling resistance).	1	2	2	1
2.2.4 Fluid dynamics				
(a) Specific gravity and density;	2	2	2	2
(b) Viscosity, fluid resistance, effects of streamlining; Effects of compressibility on fluids; Static, dynamic and total pressure: Bernoulli's Theorem, venturi.	1	2	1	1
2.3 Thermodynamics				
(a) Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition;	2	2	2	2
(b) Heat capacity, specific heat; Heat transfer: convection, radiation and conduction; Volumetric expansion; First and second law of thermodynamics; Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas; Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps; Latent heats of fusion and evaporation, thermal energy, heat of combustion.	—	2	2	1
2.4 Optics (Light)	—	2	2	—
Nature of light; speed of light;				
Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses;				
Fibre optics.				

	LEVEL			
	A	B1	B2	B3
2.5 Wave Motion and Sound	—	2	2	—
Wave motion: mechanical waves, sinusoidal wave motion, interference phenomena, standing waves;				
Sound: speed of sound, production of sound, intensity, pitch and quality, Doppler effect.				

MODULE 3. ELECTRICAL FUNDAMENTALS

	LEVEL			
	A	B1	B2	B3
3.1 Electron Theory	1	1	1	1
Structure and distribution of electrical charges within: atoms, molecules, ions, compounds;				
Molecular structure of conductors, semiconductors and insulators.				
3.2 Static Electricity and Conduction	1	2	2	1
Static electricity and distribution of electrostatic charges;				
Electrostatic laws of attraction and repulsion;				
Units of charge, Coulomb's Law;				
Conduction of electricity in solids, liquids, gases and a vacuum.				
3.3 Electrical Terminology	1	2	2	1
The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.				
3.4 Generation of Electricity	1	1	1	1
Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.				
3.5 DC Sources of Electricity	1	2	2	2
Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells;				
Cells connected in series and parallel;				
Internal resistance and its effect on a battery;				
Construction, materials and operation of thermocouples;				
Operation of photo-cells.				
3.6 DC Circuits	—	2	2	1
Ohms Law, Kirchoff's Voltage and Current Laws;				

	LEVEL			
	A	B1	B2	B3
Calculations using the above laws to find resistance, voltage and current;				
Significance of the internal resistance of a supply.				
3.7 Resistance/Resistor				
(a) Resistance and affecting factors;	—	2	2	1
Specific resistance;				
Resistor colour code, values and tolerances, preferred values, wattage ratings;				
Resistors in series and parallel;				
Calculation of total resistance using series, parallel and series parallel combinations;				
Operation and use of potentiometers and rheostats;				
Operation of Wheatstone Bridge;				
(b) Positive and negative temperature coefficient conductance;	—	1	1	—
Fixed resistors, stability, tolerance and limitations, methods of construction;				
Variable resistors, thermistors, voltage dependent resistors;				
Construction of potentiometers and rheostats;				
Construction of Wheatstone Bridge.				
3.8 Power	—	2	2	1
Power, work and energy (kinetic and potential);				
Dissipation of power by a resistor;				
Power formula;				
Calculations involving power, work and energy.				
3.9 Capacitance/Capacitor	—	2	2	1
Operation and function of a capacitor;				
Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating;				
Capacitor types, construction and function;				
Capacitor colour coding;				
Calculations of capacitance and voltage in series and parallel circuits;				
Exponential charge and discharge of a capacitor, time constants;				
Testing of capacitors.				

	LEVEL			
	A	B1	B2	B3
3.10 Magnetism				
(a) Theory of magnetism; Properties of a magnet; Action of a magnet suspended in the Earth's magnetic field; Magnetisation and demagnetisation; Magnetic shielding; Various types of magnetic material; Electromagnets construction and principles of operation; Hand clasp rules to determine: magnetic field around current carrying conductor;	—	2	2	1
(b) Magnetomotive force, field strength, magnetic flux density, permeability, hysteresis loop, retentivity, coercive force reluctance, saturation point, eddy currents; Precautions for care and storage of magnets.	—	2	2	1
3.11 Inductance/Inductor	—	2	2	1
Faraday's Law; Action of inducing a voltage in a conductor moving in a magnetic field; Induction principles; Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns; Mutual induction; The effect the rate of change of primary current and mutual inductance has on induced voltage; Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other; Lenz's Law and polarity determining rules; Back emf, self induction; Saturation point; Principle uses of inductors.				
3.12 DC Motor/Generator Theory	—	2	2	1
Basic motor and generator theory; Construction and purpose of components in DC generator;				

	LEVEL			
	A	B1	B2	B3
Operation of, and factors affecting output and direction of current flow in DC generators;				
Operation of, and factors affecting output power, torque, speed and direction of rotation of DC motors;				
Series wound, shunt wound and compound motors;				
Starter Generator construction.				
3.13 AC Theory	1	2	2	1
Sinusoidal waveform: phase, period, frequency, cycle;				
Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power;				
Triangular/Square waves;				
Single/3 phase principles.				
3.14 Resistive (R), Capacitive (C) and Inductive (L) Circuits	—	2	2	1
Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel;				
Power dissipation in L, C and R circuits;				
Impedance, phase angle, power factor and current calculations;				
True power, apparent power and reactive power calculations.				
3.15 Transformers	—	2	2	1
Transformer construction principles and operation;				
Transformer losses and methods for overcoming them;				
Transformer action under load and no-load conditions;				
Power transfer, efficiency, polarity markings;				
Calculation of line and phase voltages and currents;				
Calculation of power in a three phase system;				
Primary and Secondary current, voltage, turns ratio, power, efficiency;				
Auto transformers.				
3.16 Filters	—	1	1	—
Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.				

	LEVEL			
	A	B1	B2	B3
3.17 AC Generators Rotation of loop in a magnetic field and waveform produced; Operation and construction of revolving armature and revolving field type AC generators; Single phase, two phase and three phase alternators; Three phase star and delta connections advantages and uses; Permanent Magnet Generators.	—	2	2	1
3.18 AC Motors Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and polyphase; Methods of speed control and direction of rotation; Methods of producing a rotating field: capacitor, inductor, shaded or split pole.	—	2	2	1

MODULE 4. ELECTRONIC FUNDAMENTALS

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

	LEVEL			
	A	B1	B2	B3
4.1.2 Transistors				
(a) Transistor symbols; Component description and orientation; Transistor characteristics and properties.	—	1	2	1
(b) Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors; Basic appreciation of other transistor types and their uses; Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.	—	—	2	—
4.1.3 Integrated Circuits				
(a) Description and operation of logic circuits and linear circuits/operational amplifiers;	—	1	—	1
(b) Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.	—	—	2	—
4.2 Printed Circuit Boards	—	1	2	—
Description and use of printed circuit boards.				
4.3 Servomechanisms				
(a) Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters;	—	1	—	—
(b) Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.	—	—	2	—

MODULE 5. DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
5.1 Electronic Instrument Systems Typical systems arrangements and cockpit layout of electronic instrument systems.	1	2	2	3	1
5.2 Numbering Systems Numbering systems: binary, octal and hexadecimal; Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	—	1	—	2	—
5.3 Data Conversion Analogue Data, Digital Data; Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	—	1	—	2	—
5.4 Data Buses Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. Aircraft Network/Ethernet.	—	2	—	2	—
5.5 Logic Circuits (a) Identification of common logic gate symbols, tables and equivalent circuits; Applications used for aircraft systems, schematic diagrams.	—	2	—	2	1
(b) Interpretation of logic diagrams.	—	—	—	2	—
5.6 Basic Computer Structure (a) Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM); Computer technology (as applied in aircraft systems).	1	2	—	—	—
(b) Computer related terminology; Operation, layout and interface of the major components in a micro computer including their associated bus systems; Information contained in single and multiaddress instruction words; Memory associated terms; Operation of typical memory devices; Operation, advantages and disadvantages of the various data storage systems.	—	—	—	2	—

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
5.7 Microprocessors	—	—	—	2	—
Functions performed and overall operation of a microprocessor;					
Basic operation of each of the following microprocessor elements: control and processing unit, clock, register, arithmetic logic unit.					
5.8 Integrated Circuits	—	—	—	2	—
Operation and use of encoders and decoders;					
Function of encoder types;					
Uses of medium, large and very large scale integration.					
5.9 Multiplexing	—	—	—	2	—
Operation, application and identification in logic diagrams of multiplexers and demultiplexers.					
5.10 Fibre Optics	—	1	1	2	—
Advantages and disadvantages of fibre optic data transmission over electrical wire propagation;					
Fibre optic data bus;					
Fibre optic related terms;					
Terminations;					
Couplers, control terminals, remote terminals;					
Application of fibre optics in aircraft systems.					
5.11 Electronic Displays	—	2	1	2	1
Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.					
5.12 Electrostatic Sensitive Devices	1	2	2	2	1
Special handling of components sensitive to electrostatic discharges;					
Awareness of risks and possible damage, component and personnel anti-static protection devices.					
5.13 Software Management Control	—	2	1	2	1
Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmes.					

	LEVEL				
	A	B1-1 B1-3	B1-2 B1-4	B2	B3
5.14 Electromagnetic Environment	—	2	2	2	1
Influence of the following phenomena on maintenance practices for electronic system: EMC-Electromagnetic Compatibility EMI-Electromagnetic Interference HIRF-High Intensity Radiated Field Lightning/lightning protection.					
5.15 Typical Electronic/Digital Aircraft Systems	—	2	2	2	1
General arrangement of typical electronic/digital aircraft systems and associated BITE (Built In Test Equipment) such as: (a) For B1 and B2 only: ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly-by-Wire FMS-Flight Management System IRS-Inertial Reference System; (b) For B1, B2 and B3: ECAM-Electronic Centralised Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Alert Collision Avoidance System Integrated Modular Avionics Cabin Systems Information Systems.					

MODULE 6. MATERIALS AND HARDWARE

	LEVEL			
	A	B1	B2	B3
6.1 Aircraft Materials — Ferrous				
(a) Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels.	1	2	1	2

	LEVEL			
	A	B1	B2	B3
(b) Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1	1
6.2 Aircraft Materials — Non-Ferrous				
(a) Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials;	1	2	1	2
(b) Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	—	1	1	1
6.3 Aircraft Materials — Composite and Non-Metallic				
<i>6.3.1 Composite and non-metallic other than wood and fabric</i>				
(a) Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents;	1	2	2	2
(b) The detection of defects/deterioration in composite and non-metallic material; Repair of composite and non-metallic material.	1	2	—	2
<i>6.3.2 Wooden structures</i>				
Construction methods of wooden airframe structures; Characteristics, properties and types of wood and glue used in aeroplanes; Preservation and maintenance of wooden structure; Types of defects in wood material and wooden structures; The detection of defects in wooden structure; Repair of wooden structure.	1	2	—	2
<i>6.3.3 Fabric covering</i>				
Characteristics, properties and types of fabrics used in aeroplanes; Inspections methods for fabric; Types of defects in fabric; Repair of fabric covering.	1	2	—	2

	LEVEL			
	A	B1	B2	B3
6.4 Corrosion				
(a) Chemical fundamentals; Formation by, galvanic action process, microbiological, stress;	1	1	1	1
(b) Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	2	3	2	2
6.5 Fasteners				
6.5.1 Screw threads	2	2	2	2
Screw nomenclature; Thread forms, dimensions and tolerances for standard threads used in aircraft; Measuring screw threads.				
6.5.2 Bolts, studs and screws	2	2	2	2
Bolt types: specification, identification and marking of aircraft bolts, international standards; Nuts: self locking, anchor, standard types; Machine screws: aircraft specifications; Studs: types and uses, insertion and removal; Self tapping screws, dowels.				
6.5.3 Locking devices	2	2	2	2
Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins.				
6.5.4 Aircraft rivets	1	2	1	2
Types of solid and blind rivets: specifications and identification, heat treatment.				
6.6 Pipes and Unions				
(a) Identification of, and types of rigid and flexible pipes and their connectors used in aircraft;	2	2	2	2
(b) Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	2	2	1	2
6.7 Springs	—	2	1	1
Types of springs, materials, characteristics and applications.				

	LEVEL			
	A	B1	B2	B3
6.8 Bearings	1	2	2	1
Purpose of bearings, loads, material, construction;				
Types of bearings and their application.				
6.9 Transmissions	1	2	2	1
Gear types and their application;				
Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns;				
Belts and pulleys, chains and sprockets.				
6.10 Control Cables	1	2	1	2
Types of cables;				
End fittings, turnbuckles and compensation devices;				
Pulleys and cable system components;				
Bowden cables;				
Aircraft flexible control systems.				
6.11 Electrical Cables and Connectors	1	2	2	2
Cable types, construction and characteristics;				
High tension and co-axial cables;				
Crimping;				
Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.				

MODULE 7A. MAINTENANCE PRACTICES

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

	LEVEL		
	A	B1	B2
7.1 Safety Precautions-Aircraft and Workshop	3	3	3
Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals.			
Also, instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.			
7.2 Workshop Practices	3	3	3
Care of tools, control of tools, use of workshop materials;			

	LEVEL		
	A	B1	B2
Dimensions, allowances and tolerances, standards of workmanship; Calibration of tools and equipment, calibration standards.			
7.3 Tools	3	3	3
Common hand tool types; Common power tool types; Operation and use of precision measuring tools; Lubrication equipment and methods. Operation, function and use of electrical general test equipment.			
7.4 Avionic General Test Equipment	—	2	3
Operation, function and use of avionic general test equipment.			
7.5 Engineering Drawings, Diagrams and Standards	1	2	2
Drawing types and diagrams, their symbols, dimensions, tolerances and projections; Identifying title block information; Microfilm, microfiche and computerised presentations; Specification 100 of the Air Transport Association (ATA) of America; Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL; Wiring diagrams and schematic diagrams.			
7.6 Fits and Clearances	1	2	1
Drill sizes for bolt holes, classes of fits; Common system of fits and clearances; Schedule of fits and clearances for aircraft and engines; Limits for bow, twist and wear; Standard methods for checking shafts, bearings and other parts.			
7.7 Electrical Wiring Interconnection System (EWIS)	1	3	3
Continuity, insulation and bonding techniques and testing; Use of crimp tools: hand and hydraulic operated; Testing of crimp joints; Connector pin removal and insertion;			

	LEVEL		
	A	B1	B2
Co-axial cables: testing and installation precautions;			
Identification of wire types, their inspection criteria and damage tolerance.			
Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding;			
EWIS installations, inspection, repair, maintenance and cleanliness standards.			
7.8 Riveting	1	2	—
Riveted joints, rivet spacing and pitch;			
Tools used for riveting and dimpling;			
Inspection of riveted joints.			
7.9 Pipes and Hoses	1	2	—
Bending and belling/flaring aircraft pipes;			
Inspection and testing of aircraft pipes and hoses;			
Installation and clamping of pipes.			
7.10 Springs	1	2	—
Inspection and testing of springs.			
7.11 Bearings	1	2	—
Testing, cleaning and inspection of bearings;			
Lubrication requirements of bearings;			
Defects in bearings and their causes.			
7.12 Transmissions	1	2	—
Inspection of gears, backlash;			
Inspection of belts and pulleys, chains and sprockets;			
Inspection of screw jacks, lever devices, push-pull rod systems.			
7.13 Control Cables	1	2	—
Swaging of end fittings;			
Inspection and testing of control cables;			
Bowden cables; aircraft flexible control systems.			

