CIVIL AVIATION AUTHORITY OF BANGLADESH
AIR NAVIGATION ORDERS

AIRWORTHINESS REQUIREMENTS

PART D - LICENSING AIRCRAFT MAINTENANCE ENGINEERS

CHAPTER D. 1	**ISSUES OF AIRCRAFT MAINTENANCE ENGINEER LICENSES**

SECTIONS

1. GENERAL

1.1 This Order prescribes the training, experience requirements, application and examination procedures for Aircraft Maintenance Engineers (AMEs) licenses.

1.2 The granting and extension of AME licenses by the CAAB is in conformity with the standards of the International Civil Aviation Organization (ICAO) as prescribed in Annex 1 to the Convention on International Civil Aviation.

2. LICENSE WITHOUT TYPE RATING AND TYPE RATINGS

2.1 A license without type rating (LWTR) in any category may be issued. A License without Type Rating shall have no certification privileges.

2.2 The type ratings applicable to particular License categories and sub-categories are prescribed in Chapter D.2 and the privileges and certification responsibilities in Chapter D.3 of these Orders.

3. LICENSE CATEGORIES

3.1 AME licenses are restricted licenses in Airframe, Engine, Electrical, Instrument and radio categories.

3.2 Licenses granting privileges for maintenance, inspection, modification, repair and replacement of aircraft components, defined in ICAO Annex 1 as TYPE II Licenses, are issued in the following categories and their sub-categories:

CATEGORIES	SUB-CATEGORIES
"A" (Airframe)	- Unpressurised Aeroplanes - Pressurised Aeroplanes - Rotorcraft
"C" (Engine)	- Piston Engine - Turbine Engine
"E" (Electrical)	- DC power AC power
"I" (Instrument)	- General Aircraft Instruments - Integrated Flight Systems
"R" (Radio)	- Communications Navigation - Pulse & FM

3.3 Licenses granting privileges for overhaul, maintenance, inspection, modification, repair and replacement of aircraft components defined in ICAO Annex 1 as Type 1 licenses are issued in the following two categories and sub-categories.

CATEGORIES	SUB-CATEGORIES
"B" (Airframe)	- Unpressurised Aeroplanes
"D" (Engines)	- Piston Engines

4. REQUIREMENTS - INITIAL ISSUE

4.1 Except as provided in paragraph 4.2 of this order, an applicant for an AME License (LWTR) shall:

(a) Be not less than 21 years of age.

(b) Have sufficient knowledge of the English language to perform the duties of an AME.

(c) Not suffer from any disability likely to affect the technical skill or judgment requirement of an AME.

(d) Have completed the appropriate training requirements prescribed in Section 6 of this Order.

(e) Have acquired the appropriate practical experience prescribed in Sections 7.8 and 9 of this Order.

(f) Have successfully completed the appropriate written and oral examinations required in Section 5 of this order.

(g) Have passed at least any one of the following acceptable to the Chairman:

i) Higher Secondary School Certificate in Science, or

ii) Diploma in Aircraft Maintenance Engineering, or

iii) Diploma in Mechanical Engineering, or

iv) Diploma in Electrical or Electronic Engineering.

4.2 The Chairman may exempt from such of the requirements of paragraph 4.1 of this Order any person as he thinks fit who holds a valid AME License (LWTR) or equivalent certification issued by the competent authority of a contracting State, and which meets the intent of ICAO Annex 1.

4.3 Except as provided in paragraph 4.2 of this Order, no exemptions of any kind will be granted for other certificate, approvals, licenses, diplomas or degrees held by any person.

5. EXAMINATION – GENERAL

5.1 Application for appearing simultaneously in more than one LWTR category and or in more than one Type Rating shall not be acceptable.

5.2 The subjects for LWTR examination are mentioned in the Table A and applicable subjects for specific license categories are mentioned in the Table B of this Order.

5.3 The oral examination, Subject 19, shall cover the same subjects as the written examinations.

5.4 The syllabus for each written and oral examination shall be as detailed in Chapter D.5 of these Orders.

5.5 Issue of LWTR and type Rating shall require passing grades in written and oral examinations for all categories of License.

5.6 Following an unsuccessful attempt in a written LWTR or Type Rating examination, the applicant shall acquire at least 60 (sixty) working days of relevant maintenance experience before re-application.

5.7 Following an unsuccessful attempt in an oral examination the applicant shall acquire at least 30 (thirty) working days of relevant maintenance experience before re-application.

5.8 Except as provided in paragraph 5.11 of this Order, where an applicant is required to appear for written examinations in more than one subject for LWTR or Type Ratings, further examination will not be required in the subject(s) already passed.

5.9 Where a candidate makes 2 (two) consecutive unsuccessful attempts in a written examination on LWTR subject or type paper, further examination in that subject shall require successful completion of appropriate refresher course.

5.10 An applicant who has passed the written examinations for LWTR or Type Ratings, have to appear in oral examination for which examination schedule will be published by the CAAB. Failure to appear in consecutive 2 (two) oral examination shall require re-appearance in written examination(s).

5.11 The oral examination board may recommend a candidate to undergo refresher course if knowledge of the candidate is considered unsatisfactory. Following maximum 3 (three) consecutive unsuccessful attempts in an oral examination, the candidate shall be required to re-sit for the complete written examination(s)

5.12 Maintenance experience for LWTR and Type Rating shall be counted on the basis of working days as per AWS-11 and not on the basis of calendar period.

5.13 The minimum passing grade for all written examinations shall be 70%.

5.14 Any person detected using unfair means in any examination shall be disqualified from that examination and will not be permitted to attempt any further examinations applicable to an AME License (LWTR) or type rating for at least 24 months.

6. TRAINING REQUIREMENTS

6.1 An applicant for a LWTR in a sub-category mentioned in the Table B of this Order, shall have successfully completed a Training Course approved by the Chairman, CAAB or acceptable to the Chairman, CAAB on aircraft maintenance engineering and Airworthiness Legislation Course within the last 10 (ten) years, or shall have successfully completed an appropriate refresher course within the proceeding 36 months from the date of application.

6.2 An applicant for a Type Rating classified in Group 1 of the Chapter D.2 of these orders shall have successfully completed an approved Training course on aircraft having Maximum Take-off Weight (MTOW) exceeding 2730 kg., within the last 5(five) years or shall have successfully completed an appropriate refresher course within the preceding 36 months from the date of application. Successful completion of Type Course for aircraft not exceeding 2730 kg. MTOW is not mandatory.

6.3 An applicant for a Type Rating classified in Group 2 of the Chapter D. 2 of these Orders shall have successfully completed an approved Training course airframe, engine, electrical, instrument system or radio system as applicable, within the last 5 (five) years, or shall have successfully completed an appropriate refresher course within the preceding 36 months from the date of application.

7. COUNTING OF EXPERIENCE REQUIREMENTS

7.1 Concurrent experience in more than one LWTR category and/or Type Ratings is not acceptable except as provided in the paragraph 8.2 of this ANO.

7.2 Maintenance experience for License without Type Rating (LWTR) shall be counted from the applicable date after successful completion of Basic Course will not be credited.

7.3 Maintenance experience for type ratings shall be counted from date of obtaining LWTR appropriate to the type rating applied for or successful completion of type course whichever is later.

7.4 Schedule of works shall show that the applicant's experience is broad based and covers a representative selection of subjects in the syllabus appropriate to the category, sub-category and/or type rating.

8. EXPERIENCE REQUIREMENTS FOR LWTR

8.1 An applicant for a License category or sub-category as mentioned in the paragraph 3.2 and table B of this Order, has acquired not less than 300 (three hundred) working days of aircraft maintenance experience in the specific sub-category.

8.2 For application of LWTR under the sub-paragraph 8.1 of this Order, period of concurrent aircraft maintenance experience in more than one sub-category may be credited toward the issuance of sub-categories under "A" (Airframe), "E" (Electrical), "I" (Instrument) and "R" (Radio). However, under category "C" (Engine), specific experience is required for the sub-category Piston Engine and Turbine Engine separately.

8.3 An applicant for a License category prescribed in paragraph 3.3 of this Order shall have gained at least 3 (three) years of Major Maintenance/Repair/Overhaul experience appropriate to the License category applied for.

9. EXPERIENCE REQUIREMENTS FOR TYPE RATINGS

9.1 An applicant for a type rating shall have gained practical maintenance experience for the under mentioned minimum period solely on airframe, engine, electrical, instrument and radio system. Concurrent experience on any category or/and ratings not acceptable:

(a) 180 working days for initial issue of License in any category for aircraft mentioned in Group 1 of the ANO D.2

(b) 120 working days for subsequent extension of License in the same category for aircraft mentioned in Group 1 of the ANO D.2.

(c) 180 working days for initial issue or extension of type ratings in the same category or in any category for aircraft mentioned in Group 2 of the ANO D.2.

TABLE-A

EXAMINATION SUBJECTS FOR LICENSES WITHOUT TYPE RATINGS

	SUBJECT NUMBER	TITLE
	01	Airworthiness Legislation
	02	Basic Mechanical Engineering
	03	Basic Electrical/Instrument Engineering
	04	Basic Radio Engineering
	05	Un-Pressurized Aeroplanes
	06	Pressurized Aeroplanes
	07	Rotorcraft
	08	Airframe Overhaul
	09	Piston Engines
	10	Turbine Engines
	11	Engine Overhaul
	12	DC Power
	13	AC Power
	14	General Aircraft Instruments
	15	Integrated Flight Systems
	16	Communications
	17	Navigation
	18	Pulse &FM
I	19	Human Performance and Limitations
I	20	Viva-voce (Oral) Examination

TABLE -B LICENSE CATEGORIES, SUB-CATEGORIES, TYPE RATING & EXAMINATIONS

CATEGORIES	SUB-CATEGORIES	TYPE RATING (Ref ANO D.2)	EXAMINATIONS (Ref Table A)
"A" (Airframe)	Un- Pressurized Aeroplanes	Para 4.1	1, 2, 5, 19, 20
"A" (Airframe)	Pressurized Aeroplanes	Para 4.2	1, 2, 5, 6, 19, 20
"A" (Airframe)	Rotorcraft	Para 4.3	1, 2, 7, 19,20
"B" (Airframe)	Un-Pressurized Aeroplanes	Para 4.1	1, 2,5,8,19,20
"C" (Engine)	Piston Engines	Para 5.1	1, 2, 9, 19, 20
"C" (Engine)	Turbine Engines	Para 5.2	1, 2, 10, 19, 20
"D" (Engine)	Piston Engines	Para 5.1	1, 2,9,11,19,20
"E" (Electrical)	DC Power	Para 6.1	1, 3,12,19,20
"E" (Electrical)	AC Power	Para 6.2	1, 3, 12, 13, 19,20
"I" (Instrument)	General Aircraft Instruments	Para 7.1	1, 3, 14, 19,20
"I" (Instrument)	Integrated Flight System	Para 7.2	1, 3, 14, 15, 19,20
"R" (Radio)	Communications	Para 8.1	1, 4,16,19,20
"R" (Radio)	Navigation	Para 8.2	1, 4, 16, 17, 19, 20
"R" (Radio)	Pulse & FM	Para 8.3	1, 4,16,17,18,19,2

10. RECENCY OF EXPERIENCE

10.1 The practical experience claimed by an applicant in respect of a License category, sub-category or type rating shall have been acquired within the periods mentioned below, immediately preceding the date of application.

(a) 3 (three) years for a License category prescribed in paragraph 3.2 of ANO D.I

(b) 5 (five) year for a License category prescribed in paragraph 3.3 of ANO D.I

(c) 1 (one) years for any License in sub-category or type ratings prescribed in the ANO D.2

11. PREREQUISITES - CATEGORIES AND SUB-CATEGORIES

11.1 An applicant for a License in;

(a) Category "A" (Airframe), sub-category Pressurized Aeroplanes, shall be the holder of or have met the requirements for the issue of, sub-category Un-Pressurized Aeroplanes.

(b) Category "B" (Airframe) shall be the holder of a type rated License in Category "A" (Airframe), sub-category Un-Pressurized Aeroplanes.

(c) Category "D" (Engines) shall be the holder of a type rated License in Category "C" (Engine), sub-category Piston Engines.

(d) Category "E" (Electrical), sub-category AC Power, shall be the holder of or have met the requirements for the issue of, sub-category DC Power.

(e) Category "I" (Instrument), sub-category Integrated Flight Systems, shall be the holder of or have met the requirements for the issue of, sub-category General Aircraft Instruments.

(f) Category "R" (Radio), sub-category Navigation, shall be the holder of or have met the requirements for the issue of, sub-category Communications.

(g) Category "R" (Radio), sub-category Pulse & FM, shall be the holder of or have met the requirements for the issue of, sub-category Navigation.

12. APPLICATION PROCEDURES AND PENAL ACTION FOR FALSE DECLARATION

12.1 Application for LWTR shall be submitted along with the following forms and attested copy of the certificates.

(a) Form CA-9A

(b) FormCA-9B

(c) FormAWS-11

(d) Secondary School Certificate

(e) Higher Secondary Certificate (Science) or Diploma Certificate as per Rule 39, CARs 1984

(f) Basic Course Certificate

(g) Airworthiness Legislation Course Certificate

(h) Human Performance and Limitation Course Certificate

12.2 Application for Type rating shall be submitted along with the following forms and attested copy of the certificates.

(a) Form CA-9A
(b) Form CA-9B
(c) Particular of practical experience for Type Rating (CAA Approved Form)
(d) FormAWS-11
(e) Valid Type Course Certificate
(f) Company Approval appropriate to the Category and Ratings (if applicable).

12.3 Upon Acceptance of an application, the applicant will be notified to pay the appropriate fees and will be advised of the date, time and place of the examinations.

12.4 An examination time table and closing dates for applications are mentioned in the Airworthiness Notice No. 36

12.5 The Chairman may suspend summarily any License or type rating where it is ascertained that the holder has given false information for the purpose of obtaining or helping others to obtain a License or type rating.

12.6 Where it is ascertained that an applicant of a License (LWTR) or type rating has given false information for the purpose of obtaining or helping others to obtain a License or type rating, that applicant shall not be permitted to attempt any examination applicable to an AME License (LWTR) or type rating until a period of at least 24 months has elapsed.

13. VALIDITY OF LICENSE AND TYPE RATINGS

13.1 A License without a type rating (LWTR), being a License without certification privileges, has neither validity nor any expiry date, and becomes valid only when a type rating is issued.

1.3.2 Except as provided in the paragraphs 12.4 and 13.3 of this order, a type rated License shall remain valid for the period entered thereon, and may be renewed in accordance with the requirements of Chapter D.4 these Orders.

1.3.3 The Chairman may vary or cancel any entry or particulars in any AME License if the privileges of the License are not being exercised to the extent necessary to ensure the continued competence of the holder.

1.3.4 Where any such action taken in accordance with 13.3 of this Order adversely affects the License holder, the holder may elect to undergo an examination specified by the Chairman, or otherwise satisfy the Chairman as to his competency.

