



GOVERNMENT OF INDIA
OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
OPP. SAFDURJUNG AIRPORT, NEW DELHI

CIVIL AVIATION REQUIREMENTS
SECTION 2 - AIRWORTHINESS
SERIES 'E', PART VIII
ISSUE I, DATED 23RD JANUARY 2008

EFFECTIVE: FORTHWITH

Subject : **Approval of Organisations - Category 'G' - Training Institutes.**

1. INTRODUCTION

1.1 This part of CAR deals with the approval of Training Institutes [under Rule 133B](#), for imparting ab-initio training to students in the field of Aircraft Maintenance Engineering for obtaining Basic licence [in the following streams](#), and prescribes the minimum requirements for grant of approval and its continuity :-

- (a) [Mechanical stream \(Fixed wing\)](#), comprising of Light Aeroplanes (LA), Heavy Aeroplanes (HA), Piston Engine (PE) and Jet Engine (JE).
- (b) [Mechanical stream \(Rotary wing\)](#), comprising of Rotary Wing Aircraft (RA), Piston Engine (PE), and Jet Engine (JE).
- (c) [Avionics stream](#), comprising of Electrical System (ES), Instrument System (IS) and Radio Navigation System (RN).

1.2 The period of training in the approved schools will be counted as maintenance experience for the purpose of computing total aeronautical experience to become eligible for appearing in the AME licence examinations.

1.3 Rule 61 stipulates that for grant of Aircraft Maintenance Engineer's (AME) licence, applicants who have passed a course from DGCA approved institutes will be granted one year relaxation in the total aeronautical maintenance experience required. It is, therefore, necessary that the approved institutes provide a high standard of training to their students.

2. OBJECTIVES OF TRAINING

The training course in the field of aircraft maintenance engineering is designed to give the students the following essentials, to enable them to pass the AME licence examination conducted by DGCA.

- (i) Knowledge of Aircraft Manual (India), Civil Aviation Requirements, Airworthiness Advisory Circulars etc.
- (ii) Theoretical and practical technical knowledge of design, construction, maintenance and operation of aircraft, engines, systems and aircraft materials used in construction of airframes, engines and accessories.
- (iii) Knowledge of workshop practices and skill in the use of various equipments, general and special tools used in aircraft maintenance;
- (iv) Knowledge of good maintenance practices, necessary judgment and competence required to assess the airworthiness of aircraft and its equipment.

3. APPLICATION FOR APPROVAL

- 3.1 The application on Form CA-182 along with its enclosures as detailed in **Annexure I** signed by the Accountable Manager for approval of the institute should be submitted to local airworthiness office.
- 3.2 The application should include a "Training Manual" and a certificate that the institute meets all the requirements laid down in this CAR.

4. REQUIREMENTS FOR APPROVAL

The institute shall comply with the following requirements before approval is granted. Part approval **in Mechanical or Avionics stream**, semester wise approval or provisional approval shall not be granted.

- 4.1 A report on the compliance of this CAR shall be submitted by the applicant to the local airworthiness office. On receipt of application, the institute will be inspected by representatives of concerned Regional Director of Airworthiness office and DGCA.

4.2 Personnel Requirements

- 4.2.1 **Accountable Manager :-** The applicant shall nominate a suitable person with financial powers.
- 4.2.2 Chief Instructor :- The institute should nominate suitable persons as Chief Instructor and Deputy Chief Instructor. The nominated persons shall be examined and approved, if found suitable by a duly constituted board of DGCA.

4.2.2.1 Qualifications and experience

The Chief Instructor/ Deputy Chief Instructor shall have the following minimum

qualification and experience:

- (a) Basic licence (BAMEL) in a stream related to the scope of the approval, in at least two categories of Mechanical or Avionics streams; OR Degree in Engineering or equivalent qualification in the field of Aeronautical/ Mechanical/ Electrical/ Electronics engineering. He should also have passed Paper I of AME licence examination.
- (b) For Basic licence holders, five years practical experience in aviation industry out of which a minimum two years in the field of instruction. For engineering graduates, two years practical experience in aviation industry out of which a minimum of one year in the field of instruction.
- (c) For institutes seeking approval in both mechanical & avionics streams the Chief Instructor & Deputy Chief Instructor should together cover the entire scope of approval.

Note :- Experienced persons already functioning as Chief Instructor/ Dy. Chief Instructor/ Instructor may continue to exercise the privileges of their approval.