	LEVEL		
	A	B1	B2
7.14 Material handling			
7.14.1 <i>Sheet Metal</i>	—	2	—
Marking out and calculation of bend allowance;			
Sheet metal working, including bending and forming;			
Inspection of sheet metal work.			
7.14.2 <i>Composite and non-metallic</i>	—	2	—
Bonding practices;			
Environmental conditions;			
Inspection methods.			
7.15 Welding, Brazing, Soldering and Bonding			
(a) Soldering methods; inspection of soldered joints.	—	2	2
(b) Welding and brazing methods;	—	2	—
Inspection of welded and brazed joints;			
Bonding methods and inspection of bonded joints.			
7.16 Aircraft Weight and Balance			
(a) Centre of Gravity/Balance limits calculation: use of relevant documents;	—	2	2
(b) Preparation of aircraft for weighing;	—	2	—
Aircraft weighing.			
7.17 Aircraft Handling and Storage	2	2	2
Aircraft taxiing/towing and associated safety precautions;			
Aircraft jacking, chocking, securing and associated safety precautions;			
Aircraft storage methods;			
Refuelling/defuelling procedures;			
De-icing/anti-icing procedures;			
Electrical, hydraulic and pneumatic ground supplies.			
Effects of environmental conditions on aircraft handling and operation.			

	LEVEL		
	A	B1	B2
7.18 Disassembly, Inspection, Repair and Assembly Techniques			
(a) Types of defects and visual inspection techniques; Corrosion removal, assessment and re-protection;	2	3	3
(b) General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmes;	—	2	—
(c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods;	—	2	1
(d) Disassembly and re-assembly techniques;	2	2	2
(e) Trouble shooting techniques.	—	2	2
7.19 Abnormal Events			
(a) Inspections following lightning strikes and HIRF penetration;	2	2	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2	2	—
7.20 Maintenance Procedures	1	2	2
Maintenance planning;			
Modification procedures;			
Stores procedures;			
Certification/release procedures;			
Interface with aircraft operation;			
Maintenance Inspection/Quality Control/Quality Assurance;			
Additional maintenance procedures;			
Control of life limited components.			

MODULE 7B. MAINTENANCE PRACTICES

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

	LEVEL
	B3
7.1 Safety Precautions-Aircraft and Workshop	3
Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals.	
Also, instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.	

	LEVEL
	B3
7.2 Workshop Practices	3
Care of tools, control of tools, use of workshop materials;	
Dimensions, allowances and tolerances, standards of workmanship;	
Calibration of tools and equipment, calibration standards.	
7.3 Tools	3
Common hand tool types;	
Common power tool types;	
Operation and use of precision measuring tools;	
Lubrication equipment and methods;	
Operation, function and use of electrical general test equipment.	
7.4 Avionic General Test Equipment	—
Operation, function and use of avionic general test equipment.	
7.5 Engineering Drawings, Diagrams and Standards	2
Drawing types and diagrams, their symbols, dimensions, tolerances and projections;	
Identifying title block information;	
Microfilm, microfiche and computerised presentations;	
Specification 100 of the Air Transport Association (ATA) of America;	
Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL;	
Wiring diagrams and schematic diagrams.	
7.6 Fits and Clearances	2
Drill sizes for bolt holes, classes of fits;	
Common system of fits and clearances;	
Schedule of fits and clearances for aircraft and engines;	
Limits for bow, twist and wear;	
Standard methods for checking shafts, bearings and other parts.	
7.7 Electrical Cables and Connectors	2
Continuity, insulation and bonding techniques and testing;	
Use of crimp tools: hand and hydraulic operated;	

	LEVEL
	B3
Testing of crimp joints;	
Connector pin removal and insertion;	
Co-axial cables: testing and installation precautions;	
Wiring protection techniques: Cable looming and loom support, cable clamps, protective sleeving techniques including heat shrink wrapping, shielding.	
7.8 Riveting	2
Riveted joints, rivet spacing and pitch;	
Tools used for riveting and dimpling;	
Inspection of riveted joints.	
7.9 Pipes and Hoses	2
Bending and belling/flaring aircraft pipes;	
Inspection and testing of aircraft pipes and hoses;	
Installation and clamping of pipes.	
7.10 Springs	1
Inspection and testing of springs.	
7.11 Bearings	2
Testing, cleaning and inspection of bearings;	
Lubrication requirements of bearings;	
Defects in bearings and their causes.	
7.12 Transmissions	2
Inspection of gears, backlash;	
Inspection of belts and pulleys, chains and sprockets;	
Inspection of screw jacks, lever devices, push-pull rod systems.	
7.13 Control Cables	2
Swaging of end fittings;	
Inspection and testing of control cables;	
Bowden cables; aircraft flexible control systems.	
7.14 Material handling	
7.14.1 Sheet Metal	2
Marking out and calculation of bend allowance;	

	LEVEL
	B3
Sheet metal working, including bending and forming;	
Inspection of sheet metal work.	
7.14.2 <i>Composite and non-metallic</i>	2
Bonding practices;	
Environmental conditions;	
Inspection methods.	
7.15 Welding, Brazing, Soldering and Bonding	
(a) Soldering methods; inspection of soldered joints;	2
(b) Welding and brazing methods;	2
Inspection of welded and brazed joints;	
Bonding methods and inspection of bonded joints.	
7.16 Aircraft Weight and Balance	
(a) Centre of Gravity/Balance limits calculation: use of relevant documents;	2
(b) Preparation of aircraft for weighing;	2
Aircraft weighing.	
7.17 Aircraft Handling and Storage	2
Aircraft taxiing/towing and associated safety precautions;	
Aircraft jacking, chocking, securing and associated safety precautions;	
Aircraft storage methods;	
Refuelling/defuelling procedures;	
De-icing/anti-icing procedures;	
Electrical, hydraulic and pneumatic ground supplies;	
Effects of environmental conditions on aircraft handling and operation.	
7.18 Disassembly, Inspection, Repair and Assembly Techniques	
(a) Types of defects and visual inspection techniques;	3
Corrosion removal, assessment and reprotection;	
(b) General repair methods, Structural Repair Manual;	2
Ageing, fatigue and corrosion control programmes;	

	LEVEL
	B3
(c) Non-destructive inspection techniques including, penetrant, radiographic, eddy current, ultrasonic and boroscope methods;	2
(d) Disassembly and re-assembly techniques;	2
(e) Trouble shooting techniques.	2
7.19 Abnormal Events	
(a) Inspections following lightning strikes and HIRF penetration.	2
(b) Inspections following abnormal events such as heavy landings and flight through turbulence.	2
7.20 Maintenance Procedures	2
Maintenance planning;	
Modification procedures;	
Stores procedures;	
Certification/release procedures;	
Interface with aircraft operation;	
Maintenance Inspection/Quality Control/Quality Assurance;	
Additional maintenance procedures;	
Control of life limited components.	

MODULE 8. BASIC AERODYNAMICS

	LEVEL			
	A	B1	B2	B3
8.1 Physics of the Atmosphere	1	2	2	1
International Standard Atmosphere (ISA), application to aerodynamics.				
8.2 Aerodynamics	1	2	2	1
Airflow around a body;				
Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, upwash and downwash, vortices, stagnation;				
The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio;				
Thrust, Weight, Aerodynamic Resultant;				
Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall;				
Aerofoil contamination including ice, snow, frost.				

	LEVEL			
	A	B1	B2	B3
8.3 Theory of Flight	1	2	2	1
Relationship between lift, weight, thrust and drag;				
Glide ratio;				
Steady state flights, performance;				
Theory of the turn;				
Influence of load factor: stall, flight envelope and structural limitations;				
Lift augmentation.				
8.4 Flight Stability and Dynamics	1	2	2	1
Longitudinal, lateral and directional stability (active and passive).				

MODULE 9A. HUMAN FACTORS

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

	LEVEL		
	A	B1	B2
9.1 General	1	2	2
The need to take human factors into account;			
Incidents attributable to human factors/human error;			
"Murphy's" law.			
9.2 Human Performance and Limitations	1	2	2
Vision;			
Hearing;			
Information processing;			
Attention and perception;			
Memory;			
Claustrophobia and physical access.			
9.3 Social Psychology	1	1	1
Responsibility: individual and group;			
Motivation and de-motivation;			
Peer pressure;			
"Culture" issues;			

	LEVEL		
	A	B1	B2
Team working;			
Management, supervision and leadership.			
9.4 Factors Affecting Performance	2	2	2
Fitness/health;			
Stress: domestic and work related;			
Time pressure and deadlines;			
Workload: overload and underload;			
Sleep and fatigue, shiftwork;			
Alcohol, medication, drug abuse.			
9.5 Physical Environment	1	1	1
Noise and fumes;			
Illumination;			
Climate and temperature;			
Motion and vibration;			
Working environment.			
9.6 Tasks	1	1	1
Physical work;			
Repetitive tasks;			
Visual inspection;			
Complex systems.			
9.7 Communication	2	2	2
Within and between teams;			
Work logging and recording;			
Keeping up to date, currency;			
Dissemination of information.			
9.8 Human Error	1	2	2
Error models and theories;			
Types of error in maintenance tasks;			
Implications of errors (i.e. accidents);			
Avoiding and managing errors.			

	LEVEL		
	A	B1	B2
9.9 Hazards in the Workplace	1	2	2
Recognising and avoiding hazards;			
Dealing with emergencies.			

MODULE 9B. HUMAN FACTORS

Note: The scope of this module shall reflect the less demanding environment of maintenance for B3 licence holders.

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

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

MODULE 10. AVIATION LEGISLATION

	LEVEL			
	A	B1	B2	B3
10.1 Regulatory Framework	1	1	1	1
Role of the International Civil Aviation Organisation;				
Role of the European Commission;				

	LEVEL			
	A	B1	B2	B3
Role of EASA;				
Role of the Member States and National Aviation Authorities;				
Regulation (EC) No 216/2008 and its implementing rules Regulations (EC) No 1702/2003 and (EC) No 2042/2003;				
Relationship between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EU-OPS.				
10.2 Certifying Staff — Maintenance	2	2	2	2
Detailed understanding of Part-66.				
10.3 Approved Maintenance Organisations	2	2	2	2
Detailed understanding of Part-145 and Part-M Subpart F.				
10.4 Air operations	1	1	1	1
General understanding of EU-OPS.				
Air Operators Certificates;				
Operator's responsibilities, in particular regarding continuing airworthiness and maintenance;				
Aircraft Maintenance Programme;				
MEL//CDL;				
Documents to be carried on board;				
Aircraft placarding (markings).				
10.5 Certification of aircraft, parts and appliances				
(a) <i>General</i>	—	1	1	1
General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29.				
(b) <i>Documents</i>	—	2	2	2
Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly;				
Certificate of Registration;				
Noise Certificate;				
Weight Schedule;				
Radio Station Licence and Approval.				

	LEVEL			
	A	B1	B2	B3
10.6 Continuing airworthiness	2	2	2	2
Detailed understanding of Part-21 provisions related to continuing airworthiness.				
Detailed understanding of Part-M.				
10.7 Applicable National and International Requirements for (if not superseded by EU requirements).				
(a) Maintenance Programmes, Maintenance checks and inspections;	1	2	2	2
Airworthiness Directives;				
Service Bulletins, manufacturers service information;				
Modifications and repairs;				
Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.;				
Only for A to B2 licences:				
Master Minimum Equipment Lists, Minimum Equipment List, Dispatch Deviation Lists;				
(b) Continuing airworthiness;	—	1	1	1
Minimum equipment requirements — Test flights;				
Only for B1 and B2 licences:				
ETOPS, maintenance and dispatch requirements;				
All Weather Operations, Category 2/3 operations.				