14. RE-ISSUE OF LICENSE AND TYPE RATINGS

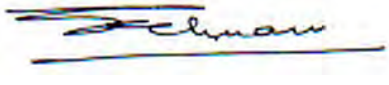
14.1 Valid AME License issued prior to the effective dale of this order will be re-issued in conformity with these requirements as they are forwarded for renewal or extension.

14.2 A re-issued License will preserve the License number and as near as possible, and grant the same responsibilities and privileges as the License it replaces.

1.4.3 A License which has been allowed to expire shall not be re-issued until the renewal requirements of Chapter D.4 have been met.

1.4.4 No fee is payable for re-issue of License, however the normal renewal extension fee, as applicable, shall be paid.

Issued in pursuance of the Rules 4 and 39 of the Civil Aviation Rules, 1984. This issue of the ANO is a partial revision (issue 5) affecting the pages 6, 7, 8 and 9.
The remaining pages 1, 2, 3, 4 and 5 remains unchanged at issue 4.



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CIVIL AVIATION AUTHORITY OF BANGLADESH
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PART D - LICENSING AIRCRAFT MAINTENANCE ENGINEER

CHAPTER D.2	**AIRCRAFT MAINTENANCE ENGINEER LICENSE TYPE RATINGS**

SECTIONS

1. GENERAL

1.1 This Order prescribes the Type Ratings which may be granted to holders of particular Aircraft Maintenance Engineer (AME) Licenses.

1.2 AME Licenses and type ratings are granted in accordance with the requirements of Chapter D. 1 of these Orders, and the privileges and responsibilities of an AME holding a type rated License are prescribed in Chapter D. 3 of these Orders.

1.3 A type rating for a Bangladesh AME License shall only be issued in respect of aircraft which are currently entered on the Register of Bangladesh Aircraft.

1.4 Where an aircraft type is removed from the Register of Bangladesh Aircraft, type ratings previously held for that aircraft type will, at next renewal of each affected AME License, be stamped as being NOT VALID.

1.5 The privileges granted in respect of a Bangladesh AME License are valid for Bangladesh Registered aircraft only.

2. GROUP 1 TYPE RATINGS

2.1 Group 1 Aircraft includes all Unpressurised Aeroplanes having Maximum Total Weight Authorised (MTWA) of 5700 Kg or less.

2.2 In Airframe and/ or Engine category on Group 1 aircraft, type ratings will normally be granted only for specific type of aircraft/ engine, or may be granted for the group as a whole as stated in the para 2.9 of this order. But in respect of Electrical or Instrument or Radio systems type ratings will be granted for the group as a whole.

2.3 Group 1 -Airframes include all aeroplanes as mentioned in the paragraph 2.1 of this Order.

2.4 Group 1 Engines include all Piston Engines installed on aeroplanes as mentioned in the paragraph 2.1 Order.

2.5 Group 1 Electrical Systems include all electrical systems installed in aeroplanes as mentioned in the paragraph 2.1 of this Order.

2.6 Group 1 Instrument systems include all instrument systems installed in aeroplanes as mentioned in the paragraph 2.1 of this Order.

2.7 Group 1 Radio systems are all communication systems and include VHP. HF. Voice Recorder and Audio systems installed in aeroplanes as mentioned in the paragraph 2.1 of this Order.

2.8 The Chairman may, where appropriate in specific cases, grant an endorsement for elementary navigation systems (ADF. VOR. ILS) installed in Group 1 aircraft.

2.9 A License in Category "A" (Airframe) and/or in Category "C" (Engine), may be endorsed with a Group type ratings on all types of aeroplanes and/ or engines classified in Group 1 of this Order provided the applicant:

a. is holder of at least 1 (one) type rating in that group for not less than 10 (ten) years prior to the date of application.

b. is currently type rated in that group on at least 3 (three) aircraft or engines, as applicable of different manufacturers.

c. Successfully pass an oral examination.

3. GROUP 2 TYPE RATINGS

3.1 Group 2 aircraft includes all aeroplanes with MTWA higher than 5700Kg. All pressurized aeroplanes and all Rotorcraft.

3.2 Group 2 type ratings shall be granted only for specific models or types of aircraft or engines or in respect of Electrical, Instrument and Radio systems, but not for the group as a whole.

3.3 Group 2 Airframes include all Aeroplanes as mentioned in the paragraph 3.1 of this Order.

3.4 Group 2 Engines include all Turbine Engines installed on any type of aeroplanes and Piston Engines as mentioned in the paragraph 3.1 of this Order.

3.5 Group 2 Electrical systems include all the instrument systems installed in aeroplanes as mentioned in the paragraph 3.1 of this Order.

3.6 Group 2 Instrument systems include all the instrument systems installed in aeroplanes as mentioned in the paragraph 3.1 of this Order.

3.7 Group 2 Radio system includes all the Communication, Navigation and Pulse & FM systems installed in aeroplanes as mentioned in the paragraph 3.1 of this Order.

4. AIRFRAME TYPE RATINGS

4.1 A License in Category "A" (Airframe) Sub-Category Unpressurised Aeroplanes, or Category "B" (Airframe) Sub- Category Unpressurised Aeroplanes, shall be endorsed with specific Type Ratings for one or more types of aeroplanes classified in the Group 1 of this Order.

4.2 A License in Category "A" (Airframe) Sub-Category Pressurised Aeroplanes, shall be endorsed with specific type ratings for one for more types of aeroplanes classified in the Group 2 of this Order.

4.3 A License in Category "A" (Airframe) Sub-Category Rotorcraft, shall be endorsed with specific type rating for one or more rotorcraft classified in the Group 2 of this Order.

4.4 A License in Category "B" (Airframes) shall not be endorsed with type ratings for aeroplanes and rotorcraft classified in the Group 2 of this Order.

5. ENGINE TYPE RATINGS

5.1 A License in Category "C" (Engines) Sub-Category Piston Engines, or Category "D" (Engines) Sub-Category Piston Engines, shall be endorsed with specific type rating for one or more types of engines classified in the Group 1 of this Order.

5.2 A License in Category "C" (Engines) Sub-Category Turbine Engines, shall be endorsed with specific type rating for one or more types of engines classified in the Group 2 of this Order.

5.3 A License in Category "D" (Engines) Shall not be endorsed for (i) any Turbine Engines or (ii) Piston Engines with a power rating exceeding 500KW (670 BMP).

6. ELECTRICAL TYPE RATINGS

6.1 A License in Category "E" (Electrical) Sub-Category DC power, shall be endorsed with specific type rating for the Electrical systems on all types of aeroplanes classified in the Group 2 of this Order.

6.2 A License in Category "E" (Electrical) Sub-Category DC power, shall be endorsed with specific type rating for the Electrical systems of one or more type of aeroplane classified in the Group 2 of this Order.

6.3 A License in Category "E" (Electrical) Sub-Category AC power, shall be endorsed with specific type rating for the Electrical systems of one or more types of aeroplanes classified in the Group 2 of this Order.

7. INSTRUMENT TYPE RATINGS

7.1 A License in Category "I" (Instruments) Sub-Category Genera! Aircraft Instruments, shall be endorsed with specific type rating for the Instrument systems on all types of aeroplanes classified in the Group 1 of this Order.

7.2 A License in Category "I" (Instruments) Sub-Category General Aircraft Instruments, shall be endorsed with specific type rating for the Instrument systems on all types of aeroplanes classified in the Group 2 of this Order.

7.3 A License in Category "I" (Instruments) Sub-Category Integrated flight Systems, shall be endorsed with specific type rating for the Instrument systems of one or more types of aeroplanes classified in the Group 2 of this Order.

8. RADIO TYPE RATINGS

8.1 A License in Category "R" (Radio) Sub-Category Communications. Shall be endorsed with specific type rating for the Communication systems on all types of aeroplanes classified in the Group 1 of this Order.

8.2 A License in Category "R" (Radio) Sub-Category Communications. Shall be endorsed with specific type ratings for the Communication systems of one or more types of aeroplanes classified in the Group 2 of this Order.

8.3 A License in Category "R" (Radio) Sub-Category Navigation, Shall be endorsed with specific type rating for the Navigation systems of one or more types of aeroplanes classified in the Group 2 of this Order.

8.4 A License in Category "R" (Radio) Sub-Category Pulse and FM. Shall be endorsed with specific type rating for the Pulse and FM systems of one or more types of aeroplanes classified in the Group 2 of this Order.

8.5 The CAAB may issue type rated AME License with appropriate ratings on the basis of Class-1 Inspection Permit issued by Biman after necessary verification.

8.6 Further, Class-1 Inspection Permit in "Radio" category will not be issued by Biman.

Issued in pursuance of the Civil Aviation Rules 1984. Rule 4 and 39. This ANO is a complete re-issue and supersedes Issue-2 August 1, 1990.

CIVIL AVIATION AUTHORITY OF BANGLADESH
AIR NAVIGATION ORDERS

AIRWORTHINESS REQUIREMENTS

PART D - LICENSING - AIRCRAFT MAINTENANCE ENGINEERS

CHAPTER D.3	**PRIVILEGES AND RESPONSIBILITIES OF LICENSED AIRCRAFT MAINTENANCE ENGINEERS**

SECTIONS

1. GENERAL

1.1 This order prescribes Aircraft Maintenance Engineer (AME) medical fitness, privileges and certification responsibilities in respect of the overhaul, maintenance, inspection, modification, repair and replacement of aircraft and aircraft components.

1.2 Holders of AME Licenses shall not exercise the privileges of their Licenses, related ratings and inspection authorization while under the influence of any psychoactive substance which might render them unable to safely and properly exercise privilege of the Licenses and/or if they know or suspect that their physical (i.e. eyesight, including colour vision, is particularly important in this respect) and mental condition (i.e. psychological integrity and personality factor) renders them unfit to exercise such privileges.

2. PRIVILEGES

2.1 In respect of aircraft registered in Bangladesh, the holder of a type rated AME License issued by the CAAB may issue the following certificates:

(a) Certificate of Compliance

(b) Maintenance Release

(c) Certificate of Fitness for Flight

3. CERTIFICATION RESPONSIBILITIES

3.1 Subject to the type rating (s) and any limitations as may be included on a License; AMEs may perform work as specified in this Order, and make the required certifications in respect of overhaul, maintenance, inspection, modification, repair and replacement.

3.2 A certificate of compliance is required to be issued by all persons concerned with the particular item of work, each assuming responsibility for those aspects for which he is entitled to assume responsibility.

3.3 Whenever work is performed on an aircraft, all involved persons to whom this Order applies shall consider the effect such work may have, directly or indirectly, on items, which are the responsibility of other such persons.

3.4 In all cases where an overlap of responsibility occurs, the person primarily responsible for the item on which the work is being performed shall inform to the appropriately responsible persons through Aircraft Maintenance Log entry.

3.5 In case new equipment or system (e.g. Freon refrigerant air-conditioning system (Cat. A), thrust augmentation system (Cat. C), Fly-by wire system (Cat. E), Inertial Reference system (INR), Laser Gyro system (Cat 1), Omega, Loran, CW Flyperbolic, MLS, GPS etc. (Cat. R) is installed and the AMEs' were not examined on the equipment/system during Type Rating examination or the AJV1E has no experience on the system, the holder of the AME License shall issue Certificate of Compliance provided approved training has been successfully completed.

3.6 To comply with these requirements, every person to whom this Order applies shall be conversant with all paragraphs contained herein.

4. ISSUE OF CERTIFICAE OF COMPLIANCE-CATEGORY "A" (AIRFRAMES)

4.1 In respect of maintenance, inspection, modification, repair and replacement, an AME licensed in Category "A" (Airframes) is responsible for the condition assembly and functioning of all parts of the aircraft other than those shown in this Order to be the responsibility of AMEs licensed in other categories.

4.2 An AME licensed in Category "A" (Airframes) is also responsible in conjunction with other licensed AMEs where stated in this Order.

4.3 Except as provided in paragraph 4.4 of this Order, an AME licensed in Category "A" (Airframes) may issue a certificate of compliance relating to maintenance, inspection, modification, repair or replacement of the following parts of an aircraft:

(a) Aircraft structure

(b) control surfaces including rotorcraft hubs and blades;

(c) rotorcraft transmission and drive systems excluding reduction gear boxes or power input coupling gear boxes which are provided by the engine manufacturer;

(d) flight control systems.

(e) Hydraulic systems

(f) Pneumatic systems

(g) Pressurisation systems including outflow valves

(h) Air-conditioning systems

(i) De-icing and anti-icing systems

(j) Landing gear systems

(k) Fuel and other liquid tanks and associated plumbing not forming a part of the engine installation, excluding the engine oil system.

(I) Fire extinguishing system (Airframe)

(m) Cabin and Cockpit Furnishings –

(n) Windshield clear vision systems

(o) Emergency equipment.

4.4 In respect of paragraph 4.3 of this Order, an AME licensed in Category "A" (Airframe) shall not issue a Certificate of Compliance for any work has involved any of the following:

(a) Bolted joints requiring special techniques

(b) Complete riveted joints in primary structures

(c) Complete glued joints in primary structures

(d) Welded and brazed joints

(e) Bonded assemblies in structures

(f) Cotton, linen, polyester, glass fiber or fabric covering of a complete fuselage or aerofoil.

(g) The disturbing of individual parts or units which are supplied as bench tested units, except for the replacement of items normally replaceable or adjustable in service, and where subsequent functional checks to verify serviceability of the system do not require use of "special" test apparatus other than "field" test apparatus used for functional check as per the applicable Maintenance Manual.

(h) Non-destructive testing (except dye penetrant inspection).

4.5 An AME type rated in Category "A" (Airframes may issue a certificate of compliance in respect of-the privileges of an AME Category "E" (Electrical), "I" (Instruments) or "R" (Radio) for unpressurized aeroplanes below 2730 Kg, for removal, replacement and installation of:

(a) Components of electrical systems provided they are not associated with engines, auxiliary power units or other propulsive devices, and the functional check to verify serviceability do not require the use of any test apparatus.

(b) Components of instrument systems provided they are not associated with engines, auxiliary power units or other propulsive devices, and the functional check to verify serviceability do not require the use of any test apparatus.

(c) Direct reading magnetic compasses provided the License has been endorsed for this purpose, however no work may be performed, and no certificate of compliance may be issued in respect of remote reading compasses and automatic pilots.

(d) Components of radio systems provided the functional check to verify serviceability do not require the use of any test apparatus.

5. ISSUE OF CERTIFICATE OF COMPLIANCE - CATEGORY "B" (AIRFRAMES)

5.1 An AME licensed in Category "B" (Airframes) may issue a certificate of compliance relating to all aspects of overhaul, maintenance, inspection, modification, repair and replacement of components and parts for which he is shown to be responsible in Section 4 of this Order as a holder of a type rated License in Category "A" (Airframes), provided that the work does not involve the making of components or parts.

5.2 Except those parts which form part of, or are attached to an engine, a holder of a type rated License in Category "B" (Airframes) is also responsible for and may issue a certificate of compliance relating to all aspects of overhaul, maintenance, inspection, modification, repair and replacement to those items listed below, provided the work does not involve the making of components or parts:

(a) Engine mounting structure and cowlings

(b) Engine controls

(c) Engine fuel, oil and coolant systems

(d) Engine fire extinguishing system

(e) Engine fluid de-icing systems.