4.2.2 Instructors :- The institute will employ adequate number of qualified and experienced Instructors for imparting both theoretical and practical training to the students. The instructors will be approved by Chief Instructor. Instructors may be taken on contractual basis, in addition to the regular instructors. Instructors teaching Aviation subjects should be holders of BAMEL in the relevant category or experienced in the relevant stream. The DGCA may also require approval of other persons who are engaged in imparting workshop training.

4.2.2.1 Qualifications and experience

The Instructors should be duly qualified to undertake the instruction in the assigned subjects. The institute should have balanced staff of persons suitably qualified in all subjects listed in the syllabi. The instructors should have an aptitude for teaching and should be patient, enthusiastic and be able to keep discipline.

The instructors should have the following minimum qualifications:

- (a) Basic license (BAMEL) in any category, or
Degree in Engineering in Aeronautical/Mechanical/Electrical/Electronics engineering, or
Diploma in any of the above disciplines, or
Bachelor of science with Physics, Chemistry and Math.

- (b) **Two** years practical/instructional experience in aviation industry for holders of Engineering degree or BAMEL, and **Three** years practical/instructional experience in aviation industry for others.

Note: Instructors assigned to teach Air Law & Airworthiness requirements should have passed paper I of AME licence examination.

4.2.3. Quality Manager :- The applicant shall nominate a suitable person as Quality Manager with over all Responsibility of ensuring compliance with applicable regulation & provisions of the Institute training manual through regular internal audits & inspections. He should report the finding to the accountable manager and ensure rectification of the deficiencies.

4.3 The overall ratio of whole-time instructors to students shall **not be less than 1:30 per subject**. In general, a training school requires atleast two instructors for each range of subjects to ensure continuity of program in the event one instructor being absent. When circumstances permit the program can be made more interesting by having additional guest lecturers.

Institutes seeking approval in any stream shall employ the minimum instructors **per 30 students** as given below:

Airframe Instructor - 1

Powerplant Instructor - 1

Materials, Workshop Practices Instructor – 1

Electrical, Instrument and Radio Instructor - 1 each

Computer Instructor - 1

Workshop **Demonstrators** - 3

4.5. Duties and Responsibilities of Chief Instructor

4.4.1 The Chief Instructor shall be responsible to DGCA for the conduct of training in accordance with the **approved Training Manual and shall ensure that all the conditions** of approval are observed.

4.4.2 He shall ensure that appropriately qualified instructors are available in adequate number to cover specific subjects.

4.4.3 He shall ensure that each student admitted for the course possesses minimum qualifications and fulfills the criteria for admission as stipulated in the approved training manual. The medical standards of the students as required for an AME shall be ensured.

- 4.4.4 He shall ensure that the aircraft, engines, items of equipment, mock-ups and other training aids are kept in clean and serviceable condition for demonstration as part of the practical training.
- 4.4.5 He shall ensure that adequate quantity of reference books are available in the institute library. In addition, he shall ensure that each student is in possession of Aircraft Manual (India), Civil Aviation Requirements and other instructions and amendments thereof, issued by DGCA from time to time. The Chief Instructor shall also ensure that lesson plans and class room notes are prepared and issued to all students on various subjects. He shall also ensure that each student maintains his log book and shall certify the same.
- 4.4.6 He shall ensure that a high standard of instruction is maintained.
- 4.4.7 He shall be responsible for setting up question papers, conducting examinations, checking of papers, etc. and to conduct examinations of various semesters in a **time bound** and fair manner.
- 4.4.8 He shall ensure that records of proper attendance of each student are maintained.
- 4.4.9 He shall ensure that permanent record of all students admitted to the course and their progression through the various semesters of the course is maintained.
- 4.4.10 He shall be responsible for submitting reports on intakes and results of semester examinations to the local airworthiness Office.
- 4.4.11 He shall ensure that all eligible candidates appear in Paper I, II and III of DGCA licence examination, as applicable and shall forward their application to CEO. **He shall also issue photo identity card to all candidates issued with the computer No. by CEO.**
- 4.4.12 He shall maintain record of candidate's results of DGCA licence examinations and submit reports to the local Airworthiness office after each session.
- 4.4.13 He shall make arrangements for on the job training (OJT) for students and monitor the performance of students during their OJT. He shall ensure that the students maintain daily logbooks during this period.
- 4.4.14 **He shall issue the course completion certificate after successful completion of the course including the mandatory OJT.**
- 4.4.15 He shall ensure that security clearance of foreign students is duly obtained through DGCA before admitting them for the course.
- 4.4.16 He shall ensure that due facilities are provided to DGCA officers for inspection of the institute.