MODULE 11A. TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

	LEVEL	
	A1	B1.1
11.1 Theory of Flight		
11.1.1. <i>Aeroplane Aerodynamics and Flight Controls</i>	1	2
Operation and effect of:		
— roll control: ailerons and spoilers,		
— pitch control: elevators, stabilators, variable incidence stabilisers and canards,		
— yaw control, rudder limiters;		
Control using elevons, ruddervators;		
High lift devices, slots, slats, flaps, flaperons;		
Drag inducing devices, spoilers, lift dumpers, speed brakes;		

	LEVEL	
	A1	B1.1
Effects of wing fences, saw tooth leading edges;		
Boundary layer control using, vortex generators, stall wedges or leading edge devices;		
Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11.1.2. <i>High Speed Flight</i>	1	2
Speed of sound, subsonic flight, transonic flight, supersonic flight;		
Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule;		
Factors affecting airflow in engine intakes of high speed aircraft;		
Effects of sweepback on critical Mach number.		
11.2 Airframe Structures — General Concepts		
(a) Airworthiness requirements for structural strength;	2	2
Structural classification, primary, secondary and tertiary;		
Fail safe, safe life, damage tolerance concepts;		
Zonal and station identification systems;		
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;		
Drains and ventilation provisions;		
System installation provisions;		
Lightning strike protection provision;		
Aircraft bonding.		
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments;	1	2
Structure assembly techniques: riveting, bolting, bonding;		
Methods of surface protection, such as chromating, anodising, painting;		
Surface cleaning;		
Airframe symmetry: methods of alignment and symmetry checks.		
11.3 Airframe Structures — Aeroplanes		
11.3.1 <i>Fuselage (ATA 52/53/56)</i>	1	2
Construction and pressurisation sealing;		
Wing, stabiliser, pylon and undercarriage attachments;		

	LEVEL	
	A1	B1.1
Seat installation and cargo loading system;		
Doors and emergency exits: construction, mechanisms, operation and safety devices;		
Windows and windscreen construction and mechanisms.		
11.3.2 <i>Wings (ATA 57)</i>	1	2
Construction;		
Fuel storage;		
Landing gear, pylon, control surface and high lift/drag attachments.		
11.3.3 <i>Stabilisers (ATA 55)</i>	1	2
Construction;		
Control surface attachment.		
11.3.4 <i>Flight Control Surfaces (ATA 55/57)</i>	1	2
Construction and attachment;		
Balancing — mass and aerodynamic.		
11.3.5 <i>Nacelles/Pylons (ATA 54)</i>	1	2
Nacelles/Pylons:		
— Construction,		
— Firewalls,		
— Engine mounts.		
11.4 Air Conditioning and Cabin Pressurisation (ATA 21)		
11.4.1 <i>Air supply</i>	1	2
Sources of air supply including engine bleed, APU and ground cart.		
11.4.2 <i>Air Conditioning</i>	1	3
Air conditioning systems;		
Air cycle and vapour cycle machines;		
Distribution systems;		
Flow, temperature and humidity control system.		
11.4.3 <i>Pressurisation</i>	1	3
Pressurisation systems;		
Control and indication including control and safety valves;		
Cabin pressure controllers.		

	LEVEL	
	A1	B1.1
11.4.4 <i>Safety and warning devices</i>	1	3
Protection and warning devices.		
11.5 Instruments/Avionic Systems		
11.5.1 <i>Instrument Systems (ATA 31)</i>	1	2
Pitot static: altimeter, air speed indicator, vertical speed indicator;		
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;		
Compasses: direct reading, remote reading;		
Angle of attack indication, stall warning systems;		
Glass cockpit;		
Other aircraft system indication.		
11.5.2 <i>Avionic Systems</i>	1	1
Fundamentals of system lay-outs and operation of:		
— Auto Flight (ATA 22),		
— Communications (ATA 23),		
— Navigation Systems (ATA 34).		
11.6 Electrical Power (ATA 24)	1	3
Batteries Installation and Operation;		
DC power generation;		
AC power generation;		
Emergency power generation;		
Voltage regulation;		
Power distribution;		
Inverters, transformers, rectifiers;		
Circuit protection;		
External/Ground power.		
11.7 Equipment and Furnishings (ATA 25)		
(a) Emergency equipment requirements;	2	2
Seats, harnesses and belts.		

	LEVEL	
	A1	B1.1
(b) Cabin lay-out; Equipment lay-out; Cabin Furnishing installation; Cabin entertainment equipment; Galley installation; Cargo handling and retention equipment; Airstairs.	1	1
11.8 Fire Protection (ATA 26)	1	3
(a) Fire and smoke detection and warning systems; Fire extinguishing systems; System tests;		
(b) Portable fire extinguisher.	1	1
11.9 Flight Controls (ATA 27)	1	3
Primary controls: aileron, elevator, rudder, spoiler; Trim control; Active load control; High lift devices; Lift dump, speed brakes; System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; Artificial feel, Yaw damper, Mach trim, rudder limiter, gust lock systems; Balancing and rigging; Stall protection/warning system.		
11.10 Fuel Systems (ATA 28)	1	3
System lay-out; Fuel tanks; Supply systems; Dumping, venting and draining; Cross-feed and transfer; Indications and warnings; Refuelling and defuelling; Longitudinal balance fuel systems.		

	LEVEL	
	A1	B1.1
11.11 Hydraulic Power (ATA 29)	1	3
System lay-out;		
Hydraulic fluids;		
Hydraulic reservoirs and accumulators;		
Pressure generation: electric, mechanical, pneumatic;		
Emergency pressure generation;		
Filters;		
Pressure Control;		
Power distribution;		
Indication and warning systems;		
Interface with other systems.		
11.12 Ice and Rain Protection (ATA 30)	1	3
Ice formation, classification and detection;		
Anti-icing systems: electrical, hot air and chemical;		
De-icing systems: electrical, hot air, pneumatic and chemical;		
Rain repellent;		
Probe and drain heating;		
Wiper systems.		
11.13 Landing Gear (ATA 32)	2	3
Construction, shock absorbing;		
Extension and retraction systems: normal and emergency;		
Indications and warning;		
Wheels, brakes, antiskid and autobraking;		
Tyres;		
Steering;		
Air-ground sensing.		
11.14 Lights (ATA 33)	2	3
External: navigation, anti collision, landing, taxiing, ice;		
Internal: cabin, cockpit, cargo;		
Emergency.		

	LEVEL	
	A1	B1.1
<p>11.15 Oxygen (ATA 35)</p> <p>System lay-out: cockpit, cabin;</p> <p>Sources, storage, charging and distribution;</p> <p>Supply regulation;</p> <p>Indications and warnings.</p>	1	3
<p>11.16 Pneumatic/Vacuum (ATA 36)</p> <p>System lay-out;</p> <p>Sources: engine/APU, compressors, reservoirs, ground supply;</p> <p>Pressure control;</p> <p>Distribution;</p> <p>Indications and warnings;</p> <p>Interfaces with other systems.</p>	1	3
<p>11.17 Water/Waste (ATA 38)</p> <p>Water system lay-out, supply, distribution, servicing and draining;</p> <p>Toilet system lay-out, flushing and servicing;</p> <p>Corrosion aspects.</p>	2	3
<p>11.18 On Board Maintenance Systems (ATA 45)</p> <p>Central maintenance computers;</p> <p>Data loading system;</p> <p>Electronic library system;</p> <p>Printing;</p> <p>Structure monitoring (damage tolerance monitoring).</p>	1	2
<p>11.19 Integrated Modular Avionics (ATA42)</p> <p>Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:</p> <p>Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.</p> <p>Core System; Network Components.</p>	1	2

	LEVEL	
	A1	B1.1
<p>11.20 Cabin Systems (ATA44)</p> <p>The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, music and video transmissions.</p> <p>The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels.</p> <p>The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems:</p> <ul style="list-style-type: none"> — Data/Radio Communication, In-Flight Entertainment System. <p>The Cabin Network Service may host functions such as:</p> <ul style="list-style-type: none"> — Access to pre-departure/departure reports, — E-mail/intranet/Internet access, — Passenger database; <p>Cabin Core System;</p> <p>In-flight Entertainment System;</p> <p>External Communication System;</p> <p>Cabin Mass Memory System;</p> <p>Cabin Monitoring System;</p> <p>Miscellaneous Cabin System.</p>	1	2
<p>11.21 Information Systems (ATA46)</p> <p>The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.</p> <p>Typical examples include Air Traffic and Information Management Systems and Network Server Systems</p> <p>Aircraft General Information System;</p> <p>Flight Deck Information System;</p> <p>Maintenance Information System;</p> <p>Passenger Cabin Information System;</p> <p>Miscellaneous Information System.</p>	1	2

MODULE 11B. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

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

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

	LEVEL	
	A2	B1.2
11.1 Theory of Flight		
11.1.1. <i>Aeroplane Aerodynamics and Flight Controls</i>	1	2
Operation and effect of:		
— roll control: ailerons and spoilers,		
— pitch control: elevators, stabilators, variable incidence stabilisers and canards,		
— yaw control, rudder limiters;		
Control using elevons, ruddervators;		
High lift devices, slots, slats, flaps, flaperons;		
Drag inducing devices, spoilers, lift dumpers, speed brakes;		
Effects of wing fences, saw tooth leading edges;		
Boundary layer control using, vortex generators, stall wedges or leading edge devices;		
Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.		
11.1.2. <i>High Speed Flight</i> — N/A	—	—
11.2 Airframe Structures — General Concepts		
(a) Airworthiness requirements for structural strength;	2	2
Structural classification, primary, secondary and tertiary;		
Fail safe, safe life, damage tolerance concepts;		
Zonal and station identification systems;		
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;		
Drains and ventilation provisions;		
System installation provisions;		
Lightning strike protection provision;		
Aircraft bonding.		
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments;	1	2
Structure assembly techniques: riveting, bolting, bonding;		
Methods of surface protection, such as chromating, anodising, painting;		
Surface cleaning;		
Airframe symmetry: methods of alignment and symmetry checks.		

	LEVEL	
	A2	B1.2
11.3 Airframe Structures — Aeroplanes		
11.3.1 <i>Fuselage (ATA 52/53/56)</i>	1	2
Construction and pressurisation sealing;		
Wing, tail-plane, pylon and undercarriage attachments;		
Seat installation;		
Doors and emergency exits: construction and operation;		
Windows and windscreen attachment.		
11.3.2 <i>Wings (ATA 57)</i>	1	2
Construction;		
Fuel storage;		
Landing gear, pylon, control surface and high lift/drag attachments.		
11.3.3 <i>Stabilisers (ATA 55)</i>	1	2
Construction;		
Control surface attachment.		
11.3.4 <i>Flight Control Surfaces (ATA 55/57)</i>	1	2
Construction and attachment;		
Balancing — mass and aerodynamic.		
11.3.5 <i>Nacelles/Pylons (ATA 54)</i>	1	2
Nacelles/Pylons:		
— Construction,		
— Firewalls,		
— Engine mounts.		
11.4 Air Conditioning and Cabin Pressurisation (ATA 21)	1	3
Pressurisation and air conditioning systems;		
Cabin pressure controllers, protection and warning devices;		
Heating systems.		
11.5 Instruments/Avionic Systems		
11.5.1 <i>Instrument Systems (ATA 31)</i>	1	2
Pitot static: altimeter, air speed indicator, vertical speed indicator;		
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;		
Compasses: direct reading, remote reading;		

	LEVEL	
	A2	B1.2
Angle of attack indication, stall warning systems;		
Glass cockpit;		
Other aircraft system indication.		
11.5.2 <i>Avionic Systems</i>	1	1
Fundamentals of system lay-outs and operation of:		
— Auto Flight (ATA 22),		
— Communications (ATA 23),		
— Navigation Systems (ATA 34).		
11.6 Electrical Power (ATA 24)	1	3
Batteries Installation and Operation;		
DC power generation;		
Voltage regulation;		
Power distribution;		
Circuit protection;		
Inverters, transformers.		
11.7 Equipment and Furnishings (ATA 25)		
(a) Emergency equipment requirements;	2	2
Seats, harnesses and belts;		
(b) Cabin lay-out;	1	1
Equipment lay-out;		
Cabin Furnishing installation;		
Cabin entertainment equipment;		
Galley installation;		
Cargo handling and retention equipment;		
Airstairs.		
11.8 Fire Protection (ATA 26)		
(a) Fire and smoke detection and warning systems;	1	3
Fire extinguishing systems;		
System tests;		
(b) Portable fire extinguisher.	1	3
11.9 Flight Controls (ATA 27)	1	3
Primary controls: aileron, elevator, rudder;		
Trim tabs;		
High lift devices;		

	LEVEL	
	A2	B1.2
System operation: manual;		
Gust locks;		
Balancing and rigging;		
Stall warning system.		
11.10 Fuel Systems (ATA 28)	1	3
System lay-out;		
Fuel tanks;		
Supply systems;		
Cross-feed and transfer;		
Indications and warnings;		
Refuelling and defuelling.		
11.11 Hydraulic Power (ATA 29)	1	3
System lay-out;		
Hydraulic fluids;		
Hydraulic reservoirs and accumulators;		
Pressure generation: electric, mechanical;		
Filters;		
Pressure Control;		
Power distribution;		
Indication and warning systems.		
11.12 Ice and Rain Protection (ATA 30)	1	3
Ice formation, classification and detection;		
De-icing systems: electrical, hot air, pneumatic and chemical;		
Probe and drain heating;		
Wiper systems.		
11.13 Landing Gear (ATA 32)	2	3
Construction, shock absorbing;		
Extension and retraction systems: normal and emergency;		
Indications and warning;		
Wheels, brakes, antiskid and autobraking;		

	LEVEL	
	A2	B1.2
Tyres;		
Steering;		
Air-ground sensing.		
11.14 Lights (ATA 33)	2	3
External: navigation, anti collision, landing, taxiing, ice;		
Internal: cabin, cockpit, cargo;		
Emergency.		
11.15 Oxygen (ATA 35)	1	3
System lay-out: cockpit, cabin;		
Sources, storage, charging and distribution;		
Supply regulation;		
Indications and warnings.		
11.16 Pneumatic/Vacuum (ATA 36)	1	3
System lay-out;		
Sources: engine/APU, compressors, reservoirs, ground supply;		
Pressure control;		
Distribution;		
Indications and warnings;		
Interfaces with other systems.		
11.17 Water/Waste (ATA 38)	2	3
Water system lay-out, supply, distribution, servicing and draining;		
Toilet system lay-out, flushing and servicing;		
Corrosion aspects.		

MODULE 11C. PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

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

	LEVEL
	B3
11.1 Theory of Flight	
<i>Aeroplane Aerodynamics and Flight Controls</i>	1
Operation and effect of:	
— roll control: ailerons,	
— pitch control: elevators, stabilators, variable incidence stabilisers and canards,	
— yaw control, rudder limiters;	

	LEVEL
	B3
Control using elevons, ruddervators;	
High lift devices, slots, slats, flaps, flaperons;	
Drag inducing devices, lift dumpers, speed brakes;	
Effects of wing fences, saw tooth leading edges;	
Boundary layer control using, vortex generators, stall wedges or leading edge devices;	
Operation and effect of trim tabs, balance and anti-balance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	
11.2 Airframe Structures — General Concepts	
(a) Airworthiness requirements for structural strength;	2
Structural classification, primary, secondary and tertiary;	
Fail safe, safe life, damage tolerance concepts;	
Zonal and station identification systems;	
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;	
Drains and ventilation provisions;	
System installation provisions;	
Lightning strike protection provision;	
Aircraft bonding;	
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments;	2
Structure assembly techniques: riveting, bolting, bonding;	
Methods of surface protection, such as chromating, anodising, painting;	
Surface cleaning;	
Airframe symmetry: methods of alignment and symmetry checks.	
11.3 Airframe Structures — Aeroplanes	
11.3.1 <i>Fuselage (ATA 52/53/56)</i>	1
Construction;	
Wing, tail-plane, pylon and undercarriage attachments;	
Seat installation;	
Doors and emergency exits: construction and operation;	
Window and windscreen attachment.	