6. ISSUE OF CERTIFICATE OF COMPLIANCE - CATEGORY "C" (ENGINES)

6.1 In respect of maintenance, inspection, modification, repair and replacement, a holder of a type rated License in category "C" (Engines) is responsible for the condition, assembly and functioning of all parts of the engine installation (s), auxiliary power unit(s) or other propulsive devices, and all associated systems and devices which are concerned with their operation, other than those shown in this Order to be the responsibility of holders of type rated licenses in other categories.

6.2 A holder of a type rated License in Category "C" (Engines) is also responsible, in conjunction with holders of other type rated licenses, for devices related to, but not concerned with, the operation of the engine(s), the auxiliary power units(s) or other propulsive devices.

6.3 Except as provided in paragraph 6.4 of this Order, a holder of a type rated License in Category "C" (Engine) may issue a certificate of compliance relating to repair, maintenance, inspection, modification or replacement of:

(a) Engines and propellers

(b) Engine mounting structures and firewalls

(c) Engine exhaust system, including thrust reversers, tail pipe assemblies and exhaust type cabin heating units.

(d) Components and items of equipment attached to or driven by the engine but excluding rotorcraft transmissions and drive systems.

(e) Engine controls including propeller, fuel, oil, anti-icing, de-icing and other controls associated with engine operation.

(f) Fuel, oil, fire extinguisher, anti-icing and de-icing systems and other systems associated with engine operation but excluding fuel tanks and associated plumbing not forming a part of the engine installation.

(g) Compressor bleed air systems contained within the engine installation section

(h) Engine cowlings

(i) Auxiliary power units.

6.4 In respect of paragraph 6.3 of this Order, an AME licensed in Category "C" (Engines) shall not issue a Certificate of Compliance for any work which involved any of the following:

(a) Dismantling of piston engines other than to obtain access to piston.

(b) Dismantling of main casings and related assemblies of turbine engine, except that dismantling of main casings only is permitted in respect of Pratt and Whitney PT6A turbine engines.

(c) The removal or dismantling of reduction gears of piston and turbine engines, except that reduction gears for engines listed in Group 1 of Chapter D. 2 of these Orders may be removed for the purpose of inspection following suspected shock loading.

(d) Propeller balancing, except where the procedure for check balancing is mentioned in the Aircraft. Maintenance Manual and suitable training on the balancing equipment has been received.

(e) Welded or brazed joints

(f) The disturbance of individual parts or units which are supplied as bench tested units, except for the replacement or adjustment of items normally replaceable or adjustable in service, and where subsequent functional checks to verify serviceability of the system do not require use of "special" test apparatus other than "field" test apparatus used for functional check as per the applicable Maintenance Manual.

(g) Non-destructive testing (except dye penetrant inspection)

6.5 For unpressurised aircraft under 2730 Kg, a holder of a type rated License in Category "C" (Engines) may issue a certificate of compliance in respect of the privileges of an AME Category "E" (Electrical) or Category "I" (Instruments) for removal, replacement and installation of:

(a) Components of electrical systems associated with the engine, including ignition systems, provided the functional check to verify serviceability do not require the use of any test apparatus.

(b) Components of instrument systems associated with the engine, provided the functional check to verify serviceability do not require the use of any test apparatus, except that no work may be performed, or a certificate of compliance issued in respect of compasses and automatic pilots.

7. ISSUE OF CERTIFICATE OF COMPLIANCE - CATEGORY "D" (ENGINES)

7.1 In respect of overhaul, maintenance, inspection, modification, repair and replacement, a holder of License type rated Category "D" is responsible for the condition and assembly of engines, and in so far as test bed performance is concerned, the functioning of engines.

7.2 Except for the overhaul, maintenance, inspection, modification and repair of ignition apparatus, components of electrical systems and components of instrument systems, a holder of a type rated License in Category "D" (Engines) may issue a certificate of compliance relating to all aspects of overhaul, maintenance, inspection, modification, repair and replacement of components and parts of the engines only, provided that the work does not involve the making of components and parts.

8. ISSUE OF CERTIFICATE OF COMPLIANCE - CATEGORY "E" (ELECTRICAL)

8.1 In respect of maintenance, inspection, modification, repair and replacement, a holder of a type rated License in category "E" (Electrical) is responsible for the condition, assembly and functioning of all parts and components of the electrical or electrically operated systems, other than those shown in this Order to be the responsibility of AMEs type rated in other categories.

8.2 A holder of a type rated License in Category "E" (Electrical) is also responsible, in conjunction with other licensed AMEs, where stated in this Order.

8.3 Except as provided in paragraph 8.4 of this Order, a holder of a type rated License in Category "E" (Electrical) may issue a certificate of compliance relating to maintenance, inspection, modification, repair and replacement of :-

(a) all electrical systems including electrical components, items of equipment, electrical wiring, bonding and multiplex systems associated with electrical installations but excluding instrument systems and radio systems.

(b) all electrical power supply and wiring, except that in respect of the radio systems, the power supply and wiring for the purpose of Category "E" (Electrical) terminates at the radio power distribution bus, circuit breaker or fuse to which the wiring of components and items of equipment of the radio systems are connected.

8.4 In respect of paragraph 8.3 of this Order, a holder of a type rated License in category "E" (Electrical) shall not issue a certificate of compliance for any work that has involved the disturbance of individual parts or units which are supplied as bench tested units, except for replacement or adjustment of items normally adjustable in service, and where subsequent functional checks to verify serviceability of the system do not require use of "Special" test apparatus other than "Field" test apparatus used for functional check as per the applicable Maintenance Manual.

9. ISSUE OF CERTIFICATE OF COMPLIANCE -CATEGORY "I" (INSTRUMENT)

9.1 In respect of maintenance, inspection, modification, repair and replacement, a holder of a type rated License in category "I" (Instruments) is responsible for the condition, assembly and functioning of all parts and components of compass systems, instrument systems and automatic flight control systems, other than those shown in this Order to be the responsibility of AMEs type rated in other categories.

9.2 A holder of a License type rated in Category "I" (Instruments) is also responsible in conjunction with AMEs type rated in other categories where stated in this Order.

9.3 Except as provided in paragraph 9.4 of this Order, a holder of a License type rated in Category "I" (Instruments) may issue a certificate of compliance relating to maintenance, inspection, modification, repair and replacement of:

(a) Any instrument system including instruments, instrument system components, items of equipment and plumbing but excluding radio system instruments.

(b) Instrument wiring, which, or the purpose of this Category, includes that instrument system wiring,

(i) Jo the electrical power supply, and which terminates at the distribution bus, circuit breaker or fuse, (ii) Which supplies data signals to the radio system, and which terminates at the connection to the radio system equipment or junction box.

(c) Automatic Pilot system

(d) Integrated flight systems

(e) Pitot static systems and Air Data Systems

(f) Oxygen systems

(g) Inertial Navigation Systems

(h) Multiplexing systems associated with instrument systems

(I) Flight Data Recorder systems

(j) Pressurisation control systems comprising altitude selector and their associated controls, wiring and plumbing.

(k) Electronically display

9.4 In respect of paragraph 9.3 of this Order, a holder of a type rated License in Category "I" (instruments)shall not issue a certificate of compliance if the work has involved the disturbance of individual parts or units which are supplied as bench tested units, except for the replacement or adjustment of items normally replaceable or adjustable in service, and where subsequent functional checks to verify serviceability of the system do not require use of "special" test apparatus other than "field" test apparatus used for functional check as per the applicable Maintenance Manual.

10. ISSUE OF CERTIFICATE OF COMPLIANCE - CATEGORY "R" (RADIO)

10.1 In respect of maintenance, inspection, modification, repair and replacement, a holder of a type rated License in Category "R" (Radio) is responsible for the condition, assembly and functioning of all parts and components of the radio installation including associated cables and accessories other than those shown in this Order to be the responsibility of holders of type rated licenses in other categories.

10.2 An AME licensed in Category "R" (Radio) is also responsible in conjunction with AMEs type rated in other categories where stated in this Order.

10.3 Except as provided in paragraph 10.4 of this Order, a holder of a type rated License in Category "R" (Radio) may issue a certificate of compliance relating to maintenance, inspection, modification, repair and replacement of :-

(a) VHF, HF, CVR, Audio/Video Equipment and Multiplex system

(b) ADF, VOR, ILS VLF/OMEGA, CW Hyperbolic equipment GPS (Global Positioning System).

(c) Weather Radar, DME, ATC Transponder, Radio Altimeter, GPWS, TCAS.

(d) Emergency Radio Equipment

(e) Attachment and bonding of all components and items of equipment of radio systems to the aircraft structure.

(0) Inter wiring of components and items of equipment, which for the purpose of this category including:

(i) Radio wiring to the power supply of the electrical installation terminates at the radio distribution bus, circuit breaker, or fuse.

(ii) Radio systems wiring supplying data signals to the instrument installation, automatic pilot and similar flight control or computer systems terminates at the connection of such wiring to the instrument installation equipment or equipment junction box.

10.4 In respect of the paragraph 10.3 of these Orders, the holder of a type rated License in Category "R" (Radio) shall not issue a certificate of compliance if the work has involved the disturbance of individual parts or units which are supplied as bench tested units, except for the replacement or adjustment of items normally replaceable or adjustable in service, and where subsequent functional checks to verify serviceability of the system do not require use of "special" test apparatus other than "field" test apparatus used for functional check as per the applicable Maintenance Manual.

11. ISSUE OF OTHER CERTIFICATES - ALL CATEGORIES

11.1 A Maintenance Release and a Certificate of Fitness for flight may be issued by:

(a) an individual AME who, by virtue of licenses held, is type rated on the entire aircraft including its engine (s), electric's instruments and radios.

OR

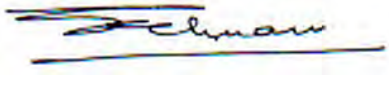
(b) Two or more AMEs who, collectively are type rated on the entire aircraft including its engines (s), electrical, instruments and radio systems.

11.2 In respect of the sub-paragraph 11.1 (b) of this Order, the AME licensed in Category "A" (Airframes) shall be responsible for ensuring that the certification requirements are complied with.

11.3 Except as provided in the paragraph 11.4 of this Order, where an AME signs a Maintenance Release or a Certificate of Fitness for Flight, he shall be responsible only for those system(s) of the aircraft for which he is authorised by this Order to issue a Certificate of Compliance.

11.4 The provisions of paragraphs 4.5 and 6.5 of this Order shall not apply for the purpose of issuing either a Maintenance Release or a Certificate of Fitness for Flight.

Issued in pursuance of the Rules 4 and 39 of the Civil Aviation Rules, 1984. This issue of the ANO is a partial revision (issue 4) affecting the pages land 9. The remaining pages 2, 3, 4, 5, 6, 7 and 8 remains unchanged at issue 3.



Air Cdre Lutfur Rahman ndu, psc
Chairman
Civil Aviation Authority of Bangladesh

CIVIL AVIATION AUTHORITY, BANGLADESH

AIR NAVIGATION ORDERS AIRWORTHINESS REQUIREMENTS

PART D – LICENSING - AIRCRAFT MAINTENANCE ENGINEERS

CHAPTER D.4	RENEWAL OF AIRCRAFT MAINTENANCE ENGINEERS' LICENSES

SECTIONS

1. GENERAL

1.1 The Civil Aviation Rules 1984, sub-rules 39(5) respectively state in part that the Chairman may:

(a) Specify in an Aircraft Maintenance Engineer License the period during which the license shall remain in force.

(b) At any time, require the holder of an Aircraft Maintenance Engineer license to undergo an examination in respect of the license or a rating endorsed on the license.

2. RENEWAL REQUIREMENTS

2.1 An Aircraft Maintenance Engineer shall not exercise the privileges of his license if the validity period of the license has expired.

2.2 An Aircraft Maintenance Engineer license is valid (or one year from the date of issue or renewal and will normally be renewed upon application, provided that:

(a) During the 24 months preceding the date of expiry of the license , the holder has been engaged for periods totaling at least six months on work affording experience directly comparable with that required for the grant of the license .

(b) During the 36 months preceding the date of expiry of the license , the holder has successfully completed approved refresher training courses in respect of all type ratings entered on the license , Airworthiness Legislation and Human Performance & Limitations.

2.3 Where the condition of paragraph 2.2 (a) has not been fulfilled, or where a license has lapsed for 24 months or more, the applicant shall substantiate by examination his ability to meet the requirements for renewal of the license . The type and extent of the examination will be determined by the Chairman, and will depend on the nature and period of employment of the holder since the license expired.

2.4 A license which has lapsed for less than 24 months will be considered for renewal without examination provided the requirements of paragraph 2.2 of this Order are met, except that in respect of sub-paragraph 2.2 (a) of this Order, the qualifying period will be the 24 months immediately preceding the date of receipt of the renewal application.

2.5 An applicant for renewal of an Aircraft (Maintenance Engineer License must possess and be familiar with all current Airworthiness Notices and Air Navigation Orders.

3. RENEWAL PROCEDURE

3.1 An application for renewal shall be made by submitting completed Form CA-68, Application for Extension or Renewal of Aircraft Maintenance Engineers License , together with a treasury receipt for the required fee, to the CAAB.

3.2 Where an applicant for renewal resides in Bangladesh or is employed by an operator of Bangladesh aircraft or by a Bangladesh approved organisation, whether employed within Bangladesh or elsewhere, the application for renewal and the receipt for the required fee shall be received by the CAAB at least two weeks prior to expiry of the license .

3.3 For applicants residing outside Bangladesh not included under paragraph 3.2 of this Order, the application for renewal and the receipt for the required fee shall be received by the CAAB at least 6 weeks prior to expiry of the license .

3.4 An Aircraft Maintenance Engineer License shall not be back- dated upon renewal, and the renewal will be affected only from the date of receipt by the CAAB of an acceptable application and renewal fee receipt.

Issued in pursuance of the Rules 4 and 39 of the Civil Aviation Rules 1984.

Air Cdre Sakeb Iqbal Khan Majlis, ndu, psc
Chairman
Civil Aviation Authority, Bangladesh

CIVIL AVIATION AUTHORITY OF BANGLADESH
AIR NAVIGATION ORDERS

AIRWORTHINESS REQUIREMENTS

PART D - LICENSING - AIRCRAFT MAINTENANCE ENGINEERS

CHAPTER D.5 AME EXAMINATION SYLLABUS SECTIONS

1. GENERAL

1.1 This order prescribes the written examination syllabus for all Aircraft Maintenance Engineer (AME) License categories, sub-categories and type ratings.

1.2 Certain subjects contained in the syllabus are common to more than one License, therefore, where an existing License is to be extended to include another category or sub-category, any subject which has been satisfied by a previous examination need not be repeated.

1.3 The combination of subjects required for a particular License is prescribed in Table B, Chapter D.1 of these Orders.

2. LEVEL NUMBERS

2.1 The level numbers shown against each syllabus subject indicates the level of knowledge required for that subject.

2.2 Level numbers are normally specified for both LWTR and type ratings; for example, L2/R1 means that level 2 knowledge is required for the License and level 1 for the type rating, or, if a level number appears as L2/-, no additional knowledge is required for the type rating.