4.5 Requirements :

4.5.1 Facilities and Equipment Requirements :

- (a) The institute should preferably have its own premises, or premises taken on long term lease (ten years). The institute should be established in such areas where it is permitted by the local administrative authorities.
- (b) Adequate number of class rooms for theoretical classes shall be available. For initial approval, at least three class rooms, properly equipped with training aids must be available.
- (c) The class rooms shall be properly lighted, well ventilated, furnished and free from noise. The size of the rooms shall be appropriate to accommodate 30 number of students at a time. As a guide line each room should be at least of 40 Sq.Mts. area.
- (d) The institute should have hangar/adequate covered area to park the Aircraft/Helicopter for demonstration and for performing practical exercises on the aircraft.
- (e) The institute shall have well equipped workshops for the training of students in General Engineering and work shop practices. In addition separate areas should be allotted for demonstrating welding, NDT, sheet metal work, electrical work, composite material repairs etc. (Annexure__ to be referred).
- (f) The institute shall have well equipped workshops in Mechanical and Avionics fields, commensurate with the scope of approval sought (Annexure__ to be referred).
- (g) Each work shop should be equipped with tools/equipment, used for General Engineering and for specific jobs.

4.5.2 In the interest of maintaining high instructional standards and for establishing proper rapport between the students and the teacher, the number of students in a batch or class shall not exceed 30.

4.5.3 In one academic year, induction of only two batches is permitted. Each batch shall not have more than 30 students.

4.5.4 Institutes seeking approval in [Mechanical stream \(Fixed wing\)](#) and in [Avionics stream](#) should have at least one heavy/pressurized aeroplane complete with engines running, landing gear and most of the instruments and systems functioning.

4.5.5 Institutes seeking approval in ["Mechanical stream \(Rotary wing\)](#), should have at least one helicopter complete with engines running (without rotor turning), landing gear and most of the instruments and systems functioning. In case an institute seeks approval in [avionics stream](#) in addition to the [Mechanical stream \(Rotary wing\)](#) approval, it must possess a helicopter on which manufacturers avionics course is conducted or it should have a

separates aeroplane as specified in para 4.5.4.

- 4.5.6 The aeroplane/ helicopter need not have a valid C of A but should be complete and in running condition for imparting practical training. The institutes should also have system lay outs/ mock ups with aircraft components (not necessarily serviceable), sectioned components, components in disassembled conditions, functional diagrams, see-through models, as required in the subject syllabus and as detailed in the [Annexure to this CAR](#).
- 4.5.7 In addition to the facilities in 4.5.6, Institutes seeking approval [in any stream shall](#) make arrangements with approved aircraft maintenance organisation for practical demonstration of the complete aircraft/engines/relevant systems.
- 4.5.8 The institute shall have a library having a stock of books commensurate with the number of students. [One set of books per 10 students](#) should be procured by the institute for issue to the students as course text books. Adequate number of suggested reference books should also be made available in the library. The list of books recommended for the training school is given in Annexure 'IV'. The Library should be equipped with photocopier and sufficient numbers of computers with access to internet facility for students.
- 4.5.9 It is desirable that the institute should have OHP and [LCD projectors in each class room](#), for use by the trainees and instructors.
- 4.5.10 Sufficient training aids, demonstration equipment and study material should be available to facilitate complete comprehension of the instruction given. The detailed requirements are giving in [Annexure 'II'](#).
- 4.5.11 [Existing institutes/training establishments are required to comply with this CAR by 31st December 2008.](#)

4.6 On-Job Practical Training

For completion of the course, six months On the Job Training (OJT) shall be mandatory. For imparting practical training on aircraft maintenance to the trainees, facilities acceptable to DGCA must exist. The school shall make suitable arrangements with DGCA approved maintenance organisation having an airworthy aircraft/engine/relevant system engaged in major maintenance for practical on the job training at the end of the course. However, maintenance schedules carried out on the aircraft possessed by the institutes, which may not have valid C of A but having all systems operational is also acceptable for on the job training.

4.7 Preparation of Training Manual

The institute will prepare a Training Manual detailing the training policy and procedures which shall be approved by DGCA. The Training Manual should contain the information given in [Annexure 'III'](#) for reference.