	LEVEL
	B3
11.3.2 <i>Wings (ATA 57)</i>	1
Construction;	
Fuel storage;	
Landing gear, pylon, control surface and high lift/drag attachments.	
11.3.3 <i>Stabilisers (ATA 55)</i>	1
Construction;	
Control surface attachment.	
11.3.4 <i>Flight Control Surfaces (ATA 55/57)</i>	1
Construction and attachment;	
Balancing — mass and aerodynamic.	
11.3.5 <i>Nacelles/Pylons (ATA 54)</i>	
Nacelles/Pylons:	1
— Construction,	
— Firewalls,	
— Engine mounts.	
11.4 Air Conditioning (ATA 21)	
Heating and ventilation systems.	1
11.5 Instruments/Avionic Systems	
11.5.1 <i>Instrument Systems (ATA 31)</i>	1
Pitot static: altimeter, air speed indicator, vertical speed indicator;	
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;	
Compasses: direct reading, remote reading;	
Angle of attack indication, stall warning systems;	
Glass cockpit;	
Other aircraft system indication.	
11.5.2 <i>Avionic Systems</i>	1
Fundamentals of system lay-outs and operation of:	
— Auto Flight (ATA 22),	
— Communications (ATA 23),	
— Navigation Systems (ATA 34).	
11.6 Electrical Power (ATA 24)	2
Batteries Installation and Operation;	
DC power generation;	

	LEVEL
	B3
Voltage regulation;	
Power distribution;	
Circuit protection;	
Inverters, transformers.	
11.7 Equipment and Furnishings (ATA 25) NO B	2
Emergency equipment requirements;	
Seats, harnesses and belts.	
11.8 Fire Protection (ATA 26)	2
Portable fire extinguisher.	
11.9 Flight Controls (ATA 27)	3
Primary controls: aileron, elevator, rudder;	
Trim tabs;	
High lift devices;	
System operation: manual;	
Gust locks;	
Balancing and rigging;	
Stall warning system.	
11.10 Fuel Systems (ATA 28)	2
System lay-out;	
Fuel tanks;	
Supply systems;	
Cross-feed and transfer;	
Indications and warnings;	
Refuelling and defuelling.	
11.11 Hydraulic Power (ATA 29)	2
System lay-out;	
Hydraulic fluids;	
Hydraulic reservoirs and accumulators;	
Pressure generation: electric, mechanical;	
Filters;	
Pressure Control;	

	LEVEL
	B3
Power distribution;	
Indication and warning systems.	
11.12 Ice and Rain Protection (ATA 30)	1
Ice formation, classification and detection;	
De-icing systems: electrical, hot air, pneumatic and chemical;	
Probe and drain heating;	
Wiper systems.	
11.13 Landing Gear (ATA 32)	2
Construction, shock absorbing;	
Extension and retraction systems: normal and emergency;	
Indications and warning;	
Wheels, brakes, antiskid and autobraking;	
Tyres;	
Steering.	
11.14 Lights (ATA 33)	2
External: navigation, anti collision, landing, taxiing, ice;	
Internal: cabin, cockpit, cargo;	
Emergency.	
11.15 Oxygen (ATA 35)	2
System lay-out: cockpit, cabin;	
Sources, storage, charging and distribution;	
Supply regulation;	
Indications and warnings.	
11.16 Pneumatic/Vacuum (ATA 36)	2
System lay-out;	
Sources: engine/APU, compressors, reservoirs, ground supply;	
Pressure and vacuum pumps	
Pressure control;	
Distribution;	
Indications and warnings;	
Interfaces with other systems.	

MODULE 12. HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS

	LEVEL	
	A3 A4	B1.3 B1.4
12.1 Theory of Flight — Rotary Wing Aerodynamics	1	2
Terminology;		
Effects of gyroscopic precession;		
Torque reaction and directional control;		
Dissymmetry of lift, Blade tip stall;		
Translating tendency and its correction;		
Coriolis effect and compensation;		
Vortex ring state, power settling, overpitching;		
Auto-rotation;		
Ground effect.		
12.2 Flight Control Systems	2	3
Cyclic control;		
Collective control;		
Swashplate;		
Yaw control: Anti-Torque Control, Tail rotor, bleed air;		
Main Rotor Head: Design and Operation features;		
Blade Dampers: Function and construction;		
Rotor Blades: Main and tail rotor blade construction and attachment;		
Trim control, fixed and adjustable stabilisers;		
System operation: manual, hydraulic, electrical and fly-by-wire;		
Artificial feel;		
Balancing and rigging.		
12.3 Blade Tracking and Vibration Analysis	1	3
Rotor alignment;		
Main and tail rotor tracking;		
Static and dynamic balancing;		
Vibration types, vibration reduction methods;		
Ground resonance.		
12.4 Transmission	1	3
Gear boxes, main and tail rotors;		

	LEVEL	
	A3	B1.3
	A4	B1.4
Clutches, free wheel units and rotor brake;		
Tail rotor drive shafts, flexible couplings, bearings, vibration dampers and bearing hangers.		
12.5 Airframe Structures		
(a) Airworthiness requirements for structural strength;	2	2
Structural classification, primary, secondary and tertiary;		
Fail safe, safe life, damage tolerance concepts;		
Zonal and station identification systems;		
Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue;		
Drains and ventilation provisions;		
System installation provisions;		
Lightning strike protection provision;		
(b) Construction methods of: stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning and anti-corrosive protection.	1	2
Pylon, stabiliser and undercarriage attachments;		
Seat installation;		
Doors: construction, mechanisms, operation and safety devices;		
Windows and windscreen construction;		
Fuel storage;		
Firewalls;		
Engine mounts;		
Structure assembly techniques: riveting, bolting, bonding;		
Methods of surface protection, such as chromating, anodising, painting;		
Surface cleaning.		
Airframe symmetry: methods of alignment and symmetry checks.		
12.6 Air Conditioning (ATA 21)		
12.6.1 <i>Air supply</i>	1	2
Sources of air supply including engine bleed and ground cart.		
12.6.2 <i>Air conditioning</i>	1	3
Air conditioning systems;		
Distribution systems;		
Flow and temperature control systems;		
Protection and warning devices.		

	LEVEL	
	A3 A4	B1.3 B1.4
12.7 Instruments/Avionic Systems		
12.7.1 <i>Instrument Systems (ATA 31)</i>	1	2
Pitot static: altimeter, air speed indicator, vertical speed indicator;		
Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator;		
Compasses: direct reading, remote reading;		
Vibration indicating systems — HUMS;		
Glass cockpit:		
Other aircraft system indication.		
12.7.2 <i>Avionic Systems</i>	1	1
Fundamentals of system layouts and operation of:		
Auto Flight (ATA 22);		
Communications (ATA 23);		
Navigation Systems (ATA 34).		
12.8 Electrical Power (ATA 24)	1	3
Batteries Installation and Operation;		
DC power generation, AC power generation;		
Emergency power generation;		
Voltage regulation, Circuit protection.		
Power distribution;		
Inverters, transformers, rectifiers;		
External/Ground power.		
12.9 Equipment and Furnishings (ATA 25)		
(a) Emergency equipment requirements;	2	2
Seats, harnesses and belts;		
Lifting systems;		
(b) Emergency flotation systems;	1	1
Cabin lay-out, cargo retention;		
Equipment lay-out;		
Cabin Furnishing Installation.		

	LEVEL	
	A3 A4	B1.3 B1.4
12.10 Fire Protection (ATA 26)	1	3
Fire and smoke detection and warning systems;		
Fire extinguishing systems;		
System tests.		
12.11 Fuel Systems (ATA 28)	1	3
System lay-out;		
Fuel tanks;		
Supply systems;		
Dumping, venting and draining;		
Cross-feed and transfer;		
Indications and warnings;		
Refuelling and defuelling.		
12.12 Hydraulic Power (ATA 29)	1	3
System lay-out;		
Hydraulic fluids;		
Hydraulic reservoirs and accumulators;		
Pressure generation: electric, mechanical, pneumatic;		
Emergency pressure generation;		
Filters;		
Pressure Control;		
Power distribution;		
Indication and warning systems;		
Interface with other systems.		
12.13 Ice and Rain Protection (ATA 30)	1	3
Ice formation, classification and detection;		
Anti-icing and De-icing systems: electrical, hot air and chemical;		
Rain repellent and removal;		
Probe and drain heating;		
Wiper system.		

	LEVEL	
	A3	B1.3
	A4	B1.4
12.14 Landing Gear (ATA 32)	2	3
Construction, shock absorbing;		
Extension and retraction systems: normal and emergency;		
Indications and warning;		
Wheels, Tyres, brakes;		
Steering;		
Air-ground sensing;		
Skids, floats.		
12.15 Lights (ATA 33)	2	3
External: navigation, landing, taxiing, ice;		
Internal: cabin, cockpit, cargo;		
Emergency.		
12.16 Pneumatic/Vacuum (ATA 36)	1	3
System lay-out;		
Sources: engine/APU, compressors, reservoirs, ground supply;		
Pressure control;		
Distribution;		
Indications and warnings;		
Interfaces with other systems.		
12.17 Integrated Modular Avionics (ATA42)	1	2
Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:		
Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.		
Core System;		
Network Components.		
12.18 On Board Maintenance Systems (ATA45)	1	2
Central maintenance computers;		
Data loading system;		

	LEVEL	
	A3 A4	B1.3 B1.4
<p>Electronic library system;</p> <p>Printing;</p> <p>Structure monitoring (damage tolerance monitoring).</p> <p>12.19 Information Systems (ATA46)</p> <p>The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.</p> <p>Typical examples include Air Traffic and Information Management Systems and Network Server Systems.</p> <p>Aircraft General Information System;</p> <p>Flight Deck Information System;</p> <p>Maintenance Information System;</p> <p>Passenger Cabin Information System;</p> <p>Miscellaneous Information System.</p>	1	2

MODULE 13. AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

	LEVEL
	B2
<p>13.1 Theory of Flight</p> <p>(a) <i>Aeroplane Aerodynamics and Flight Controls</i></p> <p>Operation and effect of:</p> <ul style="list-style-type: none"> — roll control: ailerons and spoilers, — pitch control: elevators, stabilators, variable incidence stabilisers and canards, — yaw control, rudder limiters; <p>Control using elevons, ruddervators;</p> <p>High lift devices: slots, slats, flaps;</p> <p>Drag inducing devices: spoilers, lift dumpers, speed brakes;</p> <p>Operation and effect of trim tabs, servo tabs, control surface bias;</p> <p>(b) <i>High Speed Flight</i></p> <p>Speed of sound, subsonic flight, transonic flight, supersonic flight;</p> <p>Mach number, critical Mach number;</p> <p>(c) <i>Rotary Wing Aerodynamics</i></p> <p>Terminology;</p>	<p>1</p> <p>1</p> <p>1</p>

	LEVEL
	B2
Operation and effect of cyclic, collective and anti-torque controls.	
13.2 Structures — General Concepts	
(a) Fundamentals of structural systems;	1
(b) Zonal and station identification systems;	2
Electrical bonding;	
Lightning strike protection provision.	
13.3 Autoflight (ATA 22)	3
Fundamentals of automatic flight control including working principles and current terminology;	
Command signal processing;	
Modes of operation: roll, pitch and yaw channels;	
Yaw dampers;	
Stability Augmentation System in helicopters;	
Automatic trim control;	
Autopilot navigation aids interface;	
Autothrottle systems;	
Automatic Landing Systems: principles and categories, modes of operation, approach, glideslope, land, go-around, system monitors and failure conditions.	
13.4 Communication/Navigation (ATA 23/34)	3
Fundamentals of radio wave propagation, antennas, transmission lines, communication, receiver and transmitter;	
Working principles of following systems:	
— Very High Frequency (VHF) communication,	
— High Frequency (HF) communication,	
— Audio,	
— Emergency Locator Transmitters,	
— Cockpit Voice Recorder,	
— Very High Frequency omnidirectional range (VOR),	
— Automatic Direction Finding (ADF),	
— Instrument Landing System (ILS),	
— Microwave Landing System (MLS),	
— Flight Director systems, Distance Measuring Equipment (DME),	
— Very Low Frequency and hyperbolic navigation (VLF/Omega),	
— Doppler navigation,	
— Area navigation, RNAV systems,	
— Flight Management Systems,	
— Global Positioning System (GPS), Global Navigation Satellite Systems (GNSS),	
— Inertial Navigation System,	
— Air Traffic Control transponder, secondary surveillance radar,	
— Traffic Alert and Collision Avoidance System (TCAS),	
— Weather avoidance radar,	
— Radio altimeter,	
— ARINC communication and reporting.	