2.3.1 There are three knowledge levels, defined as follows:

Level 1: general knowledge of the subject.

Level 2: Comprehension of principles with a practical ability to assess operational condition.

Level 3: detailed knowledge of all aspects of the subject.

3. EXEMINATION SUBJECTS

3.1 Examination subject content is arranged in this syllabus by topic, with each topic detailing a list of items.

3.2 Topic headings appear on the left hand side of each page; level numbers appear between topic headings and the specific syllabus items, and apply to all items in the topic unless otherwise stated.

3.3 Each new item which may be added from time to time will be identified by a vertical bar immediately to the left applicable item

3.4 The examination subjects included in the following syllabus are:

SUBJECT 1 - AIRWORTHINESS LEGISLATION

TOPIC	LEVEL	ITEM
Aircraft Maintenance Engineers License	L2/-	* Civil Aviation Rules 1984, PART I * Air Navigation Orders, Sections * Responsibilities: by the need to fly aircraft in a satisfactory condition; i. e., common, civil, constitutional law. Penalties under statutory law and resulting from civil law suits * Categories - which parts of the aircraft * Area and extent of limitations and privileges within Categories * Overlap of Category applicability * Relevant Airworthiness Notices (e.g. 5,11 and 36)
Certifications	L1/R2	Civil Aviation Rules 1984, PART VIM Certificate of Compliance: Maintenance Release; Fitness for Flight; Duplicate inspections Contributory certifications and reliance on
Aircraft Log Books	L1/R2	* Civil Aviation Rules 1984, PART VIII * CAAB approval: Light aircraft, large aircraft * Worksheets: Aircraft Maintenance Log * Data to be entered in log books * Condition reports; e.g., investigations, NOT and other inspections * Maintenance checks and inspections * Cross-reference to other files, records other documentation and persons.
Aircraft Maintenance Log	L1/R2	Aircraft Maintenance Log - Air Operator's Certificate requirements

TOPIC	LEVEL	ITEM
Aircraft Maintenance	L1/R2	* Type Certification * Weight Schedule * External and internal markings and signs; e.g., nationality and registration, cabin warning, placards, doers and exits. * Certificate of Airworthiness Categories, purposes of flight * Flight Manual * Certificate of Registration * Air Operator's Certificate * Radio Station License and Approval
Approvals	L1/R2	* Change of ownership * Maintenance Organisations * Maintenance Schedules * General Engineering Manual
Defect Reporting	L1/R2	* Stores: systems; release or parts * Civil Aviation Rules, 1984 PART VIII * Reportable defects * Reportable accidents
CAAB Requirements L1/R2		* Air Navigation Orders – Maintenance Requirements * Airworthiness Notices * Airworthiness Directives: - Bangladesh - Foreign

SUBJECT 2 - BASIC MECHANICAL ENGINEERING

TOPIC	LEVEL	ITEM
Aircraft Engineering Drawings and Manual	L1/- L2/-	Drawing details-common practices: plan, elevations, isometric, sections, scale, dimensional and indicating presentation Use, validity, control, interpretation

TOPIC	LEVEL	ITEM
Drawings and Manuals (cont.)	L1/R2	* Maintenance Manuals, Parts Catalogues, Overhaul Manuals * Service Bulletin and Modification Data * Maintenance Schedules: approved and otherwise
Mathematics/Science	1/R2	* Simple calculations: measurements, angles, graphs, metric & imperial, volume, density, specific gravity, pressure, forces, moments, centre of gravity. * Resolution of forces * Pressure, volume, temperature of gases * Hydraulics: basic principles, liquids in flow and static conditions * The atmosphere - density, pressure, temperature, altitude, humid. * Basic principles of motion acceleration, centrifugal, centripetal forces, friction.
Hangar/ Workshop Common Practices	L1/-	* Lifting and jacking * Lubrication methods and application * Hand tools, simple machine tools
	L2/-	* Precision measuring instruments, GO/NOGO gauges, fits and clearances, torque loading
	L1/-	* Hard and soft soldering, welding and brazing. * Inhibiting and corrosion protection * Painting and paint stripping * Fire protection and safety in and around the workshop, hangar and aircraft.
Common Parts	L1/R2	* Control cable fittings * Fastening devices - threaded, riveted and swaged * V-band clamps and couplings * Locking: parts and methods * Bearings

TOPIC	LEVEL	ITEM
Common Parts (cont.)		
	L1/R2	* Pipes: rigid and flexible
		* Keys and key ways
		* Worm drive and other types of band clips
Gases and Compounds	L1/R2	* Air, nitrogen, carbon dioxide, oxygen, helium
		* Acetylene
		* Safety aspects
		* Adhesives, oils, greases, sealing compounds
Metals	*121*-	* Light alloys, iron and steel
	L1/R2	* Titanium
	L1/-	* Brass, bronze, copper, lead
	L1/R2	* Recognition and general characteristics of metals used.
		* Application and use of metals
		* Heat treatments
		* Anodic treatments
		* Corrosion treatments during manufacture.
		* Corrosion treatments during repair
		* Fatigue
		* Other protective treatments and finishes
Non-destructive Testing	L1/-	* Technique - dependent methods: X-Ray/ gamma ray, ultrasonic, eddy current, magnetic particle.
	L2/-	* Penetrant leaching
	L1/R2	* Visual probes
		* Eyeglass equipment: Usefulness, effectiveness of various magnifications
Basic Electrics	L2/-	* General principles and practices
		* Simple circuits - a.c. to d.c. & d.c. to a.c. conversion
		* Insulation and conductivity
		* Common items used in aircraft applications; e.g., resistors, potentiometers, solenoids, transformers, semi-conductors, capacitors, relays

TOPIC	LEVEL	ITEM
Basic Electrics (cont.)	L2/-	* Micro Switches * Proximity detectors * Fuses, circuit breakers * Motors/actuators * Principles of frequency wild, constant frequency a.c. power * Circuit wiring, connectors crimping, clipping, cable sizes and types * Bonding * Static electricity; lightning, static charges, interference effects on radio equipment

SUBJECT 3 - BASIC ELECTRICAL/ INSTRUMENT ENGINEERING

TOPIC	LEVEL	ITEM
Engineering Drawings	L2/-	* Use, validity control
	L3/R3	* Wiring diagram manuals, interconnection charts, schematic diagrams
Mathematics	L1/-	* Simple calculations, measurement, angles, graphs, transposition of formula, volume, pressure, density * Powers of numbers, binary notation simple equations, conversion of units, SI/Imperial.
Tools	L1/R1	* Hand tools, simple machine tools, precision mechanical instruments
	L2/R3	* Crimping tools, hand and hydraulic
Common Parts	L1/R1	* Fasteners, locking devices, washers, pipes - rigid and flexible, bearings, adhesives, solvents oils, greases * Safety precautions

TOPIC	LEVEL	
Common Practices	L1/R2 L1/-	* Storage and handling, fire protection, * Earthing of aircraft and bonding * Aircraft handling, towing and mooring * Ground services, a.c. and d.c. * Soldering * Crimping * Electrostatic damage protection * Cable looms, harnesses, terminations and disconnects
Electrical Theory	L1/R2 L1/- L2/R3 L2/- L2/R 2 L1/- L2/-	* General principles, basic laws, units, power in circuits, magnetism, simple d.c. and a.c. circuit calculations, insulators, conductors, semi-conductors, circuit elements and symbols * Transformers-single phase, three phase and auto transformers * Transistors - biasing, simple circuit arrangements * Amplifiers - signal amplifiers, feed-back. * Synchros-CTs, differential, torque synchros and resolvers * Switch gear, relays, circuit protection devices, magnetic indicators and annunciators * Batteries-applications and handling * Electrical measuring instruments, circuit testing methods
Digital Techniques	L2/ L1/- L1/R2	* Logic-basic gate functions and truth tables. * Microprocessors - block diagram * Digital Computing Techniques * Parallel and serial operation * Volatile/non-volatile data storage * Multiplex systems

SUBJECT 4 - BASIC RADIO ENGINEERING

TOPIC	LEVEL	ITEM
Engineering Drawings	L2/-L3/-	Use, validity control Wiring diagram manuals inter-connection charts, schematic diagrams
Technical Information	L2/-	Service Bulletins, Modification Data, Manuals, Schedules
Mathematics	L1/-	Simple calculations, measurement, angles, graphs, transposition of formula, volume, pressure, density simple equations, conversion of units, Si/Imperial Powers of numbers, binary notation
Tools	L1/-	Hand tools, simple machine tools, precision mechanica I instruments. Crimping tools, hand
	L3/-	and hydraulic
Common Parts	L1/-	Fasteners, locking devices, washers, pipes rigid and flexible, bearings, adhesives, solvent oils, greases
	L3/-	Safety precautions
Common Practices	L1/-	Torque loading
		Corrosion protection, metal contamination
	L2/-	Storage and handling, fire protection, general safety
		Earthing of aircraft and bonding
	L1/-	Aircraft handling, towing and mooring
	L2/-	Ground services, a.c. and d.c. Soldering Crimping Electrostatic damage protection Cable iooms, harnesses, terminations and disconnects

TOPIC	LEVEL	ITEM
Electrical Theory	L2/-	* General principles, basic laws, units, power in circuits, magnetism, simple d.c. and a.c. circuit calculations, insulators, conductors, semiconductors, circuit elements and symbols * Transiormers-single phase, 3-phase, auto transformers * Transistors-biasing, simple circuit arragnements * Amplifiers-signal amplifiers, feed-back * Synchros-CTs, differential, torque synchros and resolve
	L1/-	* Switch gear, relays, circuit protection devices, magnetic i
	L2/-	* Batteries-applications and handling. * Electrical measuring instruments, circuit testing methods
Radio Theory	L1/-	* Propagation of radio waves * Polarisation * Radiation patterns * Transmitters and receivers * Oscillators, frequency synthesisers * Frequency multipliers * Mixers, detectors, BFO, AGC * Noise limiters.squelch circuits, audio amplifiers * Modulators, RF power amplifiers matching units * Filters and tuned circuits
Digital Techniques	L2/-	* Logic-basic gate functions and truth tables * Microprocessors-block diagram * Digital Computing Techniques * Parallel and serial operation * Volatile/non-volatile data storage * Multiplex systems

SUBJECT 5 - UNPRESSURISED AEROPLANES

TOPIC	LEVEL	ITEM
Basic Aerofoil Theory	L1/R2	Lift/thrust/drag/weight Stalling of an aerofoil Induced and parasitic drag Boundary layer Aerofoil shapes Chord/span/aspect ratio
Theory of Flight	L1/R2	Stability and contorl and Control Equilibrium Stalling of the aircraft Flaps and slats Aerodynamic balance Mass balance Aileron/elevators/rudder control Tabs-servo/anti-servo/balance/anti-balance/trim/spring Canard/foreplanes
Aircraft Structures	L1/R2	Main structures-fuselage/ wing. Stressed skin-diaphragms and longerons Tubular structures Skin, frames and stiffening Wing: spar and rib structures Integral fuel tanks Load paths Empennage Windows, doors and hatches
Sub-Structures	L1/R2	Folded metal, sheet metal, extrusions, tubing Effect of swaging, lightening holes Use of different metals Commonly used fasteners and joint methods Protective treatments and precautions Honeycomb Reinforced plastic/epoxy materials, applications Floors Seats-crew, passenger-crash situation

TOPIC	LEVEL	ITEM
Sub-Structures (cont.)	L1/R2	* Aerials, pilot probes, drainmasts, air intakes and similar structural fitments
		* Instrument panels and consoles
		* Radio and equipment racks and stowages
Wood Structures	L1/R2	* Types, application and uses
		* Diseases-environmental effects
		* Plywoods
		* Glues-past and present
		* Storage and condition control
		* Damage-failure modes
		* Painting/protective finishes
Reinforced Plastics/ Epoxy Composite	L1/R2	* Glass, fibre and filament reinforcement
		* Materials used
		* Cold setting, hot setting systems
		* Construction principles used, aircraft applications
		* Failure characteristics
		* Honeycomb, foam sandwich
Flight Controls	L1/R2	* Aileron, elevator, rudder
		* Operating systems and surfaces-manually operated
		* Trim operating systems and surfaces-manual and electric
		* Flap systems-electrical, hydraulic and manual
	-/R2	* Flap systems-pneumatic
	L1/R2	* Simple asymmetric protection
		* Slat systems-automatic and manual
	-/R2	* Hydraulic
	L1/R2	* Tab systems-trim, balance, servo, anti-servo, anti-balance, spring servo
		* Stall sensing and warning-simple systems; e.g., vane or reed types
		* Basic auto pilot systems
		* Inputs into main controls-function testing-attitude, heading and altitude sensing

TOPIC	LEVEL	ITEM
Hydraulics	L2/-	* Simple systems, i. e. powered pump, reverse selection, pressure relief, pressure regulation LP and HP filters
	L1/R2	* Types of pump * Different fluids - mineral/fire resistant * Control and indication methods
Landing Gear and Brakes	L1/R2	* Wheels, tyres, shock absorbers castring, steering methods
	L2/-	* Simple hydraulic brakes; i. e., master cylinder to wheel-brake unit
	L1/R2	* Brake discs and calipers
	Li/-	* Landing and braking energy conversion
Ice and Rain Protection Aicraft Fuel	L1/R2	* Liquid electric and boot systems * Power source, control and idication * Effects of snow and ice * Windscreen wipers
	-/R2	* Electrically - heated windscreens
	L1/R2	* Tanks, cells and intergral systems * Venting * Fuel pumps * Fuel grades and quality * Water contamination - drains * Filtering * Controls and quantity indicators
Heating and Cooling	L1/R2	* Combustion heaters exhaust heat Ventilation exchangers * Ram air * Ventilation fans
Oxygen	L1/R1	* Bottle storage, distribution, regulation * Masks? * Safety features and requirements
Vacuum/Pressure	L1/R2	* Dry and wet pump systems * Oil separation * Gyro supply

TOPIC	LEVEL	ITEM
Vacuum/Pressure (cont.)	L1/R2	* Relief valve * Filtering * Aerofoil anti-icing
Pneumatics	-/R2	* Landing gear/flaps/brakes * Operating systems * Basic theory and common practices
Fabrics	L1/R2 -/R1	* Natural and man-made materials-types, applications and uses * Techniques used during complete covering * Repairs * Paint finishes and protective treatments * Butyrate and nitrate paints * Ageing * Tightening, heat shrinking * Strength considerations * Drainagr and apertures * Stitching, stringing, adhesives * Testing
Electrical	L1/R2	* Simpler type systems * Batteries, generators, relays, wiring * Voltage control * Current limiting * Paralleling * a. c. from inverters * Crimping * Soldered joints * Control and indications
Instruments	L1/R2	* pitot static system and associated instruments * Gyro instruments-vacuum/pressure/electrical * Pressure and temperature indication * Position indication * Compasses
Radio	LI/-	* VHF communication systems