	LEVEL
	B2
13.5 Electrical Power (ATA 24)	3
Batteries Installation and Operation;	
DC power generation;	
AC power generation;	
Emergency power generation;	
Voltage regulation;	
Power distribution;	
Inverters, transformers, rectifiers;	
Circuit protection;	
External/Ground power.	
13.6 Equipment and Furnishings (ATA 25)	3
Electronic emergency equipment requirements;	
Cabin entertainment equipment.	
13.7 Flight Controls (ATA 27)	
(a) Primary controls: aileron, elevator, rudder, spoiler;	2
Trim control;	
Active load control;	
High lift devices;	
Lift dump, speed brakes;	
System operation: manual, hydraulic, pneumatic;	
Artificial feel, Yaw damper, Mach trim, rudder limiter, gust locks.	
Stall protection systems;	
(b) System operation: electrical, fly-by-wire.	3
13.8 Instruments (ATA 31)	3
Classification;	
Atmosphere;	
Terminology;	
Pressure measuring devices and systems;	
Pitot static systems;	
Altimeters;	
Vertical speed indicators;	

	LEVEL
	B2
Airspeed indicators;	
Machmeters;	
Altitude reporting/alerting systems;	
Air data computers;	
Instrument pneumatic systems;	
Direct reading pressure and temperature gauges;	
Temperature indicating systems;	
Fuel quantity indicating systems;	
Gyroscopic principles;	
Artificial horizons;	
Slip indicators;	
Directional gyros;	
Ground Proximity Warning Systems;	
Compass systems;	
Flight Data Recording systems;	
Electronic Flight Instrument Systems;	
Instrument warning systems including master warning systems and centralised warning panels;	
Stall warning systems and angle of attack indicating systems;	
Vibration measurement and indication;	
Glass cockpit.	
13.9 Lights (ATA 33)	3
External: navigation, landing, taxiing, ice;	
Internal: cabin, cockpit, cargo;	
Emergency.	
13.10 On Board Maintenance Systems (ATA 45)	3
Central maintenance computers;	
Data loading system;	
Electronic library system;	
Printing;	
Structure monitoring (damage tolerance monitoring).	

	LEVEL
	B2
13.11 Air Conditioning and Cabin Pressurisation (ATA21)	
13.11.1. <i>Air supply</i>	2
Sources of air supply including engine bleed, APU and ground cart;	
13.11.2. <i>Air Conditioning</i>	
Air conditioning systems;	2
Air cycle and vapour cycle machines;	3
Distribution systems;	1
Flow, temperature and humidity control system.	3
13.11.3. <i>Pressurisation</i>	3
Pressurisation systems;	
Control and indication including control and safety valves;	
Cabin pressure controllers.	
13.11.4. <i>Safety and warning devices</i>	3
Protection and warning devices.	
13.12 Fire Protection (ATA 26)	
(a) Fire and smoke detection and warning systems;	3
Fire extinguishing systems;	
System tests;	
(b) Portable fire extinguisher.	1
13.13 Fuel Systems (ATA 28)	
System lay-out;	1
Fuel tanks;	1
Supply systems;	1
Dumping, venting and draining;	1
Cross-feed and transfer;	2
Indications and warnings;	3
Refuelling and defuelling;	2
Longitudinal balance fuel systems.	3
13.14 Hydraulic Power (ATA 29)	
System lay-out;	1

	LEVEL
	B2
Hydraulic fluids;	1
Hydraulic reservoirs and accumulators;	1
Pressure generation: electrical, mechanical, pneumatic;	3
Emergency pressure generation;	3
Filters;	1
Pressure control;	3
Power distribution;	1
Indication and warning systems;	3
Interface with other systems.	3
13.15 Ice and Rain Protection (ATA 30)	
Ice formation, classification and detection;	2
Anti-icing systems: electrical, hot air and chemical;	2
De-icing systems: electrical, hot air, pneumatic, chemical;	3
Rain repellent;	1
Probe and drain heating;	3
Wiper Systems.	1
13.16 Landing Gear (ATA 32)	
Construction, shock absorbing;	1
Extension and retraction systems: normal and emergency;	3
Indications and warnings;	3
Wheels, brakes, antiskid and autobraking;	3
Tyres;	1
Steering;	3
Air-ground sensing.	3
13.17 Oxygen (ATA 35)	
System lay-out: cockpit, cabin;	3
Sources, storage, charging and distribution;	3
Supply regulation;	3
Indications and warnings.	3

	LEVEL
	B2
13.18 Pneumatic/Vacuum (ATA 36)	
System lay-out;	2
Sources: engine/APU, compressors, reservoirs, ground supply;	2
Pressure control;	3
Distribution;	1
Indications and warnings;	3
Interfaces with other systems.	3
13.19 Water/Waste (ATA 38)	2
Water system lay-out, supply, distribution, servicing and draining;	
Toilet system lay-out, flushing and servicing.	
13.20 Integrated Modular Avionics (ATA42)	3
Functions that may be typically integrated in the Integrated Modular Avionic (IMA) modules are, among others:	
Bleed Management, Air Pressure Control, Air Ventilation and Control, Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction, Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring, etc.;	
Core System;	
Network Components.	
13.21 Cabin Systems (ATA44)	3
The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, music and video transmissions.	
The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels.	
The Cabin Network Service typically consists on a server, typically interfacing with, among others, the following systems:	
— Data/Radio Communication, In-Flight Entertainment System.	
The Cabin Network Service may host functions such as:	
— Access to pre-departure/departure reports,	
— E-mail/intranet/Internet access,	
— Passenger database;	
Cabin Core System;	
In-flight Entertainment System;	
External Communication System;	

	LEVEL
	B2
<p>Cabin Mass Memory System;</p> <p>Cabin Monitoring System;</p> <p>Miscellaneous Cabin System.</p> <p>13.22 Information Systems (ATA46)</p> <p>The units and components which furnish a means of storing, updating and retrieving digital information traditionally provided on paper, microfilm or microfiche. Includes units that are dedicated to the information storage and retrieval function such as the electronic library mass storage and controller. Does not include units or components installed for other uses and shared with other systems, such as flight deck printer or general use display.</p> <p>Typical examples include Air Traffic and Information Management Systems and Network Server Systems.</p> <p>Aircraft General Information System;</p> <p>Flight Deck Information System;</p> <p>Maintenance Information System;</p> <p>Passenger Cabin Information System;</p> <p>Miscellaneous Information System.</p>	3

MODULE 14. PROPULSION

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

	LEVEL
	B2
Ignition systems and components;	
Maintenance safety requirements.	

MODULE 15. GAS TURBINE ENGINE

	LEVEL	
	A	B1
15.1 Fundamentals	1	2
Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle;		
The relationship between force, work, power, energy, velocity, acceleration;		
Constructional arrangement and operation of turbojet, turbofan, turboshaft, turboprop.		
15.2 Engine Performance	—	2
Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption;		
Engine efficiencies;		
By-pass ratio and engine pressure ratio;		
Pressure, temperature and velocity of the gas flow;		
Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.		
15.3 Inlet	2	2
Compressor inlet ducts		
Effects of various inlet configurations;		
Ice protection.		
15.4 Compressors	1	2
Axial and centrifugal types;		
Constructional features and operating principles and applications;		
Fan balancing;		
Operation:		
Causes and effects of compressor stall and surge;		
Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades;		
Compressor ratio.		
15.5 Combustion Section	1	2
Constructional features and principles of operation.		

	LEVEL	
	A	B1
15.6 Turbine Section	2	2
Operation and characteristics of different turbine blade types;		
Blade to disk attachment;		
Nozzle guide vanes;		
Causes and effects of turbine blade stress and creep.		
15.7 Exhaust	1	2
Constructional features and principles of operation;		
Convergent, divergent and variable area nozzles;		
Engine noise reduction;		
Thrust reversers.		
15.8 Bearings and Seals	—	2
Constructional features and principles of operation.		
15.9 Lubricants and Fuels	1	2
Properties and specifications;		
Fuel additives;		
Safety precautions.		
15.10 Lubrication Systems	1	2
System operation/lay-out and components.		
15.11 Fuel Systems	1	2
Operation of engine control and fuel metering systems including electronic engine control (FADEC);		
Systems lay-out and components.		
15.12 Air Systems	1	2
Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.		
15.13 Starting and Ignition Systems	1	2
Operation of engine start systems and components;		
Ignition systems and components;		
Maintenance safety requirements.		
15.14 Engine Indication Systems	1	2
Exhaust Gas Temperature/Interstage Turbine Temperature;		

	LEVEL	
	A	B1
Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems;		
Oil pressure and temperature;		
Fuel pressure and flow;		
Engine speed;		
Vibration measurement and indication;		
Torque;		
Power.		
15.15 Power Augmentation Systems	—	1
Operation and applications;		
Water injection, water methanol;		
Afterburner systems.		
15.16 Turbo-prop Engines	1	2
Gas coupled/free turbine and gear coupled turbines;		
Reduction gears;		
Integrated engine and propeller controls;		
Overspeed safety devices.		
15.17 Turbo-shaft Engines	1	2
Arrangements, drive systems, reduction gearing, couplings, control systems.		
15.18 Auxiliary Power Units (APUs)	1	2
Purpose, operation, protective systems.		
15.19 Powerplant Installation	1	2
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.		
15.20 Fire Protection Systems	1	2
Operation of detection and extinguishing systems.		
15.21 Engine Monitoring and Ground Operation	1	3
Procedures for starting and ground run-up;		
Interpretation of engine power output and parameters;		

	LEVEL	
	A	B1
Trend (including oil analysis, vibration and boroscope) monitoring;		
Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer;		
Compressor washing/cleaning;		
Foreign Object Damage.		
15.22 Engine Storage and Preservation	—	2
Preservation and depreservation for the engine and accessories/systems.		

MODULE 16. PISTON ENGINE

	LEVEL		
	A	B1	B3
16.1 Fundamentals	1	2	2
Mechanical, thermal and volumetric efficiencies;			
Operating principles — 2 stroke, 4 stroke, Otto and Diesel;			
Piston displacement and compression ratio;			
Engine configuration and firing order.			
16.2 Engine Performance	1	2	2
Power calculation and measurement;			
Factors affecting engine power;			
Mixtures/leaning, pre-ignition.			
16.3 Engine Construction	1	2	2
Crank case, crank shaft, cam shafts, sumps;			
Accessory gearbox;			
Cylinder and piston assemblies;			
Connecting rods, inlet and exhaust manifolds;			
Valve mechanisms;			
Propeller reduction gearboxes.			
16.4 Engine Fuel Systems			
16.4.1 Carburettors	1	2	2
Types, construction and principles of operation;			
Icing and heating.			

	LEVEL		
	A	B1	B3
16.4.2 <i>Fuel injection systems</i> Types, construction and principles of operation.	1	2	2
16.4.3 <i>Electronic engine control</i> Operation of engine control and fuel metering systems including electronic engine control (FADEC); Systems lay-out and components.	1	2	2
16.5 Starting and Ignition Systems Starting systems, pre-heat systems; Magneto types, construction and principles of operation; Ignition harnesses, spark plugs; Low and high tension systems.	1	2	2
16.6 Induction, Exhaust and Cooling Systems Construction and operation of: induction systems including alternate air systems; Exhaust systems, engine cooling systems — air and liquid.	1	2	2
16.7 Supercharging/Turbocharging Principles and purpose of supercharging and its effects on engine parameters; Construction and operation of supercharging/turbocharging systems; System terminology; Control systems; System protection.	1	2	2
16.8 Lubricants and Fuels Properties and specifications; Fuel additives; Safety precautions.	1	2	2
16.9 Lubrication Systems System operation/lay-out and components.	1	2	2
16.10 Engine Indication Systems Engine speed; Cylinder head temperature; Coolant temperature;	1	2	2

	LEVEL		
	A	B1	B3
Oil pressure and temperature;			
Exhaust Gas Temperature;			
Fuel pressure and flow;			
Manifold pressure.			
16.11 Powerplant Installation	1	2	2
Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.			
16.12 Engine Monitoring and Ground Operation	1	3	2
Procedures for starting and ground run-up;			
Interpretation of engine power output and parameters;			
Inspection of engine and components: criteria, tolerances, and data specified by engine manufacturer.			
16.13 Engine Storage and Preservation	—	2	1
Preservation and depreservation for the engine and accessories/systems.			

MODULE 17A. PROPELLER

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

	LEVEL	
	A	B1
17.1 Fundamentals	1	2
Blade element theory;		
High/low blade angle, reverse angle, angle of attack, rotational speed;		
Propeller slip;		
Aerodynamic, centrifugal, and thrust forces;		
Torque;		
Relative airflow on blade angle of attack;		
Vibration and resonance.		
17.2 Propeller Construction	1	2
Construction methods and materials used in wooden, composite and metal propellers;		
Blade station, blade face, blade shank, blade back and hub assembly;		

	LEVEL	
	A	B1
Fixed pitch, controllable pitch, constant speeding propeller; Propeller/spinner installation.		
17.3 Propeller Pitch Control	1	2
Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Overspeed protection.		
17.4 Propeller Synchronising	—	2
Synchronising and synchrophasing equipment.		
17.5 Propeller Ice Protection	1	2
Fluid and electrical de-icing equipment.		
17.6 Propeller Maintenance	1	3
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.		
17.7 Propeller Storage and Preservation	1	2
Propeller preservation and depreservation.		

MODULE 17B. PROPELLER

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

	LEVEL
	B3
17.1 Fundamentals	2
Blade element theory; High/low blade angle, reverse angle, angle of attack, rotational speed; Propeller slip; Aerodynamic, centrifugal, and thrust forces; Torque; Relative airflow on blade angle of attack; Vibration and resonance.	

	LEVEL
	B3
17.2 Propeller Construction	2
Construction methods and material used in wooden, composite and metal propellers; Blade station, blade face, blade shank, blade back and hub assembly; Fixed pitch, controllable pitch, constant speed propeller; Propeller/spinner installation.	
17.3 Propeller Pitch Control	2
Speed control and pitch change methods, mechanical and electrical/electronic; Feathering and reverse pitch; Overspeed protection.	
17.4 Propeller Synchronising	2
Synchronising and synchrophasing equipment.	
17.5 Propeller Ice Protection	2
Fluid and electrical de-icing equipment.	
17.6 Propeller Maintenance	2
Static and dynamic balancing; Blade tracking; Assessment of blade damage, erosion, corrosion, impact damage, delamination; Propeller treatment/repair schemes; Propeller engine running.	
17.7 Propeller Storage and Preservation	2
Propeller preservation and depreservation.	

Appendix II

Basic Examination Standard**1. General**

- 1.1. All basic examinations shall be carried out using the multi-choice question format and essay questions as specified below. The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length. In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.
- 1.2. Each multi-choice question shall have three alternative answers of which only one shall be the correct answer and the candidate shall be allowed a time per module which is based upon a nominal average of 75 seconds per question.
- 1.3. Each essay question requires the preparation of a written answer and the candidate shall be allowed 20 minutes to answer each such question.
- 1.4. Suitable essay questions shall be drafted and evaluated using the knowledge syllabus in Appendix I Modules 7A, 7B, 9A, 9B and 10.
- 1.5. Each question will have a model answer drafted for it, which will also include any known alternative answers that may be relevant for other subdivisions.
- 1.6. The model answer will also be broken down into a list of the important points known as **Key Points**.
- 1.7. The pass mark for each module and sub-module multi-choice part of the examination is 75 %.
- 1.8. The pass mark for each essay question is 75 % in that the candidates answer shall contain 75 % of the required key points addressed by the question and no significant error related to any required key point.
- 1.9. If either the multi-choice part only or the essay part only is failed, then it is only necessary to retake the multi-choice or essay part, as appropriate.
- 1.10. Penalty marking systems shall not be used to determine whether a candidate has passed.
- 1.11. A failed module may not be retaken for at least 90 days following the date of the failed module examination, except in the case of a maintenance training organisation approved in accordance with Annex IV (Part-147) which conducts a course of retraining tailored to the failed subjects in the particular module when the failed module may be retaken after 30 days.
- 1.12. The time periods required by point 66.A.25 apply to each individual module examination, with the exception of those module examinations which were passed as part of another category licence, where the licence has already been issued.
- 1.13. The maximum number of consecutive attempts for each module is three. Further sets of three attempts are allowed with a 1 year waiting period between sets.

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

2. Number of questions per module

2.1. MODULE 1 — MATHEMATICS

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

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

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

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

2.2. MODULE 2 — PHYSICS

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

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

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

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

2.3. MODULE 3 — ELECTRICAL FUNDAMENTALS

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

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

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

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

2.4. MODULE 4 — ELECTRONIC FUNDAMENTALS

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

Category B2: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B3: 8 multi-choice and 0 essay questions. Time allowed 10 minutes.

2.5. MODULE 5 — DIGITAL TECHNIQUES/ELECTRONIC INSTRUMENT SYSTEMS

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

Category B1.1 and B1.3: 40 multi-choice and 0 essay questions. Time allowed 50 minutes.

Category B1.2 and B1.4: 20 multi-choice and 0 essay questions. Time allowed 25 minutes.

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

Category B3: 16 multi-choice and 0 essay questions. Time allowed 20 minutes.

2.6. MODULE 6 — MATERIALS AND HARDWARE

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

Category B1: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B2: 60 multi-choice and 0 essay questions. Time allowed 75 minutes.

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

2.7. **MODULE 7A** — MAINTENANCE PRACTICES

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

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

Category B2: 60 multi-choice and 2 essay questions. Time allowed 75 minutes plus 40 minutes.

MODULE 7B — MAINTENANCE PRACTICES

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

2.8. **MODULE 8** — BASIC AERODYNAMICS

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

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

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

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

2.9. **MODULE 9A** — HUMAN FACTORS

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

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

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

MODULE 9B — HUMAN FACTORS

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

2.10. **MODULE 10** — AVIATION LEGISLATION

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

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

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

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

2.11. **MODULE 11A** — TURBINE AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

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

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

MODULE 11B — PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

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

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

MODULE 11C — PISTON AEROPLANE AERODYNAMICS, STRUCTURES AND SYSTEMS

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

2.12. **MODULE 12** — HELICOPTER AERODYNAMICS, STRUCTURES AND SYSTEMS:

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

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

2.13. **MODULE 13** — AIRCRAFT AERODYNAMICS, STRUCTURES AND SYSTEMS

Category B2: 180 multi-choice and 0 essay questions. Time allowed 225 minutes. Questions and time allowed may be split into two examinations as appropriate.

2.14. **MODULE 14** — PROPULSION

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

2.15. **MODULE 15** — GAS TURBINE ENGINE

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

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

2.16. **MODULE 16** — PISTON ENGINE

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

Category B1: 72 multi-choice and 0 essay questions. Time allowed 90 minutes.

Category B3: 68 multi-choice and 0 essay questions. Time allowed 85 minutes.

2.17. **MODULE 17A** — PROPELLER

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

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

MODULE 17B — PROPELLER

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

Appendix III

Aircraft Type Training and Examination Standard**On the Job Training**1. **General**

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

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

- (i) Shall be conducted by a maintenance training organisation appropriately approved in accordance with Annex IV (Part-147) or, when conducted by other organisations, as directly approved by the competent authority.
- (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.

(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 Annex IV (Part-147) or, when conducted by other organisations, as directly approved by the competent authority.
- (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, simulators, other training devices or aircraft.
- (v) Shall have been started and completed within the 3 years preceding the application for a type rating endorsement.

(c) Differences training

- (i) Differences training is the training required in order to cover the differences between two different aircraft type ratings of the same manufacturer as determined by the Agency.
- (ii) Differences training has to be defined on a case-to-case basis taking into account the requirements contained in this Appendix III in respect of both theoretical and practical elements of type rating training.
- (iii) A type rating shall only be endorsed on a licence after differences training when the applicant also complies with one of the following conditions:
 - having already endorsed on the licence the aircraft type rating from which the differences are being identified, or

- having completed the type training requirements for the aircraft from which the differences are being identified.

2. Aircraft type training levels

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

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

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

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

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

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

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

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

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

- (a) demonstrate a theoretical knowledge of aircraft systems and structures and interrelationships with other systems, provide a detailed description of the subject using theoretical fundamentals and specific examples and to interpret results from various sources and measurements and apply corrective action where appropriate;
- (b) perform system, powerplant, component and functional checks as specified in the aircraft maintenance manual;
- (c) demonstrate the use, interpret and apply appropriate documentation including structural repair manual, troubleshooting manual, etc.;
- (d) correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level;
- (e) describe procedures for replacement of components unique to aircraft type.

3. Aircraft type training standard

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

3.1. Theoretical element

(a) Objective:

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

(b) Level of training:

Training levels are those levels defined in point 2 above.

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

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

(c) Duration:

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

Category	Hours
<i>Aeroplanes with a maximum take-off mass above 30 000 kg:</i>	
B1.1	150

Category	Hours
B1.2	120
B2	100
C	30
<i>Aeroplanes with a maximum take-off mass equal or less than 30 000 kg and above 5 700 kg:</i>	
B1.1	120
B1.2	100
B2	100
C	25
<i>Aeroplanes with a maximum take-off mass of 5 700 kg and below (*)</i>	
B1.1	80
B1.2	60
B2	60
C	15
<i>Helicopters (**)</i>	
B1.3	120
B1.4	100
B2	100
C	25
(*) For non-pressurised piston engine aeroplanes below 2 000 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 exclude any breaks, examination, revision, preparation and aircraft visit.

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

(d) Justification of course duration:

Training courses carried out in a maintenance training organisation approved in accordance with Annex IV (Part-147) and courses directly approved by the competent authority shall justify their hour duration and the coverage of the full syllabus by a training needs analysis based on:

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

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

Similarly, tuition hours of differences courses or other training course combinations (such as combined B1/B2 courses), and in cases of theoretical type training courses below the figures given in point 3.1(c) above, these shall be justified to the competent authority by the training needs analysis as described above.

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

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

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

(e) Content:

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

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

Chapters	Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
	B1	C	B1	C	B1	C	B1	C	B2		
Licence category.											
Introduction module:											
05	1	1	1	1	1	1	1	1	1	1	1
06	1	1	1	1	1	1	1	1	1	1	1
07	1	1	1	1	1	1	1	1	1	1	1
08	1	1	1	1	1	1	1	1	1	1	1
09	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1	1	1	1
Helicopters											
18	—	—	—	—	3	1	3	1	—	—	—
60	—	—	—	—	3	1	3	1	—	—	—
62	—	—	—	—	3	1	3	1	1	1	1
62A	—	—	—	—	3	1	3	1	3	3	3

Chapters Level	Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
	B1	C	B1	C	B1	C	B1	C	
Licence category.									
63 Rotor Drives	—	—	—	—	3	1	3	1	1
63A Rotor Drives — Monitoring and indicating	—	—	—	—	3	1	3	1	3
64 Tail Rotor	—	—	—	—	3	1	3	1	1
64A Tail rotor — Monitoring and indicating	—	—	—	—	3	1	3	1	3
65 Tail Rotor Drive	—	—	—	—	3	1	3	1	1
65A Tail Rotor Drive — Monitoring and indicating	—	—	—	—	3	1	3	1	3
66 Folding Blades/Pylon	—	—	—	—	3	1	3	1	—
67 Rotors Flight Control	—	—	—	—	3	1	3	1	—
53 Airframe Structure (Helicopter)	—	—	—	—	3	1	3	1	—
25 Emergency Flotation Equipment	—	—	—	—	3	1	3	1	1
Airframe structures									
51 Standard practices and structures (damage classification, assessment and repair)	3	1	3	1	—	—	—	—	1
53 Fuselage	3	1	3	1	—	—	—	—	1
54 Nacelles/Pylons	3	1	3	1	—	—	—	—	1
55 Stabilisers	3	1	3	1	—	—	—	—	1
56 Windows	3	1	3	1	—	—	—	—	1
57 Wings	3	1	3	1	—	—	—	—	1
27A Flight Control Surfaces (All)	3	1	3	1	—	—	—	—	1
52 Doors	3	1	3	1	—	—	—	—	1
Zonal and Station Identification Systems.									
Airframe systems:									
21 Air Conditioning	3	1	3	1	3	1	3	1	3
21A Air Supply	3	1	3	1	1	3	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

Chapters	Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
	B1	C	B1	C	B1	C	B1	C	B1	C	
Licence category.	B1	C	B1	C	B1	C	B1	C	B1	C	B2
25 Equipment and Furnishings	3	1	3	1	3	1	3	1	3	1	1
25A Electronic Equipment including emergency equipment	1	1	1	1	1	1	1	1	1	1	3
26 Fire Protection	3	1	3	1	3	1	3	1	3	1	3
27 Flight Controls	3	1	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	3	1	2
28A Fuel Systems — Monitoring and indicating	3	1	3	1	3	1	3	1	3	1	3
29 Hydraulic Power	3	1	3	1	3	1	3	1	3	1	2
29A Hydraulic Power — Monitoring and indicating	3	1	3	1	3	1	3	1	3	1	3
30 Ice and Rain Protection	3	1	3	1	3	1	3	1	3	1	3
31 Indicating/Recording Systems	3	1	3	1	3	1	3	1	3	1	3
31A Instrument Systems	3	1	3	1	3	1	3	1	3	1	3
32 Landing Gear	3	1	3	1	3	1	3	1	3	1	2
32A Landing Gear — Monitoring and indicating	3	1	3	1	3	1	3	1	3	1	3
33 Lights	3	1	3	1	3	1	3	1	3	1	3
34 Navigation	2	1	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	3	1	2
36A Pneumatic — Monitoring and indicating	3	1	3	1	3	1	3	1	3	1	3
37 Vacuum	3	1	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	2	1	3
44 Cabin Systems	2	1	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	2	1	3

Chapters	Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
	Licence category.		B1	C	B1	C	B1	C	B1	C	
50 Cargo and Accessory Compartments	3	1	3	1	3	1	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
78 Exhaust	3	1	—	—	3	1	—	—	—	—	1
79 Oil	3	1	—	—	3	1	—	—	—	—	1
80 Starting	3	1	—	—	3	1	—	—	—	—	1
82 Water Injections	3	1	—	—	3	1	—	—	—	—	1
83 Accessory Gear Boxes	3	1	—	—	3	1	—	—	—	—	1
84 Propulsion Augmentation	3	1	—	—	3	1	—	—	—	—	1
73A FADEC	3	1	—	—	3	1	—	—	—	—	3
74 Ignition	3	1	—	—	3	1	—	—	—	—	3
77 Engine Indicating Systems	3	1	—	—	3	1	—	—	—	—	3
49 Auxiliary Power Units (APUs)	3	1	—	—	—	—	—	—	—	—	2
Piston Engine											
70 Standard Practices — Engines	—	—	3	1	—	—	3	1	3	1	1
70A Constructional arrangement and operation (Installation, Carburetors, Fuel injection systems, Induction, Exhaust and Cooling Systems, Supercharging/Turbocharging, Lubrication Systems).	—	—	3	1	—	—	3	1	3	1	1
70B Engine Performance	—	—	3	1	—	—	3	1	3	1	1
71 Powerplant	—	—	3	1	—	—	3	1	3	1	1
73 Engine Fuel and Control	—	—	3	1	—	—	3	1	3	1	1

Chapters	Level		Aeroplanes turbine		Aeroplanes piston		Helicopters turbine		Helicopters piston		Avionics
	B1	C	B1	C	B1	C	B1	C	B2		
Licence category.											
76 Engine Control	—	—	3	1	—	—	3	1	1		
79 Oil	—	—	3	1	—	—	3	1	1		
80 Starting	—	—	3	1	—	—	3	1	1		
81 Turbines	—	—	3	1	—	—	3	1	1		
82 Water Injections	—	—	3	1	—	—	3	1	1		
83 Accessory Gear Boxes	—	—	3	1	—	—	3	1	1		
84 Propulsion Augmentation	—	—	3	1	—	—	3	1	1		
73A FADEC	—	—	3	1	—	—	3	1	3		
74 Ignition	—	—	3	1	—	—	3	1	3		
77 Engine Indication Systems	—	—	3	1	—	—	3	1	3		
Propellers											
60A Standard Practices — Propeller	3	1	3	1	—	—	—	—	—	—	1
61 Propellers/Propulsion	3	1	3	1	—	—	—	—	—	—	1
61A Propeller Construction	3	1	3	1	—	—	—	—	—	—	—
61B Propeller Pitch Control	3	1	3	1	—	—	—	—	—	—	—
61C Propeller Synchronising	3	1	3	1	—	—	—	—	—	—	1
61D Propeller Electronic control	2	1	2	1	—	—	—	—	—	—	3
61E Propeller Ice Protection	3	1	3	1	—	—	—	—	—	—	—
61F Propeller Maintenance	3	1	3	1	—	—	—	—	—	—	1

(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 competent authority approving the training course.

3.2. Practical element

(a) Objective:

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

(b) Content:

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

Tasks crossed represent subjects that are important for practical training purposes to ensure that the operation, function, installation and safety significance of key maintenance tasks 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: TroubleShooting.