TOPIC	LEVEL	ITEM
Safety Equipment	L1/R2	* Fire Extinguishers - hand * Life jackets * Life rafts * Seat belts/harness - passenger/crew 3-point, 4-point, inertial, lapstraps
Ground Handling	L1/R1	* Jacking, trestling, slinging, towing, tie down * Servicing activities * Storage * Painting - protective finish/external markings
	L1/R2	* Weighing and centre of gravity determination -weighing report * Scale positions * Basic weight * Unusable fuel * Oil and other consumable liquids-quantities * Role variations * Hold/seat row/removable equipment * Station identification * C of G datum

SUBJECT 6 - PRESSURISED AEROPLANES

TOPIC	LEVEL	ITEM
Theory of Flight	L1/R2	* Transonic effects, swept wings, and Control wing fences, spoilers, high lift devices, vortex generators * High Speed Stall * Shock wave * Speed of sound - mach numbers * Wake turbulence * Active controls - computerised flight management systems - general principles

TOPIC	LEVEL	ITEM
Aircraft Structures	L1/R2	* Fail-safe application
		* Fatigue effects and control
		* Wing: box/integral tank construction
		* Pressure - loaded skin, bulkheads windows, windscreens, doors
		* Milling/chemical etch constructed structures
		* Bonded type construction
		* Fasteners-close tolerance
		* Sealing compounds
		* Maintenance programmes - structural surveys
		* NOT programmes
		* Large aircraft paint and protective finishing processes
		* Cargo holds
		* Venting and draining
		* Sound proofin
Furnishing	L1/R1	* Upholstery
		* Toilet and galley partitioning
		* Carpets and curtains
		* Particle boards and plastic laminates
		* Fire resistance requirement
		* Escape requirements
		* Passenger seats
		* Crew seats - cabin and flight crew
Flight Control	L1/R2	* Powered controls
		* Spoilers, air and speed brakes, lift dumpers
		* Lift augmentation - LE droop, slats/flaps
		* Flap operating systems - large transport aircraft
		* Flap asymmetric and alternate operation
		* Stall sensing - stick shaker
	-/R2	* Stick push/nudge
	-/R1	* Electronic control system

TOPIC	LEVEL	ITEM
Hydraulics	L1/R2	* Variable delivery systems * Accumulator/cut-out dependent systems * Pressure/volume control * Pressure reducing valves * Fire-resistant fluids - temperature, contamination, compatibilit * Pressurised reservoirs * Multiple system provision * Alternate systems - HYRAT/hydraulic motors * Electrically-powered and air-driven systems * Leak protection systems -system isolation, fused systems, priority control * Internal leakage - cause and effects - acceptability
Landing Gear	L1/R2	* Multiple axles and wheels * Bogey beams * Door sequencing * Main and alternate brake provision * Anti-skid system - electronic and mechanical -aquaplaning * Landing gear unsafe protection * Alternate lowering * Weight on/weight off sensing * Fire protection * Powered steering - retraction -self centering
	-/R2	* Auto braking
Fire Protection	L1/R2	* Fire detection * Overheat warning * Fire extinguishing * Bay and zone isolation * Fire walls, bulkheads, cladding * Fire wires, detector units * Single/dual detection * Extinguishants * First and second shot capability

TOPIC	LEVEL	ITEM
Fire Protection (cont.)	L1/R2	* Warnings and indications - lights aural warnings, fuse types, squib test * 'Bottle gone[1] indicators * Operating systems * Over pressure * Cartridges - life control * Electric and Electronic systems
Pneumatics	L1/R2	* Bleed air pneumatic systems * Systems supplied * Bleed air valves * Mass, flow, pressure and temperature control and indication * Ducting * Leak detection * Alternate supply - APU and ground cart
Ice and Rain Protection	L1/R2	* Main plane & tail plane - hot air anti-ice system * Control and indication * Leak/overheat-detection/protection * Ice detection * Rain repellant * Windscreen wipen * Laminated windscreen heating * Waste water discharge * Pitot/static sensor
Aircraft Fuel systems	L1/R2	* Tanks - cells and integral Systems * Refuelling/defuelling, crossfeed, jettison, venting, transfer * Scavenging - jet pumps * Boost pumps - backing pumps * LP/HP valves and control * Tank selection * Internal/external pipes, hoses, connectors * Fuel types * Static electricity - effects and control * Leak assessment and control

TOPIC	LEVEL	ITEM
Aircraft Fuel Systems (cont.)	L1/R2	* Fuel quantity indication - level sticks * Water contamination - effects and control * SG/Density/Volume/Weight * Filtering and heating * Fuel systems in pressurised cabin areas
Air Conditioning	L1/R2	* Cabin blower/bleed air supply * Heat exchanger's * Cold air units/air cycle machines * Vapour cycle systems * Humidity control systems * Mass, flow, pressure and temperature control and indication * Leakage detection and protection * Ventilation requirements/ * Passenger service unit air supply * Water extraction * Recirculation
Pressurisation	L1/R2	* Outflow control - electric, electronic and pneumatic * Maximum differential and negative pressure control * Cabin altitude and rate of change * Emergency dump and manual control * Ditching * Cabin altitude warning * Entrance/access/baggage door sealing and locking, indications and warnings
Toilets, Waste and Water, Galley Services	L1/R1 L1/R2 L1/R2	* Toilets: servicing position * Toilet flushing systems - Pump overheat protection * Water- washing, hot/cold * Potable water - health protection * Pressure control * Water heating systems - safety provisions * Waste collection and drainage

TOPIC	LEVEL	ITEM
Toilets, Waste and Water, Galley Services (cont.)		Galleys - refrigerators, food and drink, ice -health protection Lifts, safety factors Clearing trolleys
Baggage	L1/R2	Automatic systems - pallets and containers Restraint and securing Dangerous goods
	L1/R1	Films, video, television and audio
Entertainment	L1/R1	Public address
Electrical	L1/R1	Three phase a.c. power generation systems :- - Control and protection, - Transformer rectifier units, - Cables and terminations Basic electronics - hardware - printed circuit boards Built in test equipment (BITE) Static inverters Multiplex - basic principles
	-/R1	Logic - basic principles
	L1/R1	ADI, HSI presentation and ground functioning
Instruments	L1/R1	Altitude encoriding and transponder systems -general Computer inputs Centralised air data units CRT displays Flight recorders and voice recorders INS
Safety Equipment	L1/R2	Slides, rafts, dinghies Portable oxygen Loud nailers Smoke masks/hoods Survival equipment Notices/placards

SUBJECT 7 - ROTORCRAFT

TOPIC	LEVEL	ITEM
Theory of Flight and Control	L1 /R2	* Rotor disc: force acting, lift, drag, centrifugal force, weight, rotor useful force, phase lag; advance angle non-constant speed drive (Hookes Joint) effect * Articulated/semi-rigid/rigid rotors * Flapping, dragging, feathering * Climbing, loosing height, horizontal flight
Constructional Arrangements	L1/R2	* Main and anti-torque rotors - control inputs - cyclic and collective
Flying Controls	L1/R2	* Effects of aircraft speed on rotors having cyclic control and on those not having cyclic control * Directional control * Translational lift, inflow, ground effect * Vortex ring effect * Retreating blade stall * Reverse flow * Auto-rotation; auto-rotative force/blade section * Auto-rotation rev/min
		* Rotorcraft structures, load paths, vibration effects * Landing gear configurations; skind, wheels floats * Fuselages, tail cones, pylons, engine mounts * Gearbox and transmission mountings * Doors and windows
		* Collective, cyclic, directional * Rotor heads-main and tail rotor * Articulated, rigid, semi-rigid, teetering * Swash plate and spider control input methods

TOPIC	LEVEL	ITEM
Flying Controls (cont.)		* Blades: construction and materials; balancing; static, dynamic, span wise, chord wise * Tracking: flag and in-flight methods * Tabs and trailing edge bending * Vibration - effects and analysis * BIM indicators * Auto stabilisation and control interfacing
Transmission System	L1/R2	* Engines to rotors: shafts, clutches, free wheel units; reduction gearboxes; main transmission, gearboxes, combining gearboxes * Tail rotor drive : drive shafts, intermadiate geaitoxes, tail rotor gearboxes * Lubrication systems : oils, coolers, cooling fans, filters, magnetic plugs, chip detectors, pumps pressure control * Universal drive provision * Splined shafts, type of gears-tooth pattern * Instrumentation * Rotor brake systems
Equipment	L1/R2	* Hoists and winches * Extermal load carrying * Flotation * Survival systems * Specialised role equipment - aerial spraying cameras, po * Windscreen wipers
Flight Data Recording	-/R1	* Requirements and basic principle

SUBJECT 8 - AIRFRAME OVERHAUL

TOPIC	LEVEL	ITEM
Refurbish/Overhaul of Aircraft	L2/-	* Preparation of the aircraft - cleaning, access, dismantling, jackng and trestling, furnishing removal * Preparation of inspection reports and establishment of work required * Final inspection - preparationof final reports and records/log book entries * Applicable Mandatory Modifications, Inspections, Service Bulletins, Airworthiness Directives
Overhaul/Repair of Parts/Components	*121-*	* Overhaul data - requirements, of documentation, work sheets, inspection stages, testing * Use and control of workshop inspection aids including non-destructive test equipment * Factors and limitations affecting choice of equipment and methods used * Overhaul and testing procedures for component parts of pneumatic, hydraulic, anti-icing, de-icing, and fire extinguishing system * Assembly procedures and approved repair schemes applicable to major components * Engine mou[n]ting structures * Inspections necessary before, during and after repair, including checking of alignment and symmetry * Repair, inspection and testing of tanks, heat exchangers, fuel and oil systems, and all types of control systems relevant to a Category 'B[1] License
Facilities	*121-*	* Preparation and layout of workshop * Care, use and determining accuracy of test equipment

TOPIC	LEVEL	ITEM
Welding	L2/-	* Use and application * Approved welders - limitations-periodic testing * Support - preheating - pressure relief * Cleaning and preparation * Fluxes and filler/welding rods * Gas and specialist welding principles * Materials * Strength of welded joints * Inspection before, during and after welding * Pre-and post-treatments
	L2/-	* Equipment Brazing/Hard Soldering * Use and application Soldering * Support, pre heating, pressure relief * Cleaning and preparation * Fluxes - fillers/spelter * Materials * Equipment

SUBJECT 9 - PISTON ENGINES

TOPIC	LEVEL	ITEM
Principles, Terminologies Definitions and Laws	1/R2	* Normally aspirated and Supercharged operation * Four stroke cycle * Ignition timing, mixture, fuel grade, detonation * Power * Overhaul periods/continuation in service beyond overhaul recommendation * Ground running - principles and problems * Effect of altitude, humidity, temperature and icing * Standard atmosphere, pressure altitude * Fixed and variable pitch propeller effects * Type certification

TOPIC	LEVEL	ITEM
Constructional Arrangements	L1/R1 L1/R2	* General arrangements - internal * General arrangements - external * Crankcase breathing, cooling and cylinders * Propeller shaft sealing * Materials * Fixed pitch propeller provision
Carbu ration and Induction	L1/R2	* Float type and injection systems * Engine driven fuel pumps * Priming systems * Mixture, idle cut-off, throttle control * Air intake, filtering, manifolds * Anti-icing provision
Ignition	L1/R2	* Magnetos * Ignition harness * Spark Plugs - reach variation operating temperatures-long life * Switch control * Timing - internal and external * Advancing and retarding mechanisms * Screening * Starting aids - impulse couplings and ignition boosting
Starting methods	L1/R2	* Starter motors - manual, Bendix, solenoid, pre-engaged * Non-engagement indication and effects * Starter relays * Earth straps * Cooling * Effects on battery
Fire Protection and Indication	L1/R2	* Extinguishant, bottles, indication, cartridges, life control, * Detection systems and warnings * Two shot provision

TOPIC	LEVEL	ITEM
Lubrication	L1/R2	* Wet and dry sump systems * Systems arrangement * Pressure control * Effects of hot and cold weather * Filtering * Straight, detergent, ash dispersant oils * Engine condition assessment using oil system analysis * Propeller feathering systems * Oil coolers and temperature control valves * Hoses, rigid pipes, internal passages, splash - oil jet * Cooling functions of the oil systems
Supercharging Turbocharging	L1/R2	* Directly driven and exhaust driven supercnargers * Manual and automatic control * Lubrication and hydraulic power * controls and indication * Automatic control system
Engine Fuel	L1/R2	* Fuel pumps - electrical * Fuel grades and quality
Engine Controls	L1/R2	* Filtering * Water contamination, Filtering * Controls and indications * Throttle * Mixture * Propeller * Alternate air * Manual controls for turbocharger
Engine Instruments	L1/R2	* Manifold pressure * Rotational speed * Pressure and temperature * Cylinder head temperature * Exhaust gas temperature
Fixed Pitch Propellers	L1/R2	* Materials * Diameter - minimum/maximum * Protective finishes * Damage areas * Gripping

TOPIC	LEVEL	ITEM
Fixed pitch Propellers (cont.)	L1/R2	* Balance control * Attachment Spinners * Alternative types - different manufacture/pitch
Variable Pitch Propellers	L1/-	* Constant speeding, pitch variations.blade, forces, aerofoil aerodynamics, feathering, vibrations * Power conversion
	L1/R2	* Pitch change mechanisms, CSUs/ governors, balance control, materials, pitch stops, protective finishes * Attachment and assembly methods, oil . transfer, safety visibility * Ice protection * Automatic and manual pitch control systems
	L1/R3	* Damage acceptance areas

SUBJECT 10-TURBINE ENGINES

Principles, Terminology, Definitions and Laws	L1/R2	* Gas flow path - temperature velocity and pressure * Compression * Combustion * Turbine power extraction * Effects of atmospheric variations in temperature, density pressure altitude on engine and on engine/aircraft combination * Single shaft, two and three shaft engines * Centrifugal and axial flow compressors * Fan engines * Bypass engines * Water/Water methanol injection * Power turbines * Surge and compressor stalling * Propeller turbines

TOPIC	LEVEL	ITEM
Principles, Terminology Definitions and Laws (cont.)	L1/R2	* Gas producers * Applications * Thrust reversal * Power assessment
Constructional Arrangements	L1/R2	* Casings, shafts, bearings, accessories drive * Air intakes and compressors * Combustion section * Turbines and exhaust * Materials
	L1/R2	* Modules construction * Engine inspection capability and condition assessment provision * Principles of condition monitored and on condition maintenance programmes * Supersonic flight air intake geometry control system
Propeller and Shaft Power Provisions	L1/R2	* Gas producers * Reduction gearing * Power and auxiliary drive * Rotational speed and power control, safety systems
	L1/R1	* Principles of torque, power, rotational speed in power transmission by rotating shafts
Variable Pitch	L1/R1	* Constant speed, pitch variation, blade forces, aerofoil aerodynamics, feathering, vibration
Propellers	L1/R2	* Pitch change mechanisms, CSUs & governors balance control, materials, pitch stops protective finishes * Attachment and assembly methods, oil transfer, safety visibility * Ice protection * Automatic and manual pitch systems * Auto - feathering * Synchronising and synchrophasing * Braking * Beta control * Permitted balancing
	L1/R3	* Damage acceptance areas