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
Introduction module:											
5	Time limits/maintenance checks	X/X	—	—	—	—	—	—	—	—	—
6	Dimensions/Areas (MTOM, etc.)	X/X	—	—	—	—	—	—	—	—	—
7	Lifting and Shoring	X/X	—	—	—	—	—	—	—	—	—
8	Levelling and weighing	X/X	—	X	—	—	—	X	—	—	—
9	Towing and taxiing	X/X	—	X	—	—	—	X	—	—	—
10	Parking/mooring, Storing and Return to Service	X/X	—	X	—	—	—	X	—	—	—
11	Placards and Markings	X/X	—	—	—	—	—	—	—	—	—
12	Servicing	X/X	—	X	—	—	—	X	—	—	—
20	Standard practices — only type particular	X/X	—	X	—	—	—	X	—	—	—
Helicopters:											
18	Vibration and Noise Analysis (Blade tracking)	X/—	—	—	—	—	X	—	—	—	—
60	Standard Practices Rotor — only type specific	X/X	—	X	—	—	—	X	—	—	—
62	Rotors	X/—	—	X	X	—	X	—	—	—	—
62A	Rotors — Monitoring and indicating	X/X	X	X	X	X	—	—	X	—	X
63	Rotor Drives	X/—	X	—	—	—	X	—	—	—	—
63A	Rotor Drives — Monitoring and indicating	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
65	Tail Rotor Drive	X/—	X	—	—	—	X	—	—	—	—
65A	Tail Rotor Drive — Monitoring and indicating	X/X	X	—	X	X	—	—	X	—	X

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
66 Folding Blades/Pylon	X/—	X	X	—	—	X	—	—	—	—	—
67 Rotors Flight Control	X/—	X	X	—	X	X	—	—	—	—	—
53 Airframe Structure (Helicopter) Note: covered under Airframe structures											
25 Emergency Flotation Equipment	X/X	X	X	X	X	X	X	X	—	—	—
Airframe structures:											
51 Standard Practices and Structures (damage classification, assessment and repair)											
53 Fuselage	X/—	—	—	—	—	X	—	—	—	—	—
54 Nacelles/Pylons	X/—	—	—	—	—	—	—	—	—	—	—
55 Stabilisers	X/—	—	—	—	—	—	—	—	—	—	—
56 Windows	X/—	—	—	—	—	X	—	—	—	—	—
57 Wings	X/—	—	—	—	—	—	—	—	—	—	—
27A Flight Control Surfaces	X/—	—	—	—	—	X	—	—	—	—	—
52 Doors	X/X	X	X	—	—	—	—	X	—	—	—
Airframe systems:											
21 Air Conditioning	X/X	X	X	—	X	X	X	X	—	X	X
21A Air Supply	X/X	X	—	—	—	—	X	—	—	—	—
21B Pressurisation	X/X	X	—	—	X	X	X	—	—	X	X
21C Safety and warning Devices	X/X	—	X	—	—	—	—	X	—	—	—
22 Autoflight	X/X	—	—	—	X	—	X	X	X	X	X
23 Communications	X/X	—	X	—	X	—	X	X	X	X	X
24 Electrical Power	X/X	X	X	X	X	X	X	X	X	X	X
25 Equipment and Furnishings	X/X	X	X	X	—	—	X	X	X	—	—
25A Electronic Equipment 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

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
28 Fuel Systems	X/X	X	X	X	X	X	X	X	—	X	—
28A Fuel Systems — Monitoring and indicating	X/X	X	—	—	—	—	X	—	X	—	X
29 Hydraulic Power	X/X	X	X	X	X	X	X	X	—	X	—
29A Hydraulic Power — Monitoring and indicating	X/X	X	—	X	X	X	X	—	X	X	X
30 Ice and Rain Protection	X/X	X	X	—	X	X	X	X	—	X	X
31 Indicating/Recording Systems	X/X	X	X	X	X	X	X	X	X	X	X
31A Instrument Systems	X/X	X	X	X	X	X	X	X	X	X	X
32 Landing Gear	X/X	X	X	X	X	X	X	X	X	X	—
32A Landing Gear — Monitoring and indicating	X/X	X	—	X	X	X	X	—	X	X	X
33 Lights	X/X	X	X	—	X	—	X	X	X	X	—
34 Navigation	X/X	—	X	—	X	—	X	X	X	X	X
35 Oxygen	X/—	X	X	X	—	—	X	X	—	—	—
36 Pneumatic	X/—	X	—	X	X	X	X	—	X	X	X
36A Pneumatic — Monitoring and indicating	X/X	X	X	X	X	X	X	X	X	X	X
37 Vacuum	X/—	X	—	X	X	X	—	—	—	—	—
38 Water/Waste	X/—	X	X	—	—	—	X	X	—	—	—
41 Water Ballast	X/—	—	—	—	—	—	—	—	—	—	—
42 Integrated modular avionics	X/X	—	—	—	—	—	X	X	X	X	X
44 Cabin Systems	X/X	—	—	—	—	—	X	X	X	X	X
45 On-Board Maintenance System (or covered in 31)	X/X	X	X	X	X	X	X	X	X	X	X
46 Information Systems	X/X	—	—	—	—	—	X	—	X	X	X
50 Cargo and Accessory Compartments	X/X	—	X	—	—	—	—	—	—	—	—
Turbine/Piston Engine Module:											
70 Standard Practices — Engines — only type particular	—	—	X	—	—	—	—	X	—	—	—
70A Constructional arrangement and operation (Installation Inlet, Compressors, Combustion Section, Turbine Section, Bearings and Seals, Lubrication Systems)	X/X	—	—	—	—	—	—	—	—	—	—
Turbine engines:											
70B Engine Performance	—	—	—	—	—	X	—	—	—	—	—

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

Chapters	B1/B2	B1					B2				
	LOC	FOT	SGH	R/I	MEL	TS	FOT	SGH	R/I	MEL	TS
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 Synchronising	X/—	X	—	—	—	X	—	—	—	X	—
61D Propeller Electronic control	X/X	X	X	X	X	X	X	X	X	X	X
61E Propeller Ice Protection	X/—	X	—	X	X	X	—	—	—	—	—
61F Propeller Maintenance	X/X	X	X	X	X	X	X	X	X	X	X

4. Type training examination and assessment standard

4.1. Theoretical element examination standard

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

- 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.
- 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.
- 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.
- 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.
- 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 competent authority of the Member State 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 Part-147 or by the competent authority.

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

- (a) Oral examination questions shall be open.
- (b) Written examination questions shall be essay type or multi-choice questions.
- (c) Practical assessment shall determine a person's competence to perform a task.
- (d) Examinations shall be on a sample of chapters (***) drawn from paragraph 3 type training/examination syllabus, at the indicated level.
- (e) The incorrect alternatives shall seem equally plausible to anyone ignorant of the subject. All of the alternatives shall be clearly related to the question and of similar vocabulary, grammatical construction and length.
- (f) In numerical questions, the incorrect answers shall correspond to procedural errors such as corrections applied in the wrong sense or incorrect unit conversions: they shall not be mere random numbers.

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

1. Properly discuss with confidence the aircraft and its systems.
2. Ensure safe performance of maintenance, inspections and routine work according to the maintenance manual and other relevant instructions and tasks as appropriate for the type of aircraft, for example troubleshooting, repairs, adjustments, replacements, rigging and functional checks such as engine run, etc., if required.
3. Correctly use all technical literature and documentation for the aircraft.
4. Correctly use specialist/special tooling and test equipment, perform removal and replacement of components and modules unique to type, including any on-wing maintenance activity

(h) The following conditions apply to the examination:

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

The applicant shall confirm in writing to the maintenance training organisation or the competent authority to which they apply for an examination, the number and dates of attempts during the last year and the maintenance training organisation or the competent authority where these attempts took place. The maintenance training organisation or the competent authority 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 made by the examiner(s) to explain why the candidate has passed or failed.

(**) For the purpose of this point 5, a "chapter" means each one of the rows preceded by a number in the tables contained in points 3.1(e) and 3.2(b).

6. On the Job Training

On the Job Training (OJT) shall be approved by the competent authority who has issued the licence.

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

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

(a) Objective:

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

(b) Content:

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

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

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

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

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

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

Appendix IV

Experience requirements for extending a Part-66 Aircraft Maintenance Licence

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

The experience shall be practical maintenance experience 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 Part-147 course relevant to the subcategory.

From	To	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	6 months	—	6 months	2 years	1 year	2 years	6 months	2 years	1 year
A4		6 months	6 months	6 months	—	2 years	1 year	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	1 year	1 year	1 year	—	1 year
B3		6 months	None	6 months	6 months	2 years	6 months	2 years	1 year	2 years	—

Appendix V

Application Form — EASA Form 19

1. This Appendix contains an example of the form used for application for the aircraft maintenance licence referred to in Annex III (Part-66).
2. The competent authority of the Member State may modify the EASA Form 19 only to include additional information necessary to support the case where the National requirements permit or require the aircraft maintenance licence issued in accordance with Annex III (Part-66) to be used outside the requirement of Annex I (Part-M) and Annex II (Part-145).

APPLICATION FOR INITIAL/AMENDMENT/RENEWAL OF PART-66 AIRCRAFT MAINTENANCE LICENCE (AML)	EASA FORM 19																														
APPLICANTS DETAILS: Name: Address: Nationality: Date and Place of Birth:																															
PART-66 AML DETAILS (if applicable): Licence No: Date of Issue:																															
EMPLOYERS DETAILS: Name: Address: Maintenance Organisation Approval Reference: Tel: Fax:																															
APPLICATION FOR: (Tick relevant boxes) <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Initial AML <input type="checkbox"/></td> <td style="width: 33%;">Amendment of AML <input type="checkbox"/></td> <td style="width: 33%;">Renewal of AML <input type="checkbox"/></td> </tr> <tr> <td>Rating</td> <td style="text-align: center;">A B1</td> <td style="text-align: center;">B2 B3 C</td> </tr> <tr> <td>Aeroplane Turbine</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Aeroplane Piston</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Helicopter Turbine</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Helicopter Piston</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Avionics</td> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Piston engine non-pressurised aeroplanes of MTOM of 2t and below</td> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Large aircraft</td> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Aircraft other than large aircraft</td> <td></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table> Type endorsement/Rating endorsement/Limitation removal (if applicable):		Initial AML <input type="checkbox"/>	Amendment of AML <input type="checkbox"/>	Renewal of AML <input type="checkbox"/>	Rating	A B1	B2 B3 C	Aeroplane Turbine	<input type="checkbox"/>	<input type="checkbox"/>	Aeroplane Piston	<input type="checkbox"/>	<input type="checkbox"/>	Helicopter Turbine	<input type="checkbox"/>	<input type="checkbox"/>	Helicopter Piston	<input type="checkbox"/>	<input type="checkbox"/>	Avionics		<input type="checkbox"/>	Piston engine non-pressurised aeroplanes of MTOM of 2t and below		<input type="checkbox"/>	Large aircraft		<input type="checkbox"/>	Aircraft other than large aircraft		<input type="checkbox"/>
Initial AML <input type="checkbox"/>	Amendment of AML <input type="checkbox"/>	Renewal of AML <input type="checkbox"/>																													
Rating	A B1	B2 B3 C																													
Aeroplane Turbine	<input type="checkbox"/>	<input type="checkbox"/>																													
Aeroplane Piston	<input type="checkbox"/>	<input type="checkbox"/>																													
Helicopter Turbine	<input type="checkbox"/>	<input type="checkbox"/>																													
Helicopter Piston	<input type="checkbox"/>	<input type="checkbox"/>																													
Avionics		<input type="checkbox"/>																													
Piston engine non-pressurised aeroplanes of MTOM of 2t and below		<input type="checkbox"/>																													
Large aircraft		<input type="checkbox"/>																													
Aircraft other than large aircraft		<input type="checkbox"/>																													

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

I herewith confirm that:

- 1. I am not holding any Part-66 AML issued in another Member State,
- 2. I have not applied for any Part-66 AML in another Member State and
- 3. I never had a Part-66 AML issued in another Member State which was revoked or suspended in any other Member State.

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

Signed: Name:

Date:

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

.....
.....
.....

Experience credit for Part-147 training

.....
.....
.....

Examination credit for equivalent exam certificates

.....
.....
.....

Please enclose all relevant certificates

Recommendation (if applicable): It is hereby certified that the applicant has met the relevant maintenance knowledge and experience requirements of Part-66 and it is recommended that the competent authority grants or endorses the Part-66 AML.

Signed: Name:

Position: Date:

Appendix VI

Aircraft Maintenance Licence referred to in Annex III (Part-66) — EASA Form 26

1. An example of the aircraft maintenance licence referred to in Annex III (Part-66) can be found on the following pages.
2. The document shall be printed in the standardised form shown but may be reduced in size to 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 recognised as an aircraft maintenance licence issued in accordance with Annex III (Part-66).
3. The document may be printed in the English or the official language of the Member State concerned, except that if the official language of the Member State concerned is used, a second English copy shall be attached for any licence holder that works outside that Member State to ensure understanding for the purpose of mutual recognition.
4. Each licence holder shall have a unique licence number based upon a National identifier and an alpha-numeric designator.
5. 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 of the aircraft maintenance licence contained herein.
6. The document may be prepared (i) by the competent authority of the Member State or (ii) by any maintenance organisation approved in accordance with Annex II (Part-145) if the competent authority agrees so and subject to a procedure developed as part of the maintenance organisation exposition referred to in point 145.A.70 of Annex II (Part-145), except that in all cases the competent authority of the Member State will issue the document.
7. The preparation of any change to an existing aircraft maintenance licence may be carried out (i) by the competent authority of the Member State or (ii) any maintenance organisation approved in accordance with Annex II (Part-145) if the competent authority agrees so and subject to a procedure developed as part of the maintenance organisation exposition referred to in point 145.A.70 of Annex II (Part-145), except that in all cases the competent authority of the Member State will change the document.
8. The aircraft maintenance 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 unauthorised entries are made.
9. Failure to comply with paragraph 8 may invalidate the document and could lead to the holder not being permitted to hold any certification privilege and may result in prosecution under national law.
10. The aircraft maintenance licence delivered in accordance with Annex III (Part-66) is recognised in all Member States and it is not necessary to exchange the document when working in another Member State.
11. The annex to EASA Form 26 is optional and may only be used to include national privileges, where such privileges are covered by the national regulation outside the scope of Annex III (Part-66).
12. For information the actual Annex III (Part-66) aircraft maintenance licence issued by the competent authority of the Member State may have the pages in a different order and may not have the divider lines.
13. With regard to the aircraft type rating page the competent authority of the Member State 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.
14. Notwithstanding 13, each page issued will be in this format and contain the specified information for that page.
15. The licence shall clearly indicate that the limitations are exclusions from the certification privileges. If there are no limitations applicable, the LIMITATIONS page will be issued stating "No limitations".
16. 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.
17. Example of Aircraft Maintenance Licence referred to in Annex III (Part-66)

I.
EUROPEAN UNION (*)
 [STATE]
[AUTHORITY NAME & LOGO]

II.
Part-66
AIRCRAFT MAINTENANCE
LICENCE

III.
 Licence No. [MEMBER STATE
 CODE].66.[XXXX]

EASA FORM 26 Issue 3

IVa. Full name of holder:

IVb. Date and place of birth:

V. Address of holder:

VI. Nationality of holder:

VII. Signature of holder:

III. Licence No:

VIII. CONDITIONS:

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

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

This licence when endorsed with an aircraft rating meets the intent of ICAO annex 1.