TOPIC	LEVEL	ITEM
Thrust Reversing	L1/R2	* General arrangements * Control and interlocks * Safety features * Operating systems - hydraulic, pneumatic &mechanical * Turbine and fan applications
APUS	L1/R2	* General arrangements * Intake and exhaust systems and. door operation * Load control * Electrical output control and management * Speed control * Fuel control * Safety features * Ground, flight, & altitude -limiting factors * Mounting * Fire protection and indication * Bay cooling * Ground running
Fuel Control	L1/R2	* Principles and parameters * Mechanical &electronic control * Power speed control and limiting * Temperature and power factors * Burners - primary and secondary provision
	-/R2	* Burners - shaft injection and torch ignition
	L1/R2	* Governor speed sensing
Fuel Systems	L1/R2	* Fuel types * Leak assessment and control * Water contamination - effects and control * Crossfeed, Transfer * Booster pumps, backing pumps
Water Injection	L1/R2	* Water/Water methanol applications * Sensing, control and safety provision * Power effects * Tankage * Replenishing and dumping * Pumps

TOPIC	LEVEL	ITEM
Water Injection (cont.)		* Effects on fuel control * Pipes and pipe lines
Lubrication	L1/R2	* Tanks, storage, venting, contents indication * Pressure and scavenge pumps * Filters, screens and magnetic plugs and chip detectors * Pressure and flow control * Heat exchangers oil/fuel, oil/air * Sealing - labyrinth seals, carbon seals, etc. * Overboard drains-drains systems * Lubrication of main bearings, accessories and gear trains * Supply to propeller systems * Contamination by hydraulic fluid or fuel * Types of oil and passages - effects of heat * Use of oil for ice protection - intake and fuel control
Cooling, Sealing and Bleed Air-Services	L1/R2	* Internal cooling, external coding, sealing air * Overboard dump - temperature monitoring * Off-takes for other services - air conditioning, anti-icing equipment drive, pressurising of hydraulic reservoirs, water systems, etc, * Surge margins
Ice Protection	L1/R2	* Hot air systems - struts and intakes * Electrical systems - engine and intakes * Use of oil and air bleeds * Pressure sensor heating * Control and indication

TOPIC	LEVEL	ITEM
Fire Protection	L1/R2	Fire detection
		Overheat warning
		Fire extinguishing
		Bay and zone isolation
		Fire walls, bulkheads, cladding
		Fire wires, detector units
		Single/dual detection
		Extinguishants
		First and second shot capability
		Warnings and indications-lights, aural warnings, fuse types, squib test
		'Bottle gone' indicators
		Operating systems
		Over pressure
		Cartridges - life control
		Electric and Electronic systems
Ignition	L1/R2	High energy ignition systems
Starting	-/R2	Torch ignition
		Glow plug systems
	L1/R2	Igniter plugs and leads
		Operation inside and outside the starting cycle
	L1/R2	Starting cycle
		Initiation-HP valves, termination, bleed valves, starter valves, power lever, self sustaining speeds
		Starter motors - electrical and pneumatic, starter generators -HP air, impingement air
		Clutch provision, overspeed sensing
		Manual operation starter cooling, resting
		Ground power electrical and pneumatic provisions
Controls	L1/R2	Power, throttle, thrust reverse
	-/R1	HP/LP valve controls - manual and electric
		Condition control systems
		Propeller control
		Auto control of throttle
		Control runs
		Electronic control systems

TOPIC	LEVEL	ITEM
Pods, Pylons Cowlings and Mountings	L1/R2	* General arrangements * Services and controls-input/exit * Materials * Ventilation * Zone demarcation * Mountings * Pylon and pod structural features * Torque, vibration, expansion provisions * Bay venting * Cooling air intakes
Electrical	L1/R2	* a.c. generators - CSD/IDGS * Starter/generators * Starter motor high current circuits * CSD - principles of operation disconnect/reconnect, lubrication/hydraulic operation, filters, coolers
Instruments	L1/R2	* Rotational speed indication;a.c. generator and pulse probe systems * Temperature and pressure system * Pressure ratio system * Turbine temperature systems * Instrument system amplifiers * Fuel flow indication * Torque indication * Fuel contents and oil contents - electrical and electronic * Vibration indication
Ground Handling	L1/R2	* Storage and inhibiting * Spare engine carriage * Ground running-noise control-power checking * Functional checks of engine associated service

SUBJECT 11. ENGINE OVERHAUL

TOPIC	LEVEL	ITEM
Category 'D[1] License: General	L2/	* Overhaul as a condition control process - its advantages and disadvantages

TOPIC	LEVEL	ITEM
Category 'D' License General (cont.)	L2/-	* Familliarity with the operating environment of piston engines in aircraft * Sudden stoppage - over-reviving, over-boosting over-heating * Bogus parts * Fatigue * Mandatory reporting * Fuels and oils - Mogas
Overhaul Process Control	L2/-	* Facilities; shop layout - stores; work environment; equipment for cleaning, inspection rework and testing * Control of precision measuring instruments * and equipment * Acceptability of third party work, opinions, reports, recommendations; e.g., manufacturers, their agents and other agencies * Use of experts and expert opinion * Use of unskilled labour
Constructional Arrangements and Piston Engine General Considerations	L1/R2	* Crankshaft, balance weights, main bearings * Auxiliary drives, internal lubrication provisions * Seals and sealing materials * Oil coolers and thermostatic valves * Oil pumps, filtering, pressure control * Fuel pumps - engine driven * ignition and valve timing provision * Drive oulleys * Hardness testing, fits and clearances, Dowels and blind holes * sequential torque assembly - retorquing requirements * Tooth patterns and backlash checks * Contact area checking * End float clearance, checking and setting * Bonding and main earthing

TOPIC	LEVEL	ITEM
Repairs and Rectification	L1/R1	* Machining * Heat treatments * Anodic treatments * Plating * Corrosion treatments
Overhaul Activity	L2/R2 1/R2	* Protective treatments and finishes * Surface finishes * Fits and clearances * Thread forms * Cylinder and piston assemblies * Cooling baffles - hottest cylinder * Main casings * Rear covers * Gear trains * Camshaft and valve operating mechanisms * Crankshaft, connecting rods -bearings * Lubrication systems - passages, jets, pumps pressure relief valves, coolers, thermostatic valves filters and strainers * Sealing - slinger rings, and mechanical flow control * Crank cases, rear covers, sumps * Engine mounting provision * Governor drive provision * Induction and exhaust manifolds * Reduction gears, assemblies and housings * Superchargers and turbochargers * Hoses and pipes
Non-Destructive Testing	L2	* Electrical wiring * Ignition harness * Carburetor and injection systems * Eddy current, Ultrasonic, X-Ray, Gamma ray, Magnetic particle * Techniques - status and approval * Interpretation of results * Certification of inspection completion and acceptability of the condition found

TOPIC	LEVEL	ITEM
Welding/Brazing	L2/-	* Preparation - fluxes, welding, brazing rods * Expansion & contraction effects and control * Hollow parts - internal protection * Welding methods: gas, arc, resistance * Brazing/hard soldering methods * Inspection of welded/brazed joints
Testing after Overhaul	L2/-	* Dynamometer testing * Fan testing * Endurance tests * Final tests * Testing in aircraft * Run-in procedure * Oil consumption run * Turbocharger setting up after overhaul
Release, Preservation, Storage and Transportation	L2/-	* Log Books:- certification reports, references, recording of parts, limits, concessions, modifications, alternate parts, mandatory modifications and inspections * Service information leaflets, etc * Lifed parts, salvage schemes/oversize parts * Inhibiting - internal, external, injectors carburetors, turbo-chargers

SUBJECT 12 - DC POWER

TOPIC	LEVEL	ITEM
Batteries		Principles of primary and secondary cells
	L2/-	Lead-acid types
		Ni-Cad types
	L2/R3	Methods of charging batteries in aircraft
	L2/-	Capacity testing, storage

TOPIC	LEVEL	ITEM
Director Current Machines	L2/-	* Basic laws and principles * Types and characteristics * Contorl
Direct Current Generation	L1/R2	* Voltage regulation * Control * Load sharing * Paralleling * System layouts * Interlock circuits
Fire Protection	L1/R2	* Detection systems * Fire and overheat warning * Smoke detectors-principles and applications * Overheat sensors * Extinguishing systems * Warnings
Flight Controls Lighting Systems Engine and Propeller Control	L1/R2	* Motors and actuators - clutches and breaks * Limit switches, micro switches and proximity detectors * Flap motors protection and control
Starting and Ignition	L1/R2	* External systems - landing, navigation, anti-collision and inspection etc. * Internal systems - normal and emergency, fluorescent tubes, reading and passenger information systems, multiplex function
	L1/R2	* Fuel control valves * Temperature and speed limiting system * Propeller feathering controls * Electronic engine control
	L1/R2	* System types * Control * Principles of operation of high energy ignition units * Aircraft and engine applications and related systems; e.g., stall warning

SUBJECT 13-AC POWER

TOPIC	LEVEL	ITEM
Alternating Current Machines Alternating Current Generation	LI/-	* Basic laws and principles * Types and characteristics * Control
	LI/L2	* Constant and variable frequency * Constant speed drive units * Paralleling * Load sharing * Loadshedding * Generator control unit * Voltage regulation * Load controller * Differential protection *' Fault and test panels
Power Conversion Equipment		* Voltage, frequency and excitation control and protection
Alternating Current Power Distribution Systems	L1/R2	* Static and rotary inverters * Transformer rectifier units
	L1/R2	* Bus-bar layouts * Split, and parallel systems * Transfer relay interlocks * Emergency conditions * APU and GPU interlocks * Warnings * Maintenance panels
Air Conditioning Systems Fire Protection	L1/R2	* Control * Indication * Protection
	L1/R2	* Detection systems * Fire and overheat warning * Smoke detectors-principles and applications * Overheat sensors * Extinguishing systems * Warnings
Flight Controls	-/R2	* Motors and actuators - Clutches and brakes * Limit switches, micro switches and proximity detectors * Power control units

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TOPIC	LEVEL	ITEM
Flight Controls (cont.)	/R2	Flap motors protection and control Trim motor
Fuel Systems	L1/R2	Boost pumps control and indication Jettison systems Refuel and defuel systems Fuel heaters Crossfeed, supply nad shut-off valves-normal and emergency
Hydraculic Systems	L1/R2	Pump control and isolation Pressure switches Overheat warnings Electrically-operated priority valves Low level warning
Ice and Rain Protection	L1/R2	Windscreen heating; control, indication and failure Engine, propeller and airframe anti-ice protection: thermal, electrical and pneumatic Warnings and indications Overheat indications and protection Ground operations Windscreen wipers, washer and rain repellant systems Sensor protection - angle of airflow, pitot head, static plate and temperature probes Waste water heaters - thermal anti-icing protection Aerial neaters
Landing Gear Systems	L1/R2	Actuation - motors - selection and control Indication - proximity sensors - micro switches Air/ground sensor systems Anti-skid system-operation, control and override Automatic braking systems-inputs; control and override

TOPIC	LEVEL	ITEM
Lighting Systems	-/R2	External systems: landing, navigation, anti-collision and inspection etc. Internal systems: normal and emergency, fluorescent tubes, systems, multiplex function
		Contorl - indication and protection
Pneumatics Engine and	-/R2	Fuel control valves
Propeller	-/R2	Temperature and speed limiting systems
		Propeller feathering controls
		Electronic engine control Starting
	L1/R2	System types Ignition
		Control
		Principles of operation of high energy ignition units
		Aircraft and engine applications and related systems; e.g., stall warning
Auxiliary Power Units	L1/R2	Starting, control, protection Power generation Fire protection
Ground Power Supplies	L1/R2	Interlocks and protection of aircraft supplies Control
Centralised Warning and Indication System	L1/R2	Inputs Ourput warnings Priority philosophy
Galley/Toilet Services	L1/R2	Power supply and protection Water heating Equipment

SUBJECT 14 - GENERAL AIRCRAFT INSTRUMENTS

TOPIC	LEVEL	HEM
Pitot Static System*		
	L1/-	* Atmospheric physics, temperature and Instruments lapse rate, Mach computation

TOPIC	LEVEL	ITEM
Pitot Static Systems and Instruments (cont.)	L2/-	* Airspeed indicator, altimeter, vertical speed indicator, and mach meter
Rate of Turn and Slip Indication		* Servo altimeter
	L1/R2	* Pilot probes, stati9, plates and heaters
	L2/P2	* Pipelines and flexible hoses
Vacuum Systems	L1/R2	* Drain traps, associated equipment
Pressure Measurement		Altitude and airspeed switches
Oxygen	L1/R2	* Rotor speed; display
	L1/-	* Sources
	L1/R2	* Control and adjustment
		* Indication
	L1/-	* Sensing elements; capsules, bellows, bourdon tubes, transmitters
		* Displays
	L2/R2	* Bottle storage, distribution, regulation
		* Masks
		* Safety features and requirements
Temperature Measurement	L1/R2	* Variable resistance
		* Thermocouples; compensation limits and values, servo indicators: contorl system inputs
Pressurization System	L1/R2	* Out flow control -Electric
		- Electronic
		- Pneumatic
		* Maximum difference and negative Pressure control.
		* Cabin altitude and rate of change
		* Emergency dump and manual Control
		* Ditching
		* Cabin altitude Warning
Rotational Speed	L1/R2	* Direct drive indicators; tach - generator and indicator sysems; pulse probe systems
		* Displays
Position Measurement	L1/R2	* d.c. and a.c. systems
Quantity Measurement	L1/R2	Direct reading
	L2/R2	Electrical and electonic systems
	L1/R2	Compensation
		Power supplies
Flow Measurement	L1/R2	Indicators
		Transmitters
		Power supplies
Compasses	L1/R2	* Direct reading compass installation; safe distance
		* Flux detectors remote sensors, remote system components
		* Heading reference outputs

TOPIC	LEVEL	ITEM
Compass Compensation	L2	* Base survey techniques
		* Compass swinging areas
		* Aircraft magnetism
		* Terrestrial magnetism - variation
	L3/R3	* Methods and procedures for swinging compasses
		* Flux valve operation
		* Deviation: calculation and effects on a compass
	L1/-	* Various compass types Gyroscopes
	L1/-	* Basic principles
	L1/R2	* Types and methods of operation - vacuum electrical, or laser
	L2/-	* Handling care
	L1/R2	* Attitude sensing: - Errors, correction, remote gyros, interconnections and transfers Limits
		* Direction sensing: Errors, compensation, remote gyros, interconnections and transfer
		* Rate sensing : alignment, rotor speeds
Accelerometers	L1/R2	* Basic principles
Servomechanisms	L1/R2	* Rate and position sensing and control
		* Integrators
		* Response and damping
		* Power requirements
		* Clutches
		* Override and lockout protection
		* Null and loop error sensing
		* Synchronisation systems
		* Force rebalance systems

SUBJECT 15 - INTEGRATED FLIGHT SYSTEMS

TOPIC	LEVEL	ITEM
Theory of Flight	L1/R2	* Forces on the aeroplane
		* Stability - dihedral, sweepback, etc.

TOPIC	LEVEL	ITEM
Theory of Flight (cont.)	L1/R2	* Contort axis * Primary control surfaces - operation and effect on the aeroplane * Secondary controls * Forces during turns * Functions of trim tabs, balance * Tabs and servo tabs * High speed buffet and stall conditions * Auto-pitot control axis - * Auto stabilisers, wing levellers * Coordinated turns, aileron/rudder cross feed * Versine generation and application * Sideslip monitors - slip and skid in a turn * Turbulence penetration and the effect on autopilot control
Yaw Dampers	L1/R2	* Dutch roll phenomenon * Yaw sensing * Yaw signal sensing * Synchoronisation * Series and parallel systems * Cockpit indication * Aileron/rudder control interaction in turns * Rudder PCU, LRUs * Interlocks with autopilot systems
Pitch Trim Systems	L2/R2	* Longitudinal axis stability * High speed tuck * Mach number inputs
Mach Trim	L1/R2	* Mach trim actuators computation * Connection with aircraft controls * Warnings
Alpha Trim	L1/R2	* Angle of attack sensing * Computation * Interface with other aircraft systems; e.g., N1 computers and stall warning systems * Flight directors.

TOPIC	LEVEL	ITEM
Auto Stabilisers	L1/R2	* Trim actuators- control and safety interlocks * Speed change systems for trim actuators
C of G Trimmers		* Interlocks * Elevators/stabiliser interaction
Error Signals		* Neutral shift sensors
	L1/R2	* Computation * Indication
	L1/R2	* Rate system - errors and control * Displacement systems - errors and control * Headihg and course error inputs * Radio beam deviation inputs Altitude inputs *. CADC/autopilot interface-e.g. q or % adaptation * Sideslip sensors and monitors
Signal Processing	L1/R2	* Typical channel signal flow path * Buffer amps * Input signal modulation * Quadrantal signal rejection * Summing points . * Voter systems * Signal sensors and switching functions * Integrators * Limiters * Gain proprammers * Dual channel monitors
Demand Signals	L1/R2	* Mode selectors * Control display units * Turn controllers * Control wheel steering systems * Touch wheel steering systems * Control column transducers * Command override systems * Mode compatibility * Mode annunciators * Failue and disconnect lights and tural warnings * Interlocks - pre and post engage * Pitch attitude trim

TOPIC	LEVEL	ITEM
Demand Signals (cont.)	L1/R2	* Roll out & heading-hold, engage * Synchoronisation * Trim monitors and indicators * Altitude hold inputs * Vertical speed control * Mach/IAS hold * Altitude acquire or change systems
Command signals Outputs	L1/R2	* Power control units - line replaceable units * Solenoid valves * Transfer valves * Position sensors * Servomotors - construction interconnection with control runs * Clutches - torque settings * Brakes * Tach-generators-feedback and * Position feedback - indication * Torque limiting * Hardover sensing-disconnection * Jam detection * Runaway condition - disconnection * Pilot override - disconnection
Automatic Throttle Systems L1/R2		* Control inputs * Related engine controls * Sensors * Engine coupling units - clutches and servo motors * Override and safety consideration * Modes of operation * Electronic engine control - microprocessor inputs and control
Auto Landing Systems	L1/R2	* Principles, requirements and approach categories * Types of system operation-dual and triple channel * System operation on approach * Monitors and failure conditions Roll out control
	-/R2	* Built test equipment (BITE)

TOPIC	LEVEL	ITEM
Digital Flight	L2A	* Flight management systems * Cathode ray tube display
Air Date Computation	L2/-	* Sensors and inputs * Signal processors - mechanical, electrical and electronic * Signal outputs and displays
Flight Path Computation	L2/R2 L1/R2	* Signal sources, radio inputs * Modes, computation * Displays
Electronic Display	L1/R2	* CRT;LED; ICD displays * EADI; EHSI, symbol generators * Control panels * Comparators and monitors * Engine indicating and crew alerting systems * Electronic centralised aircraft monitors
Flight Recorders	L2/R2 L1/R2 L 1/R2 L1/R2	* Requirements * Sensors and inputs * Interface with aircraft systems * Signal processing * Entry panels * Computer principles * Data recording methods * Retrieval and verification * Readout * Failure monitors
Inertial Navigation Systems	L1/R1 L1/R2	* Basic principles * Platform construction * Computation * Display and interface with aircraft equipment * Mode selector and CDU * Operation: fault code analyusis * Power supplies and cooling
Inertial Reference Systems	L1/R2	* Basic principles
Vibration Measurement	L1/R2	* Types of pick-up * Signal conditioning * Displays * Alarm levels and warnings

TOPIC	LEVEL	ITEM
Oxygen	L1/R2	* Storage, distribution and charging * Drop-out system * Chemical systems * Therapeutic provision
	L1/R3	* Masks - passenger, crew, smoke * Bottle checks and precautions

SUBJECT 16 - COMMUNICATIONS

TOPIC	LEVEL	ITEM
Interference	L2/R2	* Principles and methods used to minimise the effects of conducted and radiated interference * Method used to minimise the effects of lightning strikes and static on aerials
Aerials and Feeders	L2/R2	* Duplexers, baluns and matching stubs * Fixed and variable matching arrangements * Locations and types of aerials-communication and navigation * Bandwidth and effective height of an aerial
Communications	L2/P2	* Calculation of standing wave ratio (SWR) * Control and monitoring circuits
Audio Systems	L2/R3	* Intercommunication * Audio mixing and distribution systems * Public address and entertainment systems * Headsests and microphones
Cockpit Voice Recorders	L2/R3	* Signal sources * Control circuitry - hot microphone * Requirements
VHF/HF Communications	L2/R3	* Airborne installation

SUBJECT -17 NAVIGATION			
TOPIC	LEVEL		ITEM
	WTR	TR	
VOR/ILS	1 2	2 3	* Ground station signals * Airborne installations * Control * Monitors * Indicators * Loading * AFCS and instrument interface
Marker	1 2	2 3	* Ground installations * Airborne systems
Automatic Direction Finding	2	3	* Receiver * Loop and sense aerials and feeders * Bearing errors and correction devices * Loop swings
Satellite Communica-tion and Navigation (GPS) Systems	1 1 2	2 2 2	* Airborne installations, * Receiver, computer * Displays, Interface with other systems
Flight Compartment Electronic Display Systems	1	2	* EADI; EHSI; symbol generators * Control panels * Comparators and monitors
Microwave Landing Systems (TRSB)	2	2	* Receiver * Computer, Interface with other systems
RNAV	1	2	* Computer, Interface with other systems, indicator

SUBJECT -18 PULSE AND FM

TOPIC	**LEVEL**		**ITEM**
	WTR	**TR**	
Pulse Techniques			* Radar transmitter/receiver * Pulse modulation * Peak power, average power * Duty cycle, pulse shape, pulse width * Pulse rise time and repetition frequency * Range accuracy and resolution * Receiver bandwidth * Noise

Primary Radar		* Weather radar: Control and monitoring circuits * Indicators; displays, Scanners; wave guides
		* Doppler: Aerials, Indicators, Interface with other equipment
	2	* Radio altimeters: Pulse and FM.CW systems
	3	* Displays - interface with other aircraft systems
Secondary Radar		* DME: Indicators, Control and monitor circuits, Interface with other aircraft systems
		* ATC Transponders: Instrument system interface, * Control and monitor circuits
		* TCAS: Indicators, Control and monitor circuits, Interface with other aircraft systems
Ground Proximity Warming Systems		* Modes, Warnings, Inputs and interface with other aircraft systems
		* Computation, Monitors, Failure indication

SUBJECT -19 HUMAN PERFORMANCE AND LIMITATIONS			
TOPIC	LEVEL		ITEM
	WTR	TR	
Fundamental Human Factors Concept	2		* Understand the term Human Factors * The need take human factors into account * Incidents attributable to human factors/human error * Human Factors applications in aviation operations
Human Performance and Limitations	2		* Vision * Hearing * Information and perception * Memory * Claustrophobia and physical access
Social Psychology	1		* Responsibility: individual and group * Motivation and de-motivation * Peer Pressure * 'Culture' issues * Team working * Management, supervision and leadership
Factors Affecting Performance	2		* Fitness/health * Stress: domestic and work related * Time pressure and deadlines * Workload, overload * Sleep and fatigue, shift work * Alcohol, medication, drug abuse * Use of Psychoactive substances * Restriction on exercising privileges of License/ authorization under influence psychoactive substance (Reference ANO D.3)

Physical Environment, Management and Organization	1		* Noise and fumes * Illumination * Climate and temperature * Motion and vibration * Working environment * Management's contribution to safety * Allocation of resources * Safe and unsafe organization
Tasks	1		* Physical work * Repetitive tasks * Visual inspection * Complex systems
Communication	2		* Within and between teams * Work logging and recording * Keeping up- to- date, currency * Dissemination of information * Teams and organizational issues in aircraft maintenance
Human Error	2		* Error models including the SHEL and Reason models and theories, Murphy's Law * Human error in aircraft maintenance inspection including selected case studies * Implications of errors (i.e. accidents) * Error prevention considerations and strategies * Avoiding and managing errors
Hazards in - Workplace	2	-	* Recognising and avoiding hazards * Dealing with emergencies

This issue of the ANO is a partial revision affecting the pages 1, 2, 47 and 48 at issue 3, the pages 49 and 50 at issue 1, and the pages 3 through 46 remains unchanged at issue 2.

Air Cdre Lutfur Rahman ndu, psc
Chairman
Civil Aviation Authority of Bangladesh

CIVIL AVIATION AUTHORITY, BANGLADESH
AIR NAVIGATION ORDERS

AIRWORTHINESS REQUIREMENTS

PART D – LICENSING - AIRCRAFT MAINTENANCE ENGINEERS

CHAPTER D.6	**VALIDATION OF FOREIGN AME LICENSE**

SECTIONS	**TITLES**
1.	**GENERAL**
2.	**DEFINITIONS**
3.	**TYPES OF CERTIFICATE OF VALIDATION**
4.	**GENERAL REQUIREMENTS**
5.	**LICENSE AND EXPERIENCE REQUIREMENTS**
6.	**ISSUE OF CERTIFICATE OF VALIDATION FOR ONE OFF CERTIFICATION**
7.	**ISSUE OF CERTIFICATE OF VALIDATION FOR MULTIPLE CERTIFICATIONS**
8.	**VALIDITY PERIOD OF CERTIFICATE OF VALIDATION**
9.	**RENEWAL OF CERTIFICATE OF VALIDATION FOR MULTIPLE CERTIFICATIONS**
10.	**PRIVILEGES OF CERTIFICATE OF VALIDATION**
APPENDIX -1	**APPLICATION FORM FOR VALIDATION OF FOREIGN AME LICENSE OR INSPECTION AUTHORISATION**

1. GENERAL

1.1. A Bangladeshi air transport operator can be permitted to employ aircraft maintenance engineers (AMEs) holding foreign Licenses, issued by a contracting State of ICAO, to operate and maintain Bangladesh registered aircraft, till Bangladeshi engineers are trained and acquire appropriate Bangladeshi License and ratings.

1.2 Such permission can be given with the approval of the Chairman and by validating the foreign License under the provisions of the Rule 43 of the CARs, 1984, when the License has been granted by the duly competent authority of another contracting State and is for the time being in force, subject to such conditions and limitations and for such periods as considered necessary

1.3 This order prescribes the procedures regarding issue / re-issue of Certificate of Validation to the following categories of persons, who have been employed by an operator(s) of Bangladesh and are required to exercise privileges of their AME License or Company issued Inspection Authorisation for certification of maintenance tasks performed on aircraft registered in Bangladesh:

(i) Type rated AME License or Inspection Authorisation; or

(ii) License without type rating (LWTR) having company Authorisation issued by an Operator/AMO in accordance with the EASA Part 145 or equivalent procedures approved by the Licensing Authority of the contracting State of the holder(s).

2. DEFINITIONS

2.1. For the purpose of this Order, the definitions as mentioned under the Rules 2, 183 and 234 of the Civil Aviation Rules, 1984 shall apply. Where a particular definition is not given under the Rule, the under mentioned definitions shall apply:

(a) **"Inspection Authorisation (I.A.)"** means the authorisation issued to the qualified persons by an approved maintenance Organisation (AMO) and which specifies the fact that they may sign certificate of release to service or maintenance release within the limitations stated in such authorisations on behalf of the approved maintenance organisation.

(b) **"Licensing Authority"** means the Authority designated by a Contracting State responsible for personnel licensing.

(c) **"Maintenance"** means the same definition as given in the ANO (Airworthiness) Chapter B.1 of these Orders.

(d) **"Maintenance Certification"** means certifications of maintenance tasks on an aircraft as per the procedures stated in the Air Navigation Orders (Airworthiness) Chapter B.3.

(e) **"Rendering a License valid"** means the actions taken by the Chairman, in accepting a License issued by another Contracting State as equivalent to the License issued by CAAB.

3. TYPES OF CERTIFICATE OF VALIDATION

3.1 Normally 2 (two) types of Certificate of Validation in respect of a type rated AME License or a License without type rating (LWTR) in conjunction with an Inspection Authorisation / Company Authorisation based on FAR/EASA Part 145 system are issued by the CAAB for the purposes as mentioned:

(a) **Certificate of Validation for one off certification:** This type of validation is issued for certification of specific maintenance / repair / overhaul tasks / NDT inspection / welding process on specific aircraft or component or parts of the Operator as may be applicable, within the scope of privileges granted under the original License, unless restricted by the Certificate of Validation.

(b) **Certificate of Validation for multiple certifications:** This type of validation is issued for certification of maintenance / repair / overhaul tasks / NDT inspection / welding process on applicable aircraft or component or parts of the Operator as may be applicable during the validity of the Certificate of Validation and within the scope of privileges granted under the original License, unless restricted by the Certificate of Validation.

4. GENERAL REQUIREMENTS

4.1 The request for validation of foreign AME License or Inspection Authorisation would be considered only from Bangladeshi operators when adequate number of such qualified personnel is not available in the country. For this purpose the operator shall furnish necessary details as per the **Appendix -1** in duplicate for obtaining the validation. The operator shall furnish his plans of training the Bangladeshi AMEs and other technical persons and due justification for employing the foreign personnel including the plan of phasing out the foreign AMEs, which should not exceed 4 (four) years.

4.2 The following permission / clearance in respect of the holder of foreign AME License or I.A. as may be required shall be obtained and a copy shall be submitted to the CAAB along with the application for validation of the License:

(a) Permission of Board of Investment (BOI) or Ministry of Labor as appropriate.

4.3 The operator should ensure that the medical assessment of the concerned person in accordance with the rule 51 (1) and (2) as provided under the rule 39 (1) (f) of the CARs, 1984, has been carried out by the medical examiner(s) designated by the Chairman, found satisfactory and is remains valid during the period of employment by the Operator:

(a) General physical and mental conditions including biochemical testing for addiction to or use of psychoactive substances (if any);

(b) Visual and colour perception (with or without correcting lens); and

(c) Normal hearing ability.