The privileges of the holder of this licence are prescribed by Regulation (EC) No 2042/2003 and in particular its Annex III (Part-66).

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

The privileges of this licence may not be exercised unless in the preceding two year period the holder has had either 6 months of maintenance experience in accordance with the privileges granted by the licence, or met the provision for the issue of the appropriate privileges.

III. Licence No:

IX. Part-66 CATEGORIES					
VALIDITY:	A	B1	B2	B3	C
Aeroplanes Turbine			n/a	n/a	n/a
Aeroplanes Piston			n/a	n/a	n/a
Helicopters Turbine			n/a	n/a	n/a
Helicopters Piston			n/a	n/a	n/a
Avionics	n/a	n/a		n/a	n/a
Large Aircraft	n/a	n/a	n/a	n/a	
Aircraft other than large	n/a	n/a	n/a	n/a	
Piston-engine non pressurised aeroplanes of 2 000 Kg MTOM and below	n/a	n/a	n/a		n/a

X. Signature of issuing officer & date:

XI. Seal or stamp of issuing Authority:

III. Licence No:

XII. PART-66 AIRCRAFT RATINGS		
Aircraft Rating	Category	Stamp & Date
III. Licence No:		

XIII. PART-66 LIMITATIONS
Valid until:
III. Licence No:

Annex to EASA FORM 26
XIV. NATIONAL PRIVILEGES outside the scope of Part-66, in accordance with [National Legislation] (Valid only in [Member State])
Official Stamp & Date
III. Licence No:

<p>INTENTIONALLY LEFT BLANK</p>

4. Annex IV (Part-147) to Regulation (EC) No 2042/2003 is amended as follows:

(1) the table of contents is replaced by the following:

‘CONTENTS

147.1

SECTION A — TECHNICAL REQUIREMENTS

SUBPART A — GENERAL

147.A.05 Scope

147.A.10 General

147.A.15 Application

SUBPART B — ORGANISATIONAL REQUIREMENTS

147.A.100 Facility requirements

147.A.105 Personnel requirements

147.A.110 Records of instructors, examiners and assessors

147.A.115 Instructional equipment

147.A.120 Maintenance training material

147.A.125 Records

147.A.130 Training procedures and quality system

147.A.135 Examinations

147.A.140 Maintenance training organisation exposition

147.A.145 Privileges of the maintenance training organisation

147.A.150 Changes to the maintenance training organisation

147.A.155 Continued validity

147.A.160 Findings

SUBPART C — APPROVED BASIC TRAINING COURSE

147.A.200 The approved basic training course

147.A.205 Basic knowledge examinations

147.A.210 Basic practical assessment

SUBPART D — AIRCRAFT TYPE/TASK TRAINING

147.A.300 Aircraft type/task training

147.A.305 Aircraft type examinations and task assessments

SECTION B — PROCEDURES FOR COMPETENT AUTHORITIES

SUBPART A — GENERAL

147.B.05 Scope

147.B.10 Competent authority

147.B.20 Record-keeping

147.B.25 Exemptions

SUBPART B — ISSUE OF AN APPROVAL

147.B.110 Procedure for approval and changes to the approval

147.B.120 Continued validity procedure

147.B.125 Maintenance training organisation approval certificate

147.B.130 Findings

SUBPART C — REVOCATION, SUSPENSION AND LIMITATION OF THE MAINTENANCE TRAINING ORGANISATION APPROVAL

147.B.200 Revocation, suspension and limitation of the maintenance training organisation approval

Appendix I — Basic Training Course Duration

Appendix II — Maintenance Training Organisation Approval referred to in Annex IV (Part-147) — EASA Form 11

Appendix III — Certificates of Recognition referred to in Annex IV (Part-147) — EASA Forms 148 and 149;

(2) The title of the section A is replaced by the following:

‘SECTION A

TECHNICAL REQUIREMENTS’

(3) point 147.A.125 is replaced by the following:

‘147.A.125 Records

The organisation shall keep all student training, examination and assessment records for *an unlimited period*.’;

(4) point 147.A.145 is modified as follows:

(i) point (e) is replaced by the following:

‘(e) An organisation may not be approved to conduct examinations unless approved to conduct the corresponding training.’;

(ii) a point (f) is added as follows:

‘(f) By derogation from point (e), an organisation approved to provide basic knowledge training or type training may also be approved to provide type examination in the cases where type training is not required.’;

(5) the title of the Section A Subpart C is replaced by the following:

‘SUBPART C

APPROVED BASIC TRAINING COURSE’

(6) point 147.A.200(b) is replaced by the following:

‘(b) The knowledge training element shall cover the subject matter for a category or subcategory aircraft maintenance licence as specified in Annex III (Part-66).’;

- (7) the title of the Section B is replaced by the following:

‘SECTION B

PROCEDURES FOR COMPETENT AUTHORITIES’

- (8) point 147.B.15 is deleted;

- (9) point 147.B.120(a) is replaced by the following:

‘(a) Each organisation shall be completely audited for compliance with this Annex (Part-147) at periods not exceeding 24 months. This shall include the monitoring of at least one training course and one examination performed by the maintenance training organisation.’;

- (10) Appendix I is replaced by the following:

Appendix I

Basic Training Course Duration

The minimum duration of a complete basic training course shall be as follows:

Basic Course	Duration (in hours)	Theoretical training ratio (in %)
A1	800	30 to 35
A2	650	30 to 35
A3	800	30 to 35
A4	800	30 to 35
B1.1	2 400	50 to 60
B1.2	2 000	50 to 60
B1.3	2 400	50 to 60
B1.4	2 400	50 to 60
B2	2 400	50 to 60
B3	1 000	50 to 60’

(11) Appendix II is amended as follows:

Appendix II

Maintenance Training Organisation Approval referred to in Annex IV (Part-147) — EASA Form 11

[MEMBER STATE (*)]

A Member of the European Union (**)

MAINTENANCE TRAINING AND EXAMINATION ORGANISATION APPROVAL CERTIFICATE

Reference: [MEMBER STATE CODE (*)].147.[XXXX]

Pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council and to Commission Regulation (EC) No 2042/2003 for the time being in force and subject to the condition specified below, the [COMPETENT AUTHORITY OF THE MEMBER STATE (*)] hereby certifies:

[COMPANY NAME AND ADDRESS]

as a maintenance training organisation in compliance with Section A of Annex IV (Part-147) of Regulation (EC) No 2042/2003, approved to provide training and conduct examinations listed in the attached approval schedule and issue related certificates of recognition to students using the above references.

CONDITIONS:

- 1. This approval is limited to that specified in the scope of work section of the approved maintenance training organisation exposition as referred to in Section A of Annex IV (Part-147); and
- 2. This approval requires compliance with the procedures specified in the approved maintenance training organisation exposition; and
- 3. This approval is valid whilst the approved maintenance training organisation remains in compliance with Annex IV (Part-147) of Regulation (EC) No 2042/2003;
- 4. Subject to compliance with the foregoing conditions, this approval shall remain valid for an unlimited duration unless the approval has previously been surrendered, superseded, suspended or revoked.

Date of original issue:

Date of this revision:

Revision No:

Signed:

For the competent authority: [COMPETENT AUTHORITY OF THE MEMBER STATE (*)]

(*) or EASA if EASA is the competent authority
(**) Delete for non-EU Member States or EASA

MAINTENANCE TRAINING AND EXAMINATION ORGANISATION APPROVAL SCHEDULE

Reference: [MEMBER STATE CODE (*).147.[XXXX]

Organisation: [COMPANY NAME AND ADDRESS]

CLASS	LICENCE CATEGORY	LIMITATION	
BASIC (**)	B1 (**)	TB1.1 (**)	AEROPLANES TURBINE (**)
		TB1.2 (**)	AEROPLANES PISTON (**)
		TB1.3 (**)	HELICOPTERS TURBINE (**)
		TB1.4 (**)	HELICOPTERS PISTON (**)
	B2 (**)	TB2 (**)	AVIONICS (**)
	B3 (**)	TB3 (**)	PISTON-ENGINE NON-PRESSURISED AEROPLANES 2 000 KG MTOM AND BELOW (**)
	A (**)	TA.1 (**)	AEROPLANES TURBINE (**)
		TA.2 (**)	AEROPLANES PISTON (**)
		TA.3 (**)	HELICOPTERS TURBINE (**)
		TA.4 (**)	HELICOPTERS PISTON (**)
TYPE / TASK (**)	C (**)	T4 (**)	[QUOTE AIRCRAFT TYPE] (***)
	B1 (**)	T1 (**)	[QUOTE AIRCRAFT TYPE] (***)
	B2 (**)	T2 (**)	[QUOTE AIRCRAFT TYPE] (***)
	A (**)	T3 (**)	[QUOTE AIRCRAFT TYPE] (***)

This approval schedule is limited to those trainings and examinations specified in the scope of work section of the approved maintenance training organisation exposition,

Maintenance Training Organisation Exposition reference:

Date of original issue:

Date of last revision approved: Revision No:

Signed:

For the competent authority:[COMPETENT AUTHORITY OF THE MEMBER STATE (*)]

(*) or EASA if EASA is the competent authority

(**) Delete as appropriate if the organisation is not approved.

(***) Complete with the appropriate rating and limitation.

(12) Appendix III is replaced by the following:

Appendix III

Certificates of Recognition referred to in Annex IV (Part-147) — EASA Forms 148 and 149

1. Basic Training/Examination

The Part-147 basic training certificate template detailed below is to be used for recognition of completion of either the basic training, the basic examination or both the basic training and basic training examinations.

The training certificate shall clearly identify each individual module examination by date passed together with the corresponding version of Appendix I to Annex III (Part-66).

Page 1 of 1
CERTIFICATE OF RECOGNITION
Reference: [MEMBER STATE CODE (*).147.[XXXX].[YYYYY]
This certificate of recognition is issued to:
[NAME]
[DATE and PLACE OF BIRTH]
By:
[COMPANY NAME AND ADDRESS]
Reference: [MEMBER STATE CODE (*).147.[XXXX]
a maintenance training organisation approved to provide training and conduct examinations within its approval schedule and in accordance with Annex IV (Part-147) of Regulation (EC) No 2042/2003.
This certificate confirms that the above named person either successfully passed the approved basic training course (**) or the basic examination (**) stated below in compliance with Regulation (EC) No 216/2008 of the European Parliament and of the Council and to Commission Regulation (EC) No 2042/2003 for the time being in force.
[BASIC TRAINING COURSE (**)] or/and [BASIC EXAMINATION (**)]
[LIST OF PART-66 MODULES/DATE OF EXAMINATION PASSED]
Date:
Signed:
For: [COMPANY NAME]
EASA Form 148 Issue 1
(*) or EASA if EASA is the competent authority. (**) Delete as appropriate.

2. Type Training/Examination

The Part-147 type training certificate template detailed below is to be used for recognition of completion of either the theoretical elements, the practical elements or both the theoretical and practical elements of the type rating training course.

The certificate shall indicate the airframe/engine combination for which the training was imparted.

The appropriate references shall be deleted as applicable and the course type box shall detail whether only the theoretical elements or the practical elements were covered or whether theoretical and practical elements were covered.

The training certificate shall clearly identify if the course is a complete course or a partial course (such as an airframe or powerplant or avionic/electrical course) or a difference course based upon the applicant previous experience, for instance A340 (CFM) course for A320 technicians. If the course is not a complete one, the certificate shall identify whether the interface areas have been covered or not.

Page 1 of 1

CERTIFICATE OF RECOGNITION

Reference: [MEMBER STATE CODE (*)].147.[XXXX].[YYYYY]

This certificate of recognition is issued to:

[NAME]

[DATE and PLACE OF BIRTH]

By:

[COMPANY NAME AND ADDRESS]

Reference: [MEMBER STATE CODE (*)].147.[XXXX]

a maintenance training organisation approved to provide training and conduct examinations within its approval schedule and in accordance with Annex IV (Part-147) of Regulation (EC) No 2042/2003.

This certificate confirms that the above named person either successfully passed the theoretical (**) and/or practical elements (**) of the approved type training course stated below and the related examinations in compliance with Regulation (EC) No 216/2008 of the European Parliament and of the Council and to Commission Regulation (EC) No 2042/2003 for the time being in force.

[AIRCRAFT TYPE TRAINING COURSE (**)]

[START and END DATES]

[SPECIFY THEORETICAL ELEMENTS OR PRACTICAL ELEMENTS]

and/or

[AIRCRAFT TYPE EXAMINATION (**)]

[END DATE]

Date:

Signed:

For: [COMPANY NAME]

EASA Form 149 Issue 1

[...]

(*) or EASA if EASA is the competent authority.

(**) Delete as appropriate.