4.4 The AME maintaining Bangladeshi registered aircraft on the basis of validation of their foreign Licenses, shall comply with all the applicable rules, regulations, procedures and directions issued by the Chairman from time to time and, the maintenance procedures and MEL of the operator.

4.5 The validation of foreign AME License / I.A. shall stand cancelled if the holder of foreign AME License/I.A. discontinues his employment with the Bangladeshi operator who sponsored his validation. The certificate of validation shall stand automatically cancelled in case of joining another Bangladeshi Operator without proper release certificate or No Objection Certificate (NOC) from the operator who sponsored for the current Certificate of Validation. In such cases no fresh Certificate of Validation shall be issued in respect of the AME until a lapse of 6 (six) months from the date of cancellation.

4.6 The validation of the foreign License shall also be subject to the requirements/conditions stipulated by the contracting State who has issued the License.

4.7 The Chairman may verify the authenticity of documents in the manner required, if considered necessary.

4.8 Where an operator needs the services of maintenance engineer(s) from the aircraft manufacturers for carrying out the On Job Training of Bangladeshi aircraft maintenance engineers on a new type of aircraft which is first time introduced in the country, the requirements relating to minimum experience on the type aircraft as stated in the paragraph 5.4 of this Order may not be insisted upon.

4.9 The validation of the foreign License shall be subject to the provisions of Rule 10 of the CARs, 1984 and can be suspended or cancelled under the said rule, as in the case of Bangladeshi Licenses.

4.10 The operator/holder of the validation shall be responsible for keeping current the passport and employment visa vis-à-vis the operator as long as exercising the privileges of the validation.

4.11 The validation issued shall be valid only when carried along with the License validated. The date of validation shall not be beyond the validity of the License held.

5. LICENSE AND EXPERIENCE REQUIREMENTS

5.1 The aircraft maintenance engineer (AME) should have been properly licensed and rated on the type of aircraft:

(a) By the competent authority of a contracting State in accordance with the ICAO requirements; or

(b) A License Without Type Rating (LWTR) / Basic License issued by a contracting State and company approval (under FAR/EASA 145 or equivalent system) on the type of aircraft issued by a competent authority, acceptable to the Chairman.

5.2 The foreign License should be valid with current ratings on the type of aircraft registered in Bangladesh that the applicant proposes to maintain.

5.3 The AMEs should be under contract with the operator.

5.4 The engineer should have at least 3 (three) years working experience in maintenance after the endorsement of the aircraft type on his AME License / Company approval, out of which at least 6 (six) months should be recent experience on the type, in the preceding (twelve) 24 months.

5.5 The AME should be proficient to communicate in English language and should be capable of understanding Aircraft Maintenance Manual (AMM) and Work cards of the Operator.

5.6 The engineer should be well conversant with the approved maintenance system of the Bangladeshi operator as given in the operator's MCM/MPM. In this regard the Quality Manager/ his designated representative should provide necessary briefing and training to the foreign engineer and issue a certificate stating that the engineer has been trained and is well conversant with the approved maintenance system. The engineer should also be made familiar with the operator's organisation structure, quality system, engineering management and the duties and responsibilities assigned to him.

5.7 lf the engineer is required to certify major maintenance of aircraft, he should produce documentary evidence of his qualification and experience covering the major maintenance of the type of aircraft.

5.8 The operator should ensure that the incumbent is on employment visa and the Visa and passport of the foreign engineer is valid at all times during the period of approval.

6. ISSUE OF CERTIFICATE OF VALIDATION FOR ONE OFF CERTIFICATION

6.1 For obtaining this type of validation, the Bangladeshi operator shall submit an application along with the following documents and explaining the circumstances under which Certificate of Validation is needed:

(a) An application along with the required information as shown in the **Appendix -1** of this Order.

(b) Photocopy of the contract/appointment letter issued by the operator in Bangladesh in accordance with the prevailing regulations of the Government of Bangladesh;

(c) Copy of the valid AME License and /or Company authorisation in English text showing scope of the certification privileges; and

(d) Statement by the Chief of Quality control/Quality assurance of the Operator or Chief of Maintenance that the holder has been briefed and made conversant with the maintenance certification requirements of the Chairman and the Operator.

6.2 After scrutiny and being satisfied, the Operator will be informed to present the License holder for interview along with the original copy of the documents mentioned above.

7. ISSUE OF CERTIFICATE OF VALIDATION FOR MULTIPLE CERTIFICATIONS

7.1 The Bangladeshi Operator has to submit an application along with the following documents mentioning the period and circumstances due to which Certificate of Validation is needed:

(a) The plan of the Operator for training the Bangladeshi AMEs and other technical persons and due justification for employing the foreign personnel including the plan of phasing out the foreign AMEs, which should not exceed 4 (four) years.

(b) The documents stated in the paragraph 6.1(a) to (d) of this Order;

(c) Photocopy the incumbent's passport showing passport number, issuing authority, holder's photograph and validity period of the passport;

(d) Medical Fitness Certificate as mentioned in the paragraph 4.3 of this Order in respect of the License holder;

(e) A certificate that during the 24 months proceeding the date of application for the Certificate of Validation, the applicant has been engaged for periods totaling at least (6) six months on work affording experience on the category and type of aircraft for which the Certificate of Validation is sought; and

(f) Documentary evidence of validity (2 years) of the recurrent training on:

(i) Airworthiness legislation;
(ii) Human performance and limitations; and
(iii) Aircraft systems (type course) as endorsed on the License.

(g) Photocopy of the appointment letter issued by the operator in Bangladesh in accordance with the prevailing regulations of the Government of Bangladesh.

7.2 After scrutiny of the documents and being satisfied, the applicant will be required to appear for oral examination along with original AME License/Company Authorisation. The oral examination will cover the following subjects:

(a) English Proficiency on understanding aircraft maintenance manuals, Work cards of the operator, Minimum Equipment List, aircraft maintenance logs and MCM/MPM of the operator;

(b) Airworthiness Legislation of CAAB.

7.3 The original documents i.e. License, medical certificate of fitness, log books etc. would be examined during the oral examination and returned immediately. On the basis of the examination, the Chairman may prescribe familiarization check or any other test, which the AME will have to undergo, before certifying the aircraft.

8. VALIDITY PERIOD OF CERTIFICATE OF VALIDATION

8.1 The validity period of a Certificate of Validation for one off certification shall be for the period adequate to complete the work and issue of Certificate of Compliance by the authorized person. After completion and certification of work, the Authorisation to exercise the privileges lapses and cannot be exercised again.

8.2 Bangladeshi Operator employing foreign AME License holders should not plan to utilize the services of expatriate AMEs for long term. The Certificate of Validation for multiple certifications is intended to provide short term relief to the operator in such circumstance where qualified Bangladeshi AMEs License holder is not available within Bangladesh. The Certificate of Validation should never be considered as a planned substitute of the License issued by CAAB.

8.3 Initial validity period of a Certificate of Validation for multiple certifications will normally be up to the “expiry date” as mentioned in the License or 1 (one) year from the date of issue of the Certificate of Validation, whichever is less.

9. RENEWAL OF CERTIFICATE OF VALIDATION FOR MULTIPLE CERTIFICATIONS

9.1 The holder(s) of foreign AME License on long-term employment exceeding period of 1 (one) year is required to complete the following recurrent training (as applicable) for re-issue of Certificate of Validation:

(a) Airworthiness Legislation Course;
(b) Human Performance & Limitations;
(c) Aircraft systems as per the type rating on the AME License or Company Authorisation.

Note: Validity of the recurrent training shall be 2 (two) years as per the EASA/FAR Part 145 regulations.

(d) Medical Fitness Certificate of the candidate issued by CAAB designated Medical Examiner as per Rule-51 (1); and

(e) A certificate that during the 24 (twenty four) months proceeding the date of application for the Certificate of Validation, the applicant has been engaged for periods totaling at least 6 (six) months on work affording experience on the category and type of aircraft for which the Certificate of Validation is sought.

9.2 Renewal of validation shall require passing written examination of CAAB on the following subjects as provided in the ANO (AW) D.4:

(a) Subject 1 titled Airworthiness Legislation;

(b) Subject 19 titled Human Performance Limitations; and

(c) Oral examination on Airworthiness Legislation.

10. PRIVILEGES OF CERTIFICATE OF VALIDATION

10.1 Privileges of the validation will be in accordance with privileges of the original Licence/Certificate and such other conditions that may be imposed by the Chairman.

This Order is issued in pursuance of the Rules 4, 196 and 199 of the Civil Aviation Rules, 1984 and is a complete re-issue and supersedes the Issue 3, dated 27 November, 2004.

Air Cdre Sakeb Iqbal Khan Majlis, ndu, psc
Chairman
Civil Aviation Authority, Bangladesh

APPLICATION FORM FOR VALIDATION OF FOREIGN AME LICENSE OR INSPECTION AUTHORISATION (Attach extra page as needed)

1. Name of the AME and AME License No.:

2. Nationality:

3. Country of issue of the License:

4. Details of the AME License:

Category	Type ratings	Validity of the License

5. Details of Company Authorisations (if any):

6. Duration for which validation is sought:

7. Permission of BOI or Ministry of labour:

8. Validity of Medical Fitness and Medical Fitness Certificate:

9. Type of aircraft to be maintained in Bangladesh:

10. Details of maintenance experience (for AMEs only):

    (a) Total experience:
    (b) Experience on the type of aircraft to be maintained in Bangladesh:
    (c) Experience on the type during the last one year.

11. Proficiency in English language:
    [Fluent in (i) Reading, (ii) Writing, (iii) Speaking and (iv) Understanding]

12. Whether previously operated or maintained Bangladesh registered aircraft?
    (Copy of the NOC from the operator as applicable, Name and period.)

13. Past history of involvement in any accident, incident, suspension of License etc.:

14. Photo copy of License/ I.A.:

15. Any other relevant information.

It is certified that the information furnished above is correct and true in every respect.

_____
Signature of authorised person of the operator

Name and Address of the Operator:

Place:

Date:

CIVIL AVATION AUTHORITY OF BANGLADESH
AIR NAVIGATION ORDERS

AIRWORTHINESS REQUIRENEBTS

PARTD- LICENSING – AIRCRAFT MAINTENANCE ENGINEERS

CHAPTER D.7	**LIST OF APPROVED / ACCEPTED TRAINING ORGANISATION AND COURSES FOR APPEARING IN AME LICENSE EXAMINATIONS**

1. GENERAL

1.1 The Rule 190 of the Civil Aviation Rules, 1984 states the requirements that any person or organization intending to be engaged to impart training for persons in aviation sector may apply to the Chairman for a Certificate Approval in respect to the above mentioned active and the chairman on being satisfied that the person or organization can satisfactorily accomplish the activity, may issue a Certificate of Approval.

1.2 The Rule 39 (c) of the CARs 1984 requires that the applicant shall have experience in the inspection, servicing and maintenance of aircraft and its components for the issue of a license with the privileges for the aircraft. It also states that the experience requirements are variable depending upon the scope of the license, provided the applicant has satisfactorily completed an approved training course.

1.3 Name of the approved training organizations along with the Certificate of Approval reference number are listed in this ANO. Additionally, the training organization(s) which have not been approved by the chairman, but training courses completed at such training organizations and countries are acceptable subject to the condition(s) mentioned therein for appearing AME license examination in accordance with the ANO (AW) D.1 are also mentioned this ANO.

2. DEFINITIONS

2.1 For the purpose of this Order, the definitions as mentioned under the Rule 2, 183 and 234 of the Civil Aviation Rules, 1984 shall apply. Where a particular definition is not given under the rules, the under mentioned definitions shall apply:

(a) **" Approved/ Accepted training"** means the training conducted within an approved training organization under special curricula approved by the Chairman or by the appropriate authority of a ICAO contracting State, provided the specific training courses have been accepted by the Chairman or acceptable to the chairman.

(b) **"Approved training organization"** means an organization approved / accepted by the Chairman to impart specified training to personnel for aviation sector and holding valid Certificate of Approval.

(c) **"Basic Training"** means fundamental knowledge and skills appropriate to the discipline to be pursued in the environment of that specific discipline.

(d) **"Refresher / Recurrent Training"** means training give to personnel, designed to review, reinforce, augment or upgrade existing knowledge and skills, including team skills.

3. LIST OF THE APPROVED AME TRAINING ORGANISATION AND AVAILABLE APPROVED COURSES

3.1 Currently the following AME training organizations are approved subject to compliance with the CAAB approved engineering Training Procedure Manual (TPM):

Name of the training organization
Bangladesh Airlines Training Centre Hazrat Shahjalal International Airport Kurmitola DhakA-1229
Aeronautical Institute of Bangladesh House No.21, Road No.1, Sector No.13 Uttara Model Town Dhaka-1230

3.2 It is strongly advised that the persons planning to undertake any course(s) should check and confirm from the concerned training organization regarding current valid list of approved course before

enrolling. The approved organization(s) are required to display the current Certificate of Approval and attached schedule in a prominent position at the headquarters of the approved company. If required, authentication of the training organization(s) and current course(s) may be verified from the Airworthiness and Licensing Division of the CAAB.

4. LIST OF THE ACCEPTED TRAINING COURSES

4.1 The training courses conducted at the training organization and countries mentioned below are acceptable for appearing in the LWTR examination with the condition(s) stated therein:

Name of the training institute	**Name of the course**	**Conditions**
Aero Engineering Training Squadron / communication & Electronics Training Wing Bangladesh Air Force.	Advance Training Program on "Aircraft Maintenance Technology" appropriate to the CAAB AME License category leading to issue of "DIPLOMA" Certificate by BAF and recognized by the Board of Technical Education, Bangladesh.	Subject to successful completion of CAAB Approved Refresher Courses as applicable.
Aero Engineering Training Squadron / Communication & Electronics Training Wing Bangladesh Air Force.	Integration Course on opposite category of the AME license.	1. The applicant has to obtain license on the basis of Diploma course. 2. Successful completion of the CAAB approved Refresher Course as applicable.
Bachelor of Engineering / Science Graduate with Physics and Mathematics in Armed Forces.	Aerospace Technology or Equivalent Course conducted by Bangladesh Air Force and accepted by the CAAB.	Successful completion of CAAB Approved Refresher Courses as applicable.
Training organization / Institutes approved by ICAO Contracting States and accepted by CAAB.	Full Basic course(s) appropriate to the CAAB category of license.	1. On case by case basis. 2.Subject to confirmation (Mandatory) from the concerned CAA / DCA of the contracting State. 3.Subject to satisfactory

		completion of CAAB approved Refresher Course and Additional Courses as applicable appropriate to the category.
Military Institute of Science & Technology Mirpur, Dhaka	Aerospace and Avionics	Successful completion of CAAB approved Additional Courses as applicable.

This Order is issued in pursuance of the Rules 4 and 39 of the Civil Aviation Rules, 1984 and comes in to immediate effect.

Air Vice Marshal Mahmud Hussain, ndc, psc
Chairman
Civil Aviation Authority, Bangladesh