5. QUALIFICATIONS FOR ADMISSION

5.1 For AME training course, the candidates shall have passed 10+2 class with average of 50% marks in Physics, Chemistry and Mathematics or shall have acquired a higher qualification.

5.2 The trainees shall be subjected to a medical examination before they are admitted to the training institute by a doctor possessing at least an MBBS degree. Candidates shall not have any physical disabilities or colour blindness, which may interfere in discharging the duties as an AME. (Refer Annexure ___)

6. PERIOD OF TRAINING

6.1 The period of training in the approved institute will be counted for the purpose of computing total aeronautical maintenance experience required for becoming eligible for appearing in the AME licence written examination.

6.2 The duration of the training as a combination of streams shall be as follows:

- (a) "LA, PE, HA & JE " Mechanical stream, (Fixed wing)-
Three & half years plus six months OJT
- (b) "RA, JE & PE " Mechanical stream, (Rotary wing)-
Three & half years plus six months OJT
- (c) "ES, IS & RN" Avionics stream-
Three & half years plus six months OJT

The initial seven semesters in training institute shall contain both theoretical and practical classes in equal proportion. The last semester shall be exclusively practical oriented and conducted in an approved maintenance organisation carrying out major maintenance of aircraft/engine etc.

During the entire period of training, each student shall maintain a log book indicating the practical training he has undergone. The log book shall be signed by an instructor of the institute or the QCM of the organisation where he has undergone the practical training.

6.3 The courses shall start in the month of July each year to ensure that the students are eligible for the October examination session of the following year. The list of admitted students in a batch should be forwarded to CEO for allotment of Computer number to the students.

6.4 The number of students in each batch shall commensurate with the infrastructure available and shall not exceed 30. However no institute

shall have more than two batches in combinations given in Para 6.2.

6.5 During any semester the practical training shall not be normally less than 50% of total training time. Any variation in period or scope of training will have prior approval of DGCA.

7. EXAMINATIONS

7.1 Semester Examination

7.1.1 After completing each semester the candidate shall be subjected to an examination. Before a candidate is allowed to appear for the examination, he should have been present for at least 80% of the training period. The examination shall be conducted semester-wise every six months.

7.1.2 Examinations papers shall be set, invigilated and checked by competent examiners designated by the Chief Instructor. Examinations shall be held at the end of each course/phase or each section of the course.

7.1.3 The examination papers shall be combination of quiz type and essay type questions.

7.1.4 Candidates who are successful in the semester examination shall be issued with a mark sheet by the school giving details of the marks obtained in each subject. After successful completion of the course, the school shall award a Certificate approved by DGCA.

7.1.5 The DGCA representative may at his discretion associate with the examination to ensure that the standard of questions and fair examination practices are followed.

7.1.6 To be declared successful in the course, the candidates must obtain a minimum 70% in each paper.

7.1.7 A candidate shall only be promoted to the next semester after he has successfully passed the previous semester.

7.1.8 The syllabus for various semesters of the Basic licence course shall be drafted to cover various modules of DGCA licensing system as given in CAR-66 (being proposed).

7.2 AME licence examination conducted by DGCA

7.2.1 AME licence examinations are conducted by DGCA three times in a calendar year i.e., in the months of February, June and October.

7.2.2 The eligibility of students to appear in AME licence examinations shall be as specified in CAR Section 2, Series L, Part II.

8. Maintenance of Records

8.1 The Chief Instructor shall ensure that the following records are kept :

- (a) The name and address of all trainees attending courses.
- (b) Progress records in respect of all students attending Basic licence course or type courses.
- (c) The commencement and conclusion dates of all courses run and copies of the syllabus approved at the time.
- (d) Examination results of all courses run.

8.2 Question and answer papers of each semester shall be preserved for a period of two years from the date of final examination

9. GRANT OF APPROVAL

9.1 Upon satisfactory compliance with the requirements given in this CAR and any other instructions issued by DGCA from time to time, a Certificate of Approval will be issued to the institute. Normally the validity of approval granted to the institute will be for one calendar year. The certificate should be displayed at prominent place and a copy kept in the training manual.

9.2 The approval granted to an institute shall be deemed to be suspended if, at any time, the institute does not meet the requirements stipulated above. In such case, the institute should immediately intimate the local airworthiness office and submit an action plan to ensure compliance with the requirements.

9.3 The certificate shall be surrendered when the institute is no longer approved.

9.4 The institute shall carry out an internal audit of their facilities and submit a report to local airworthiness office at least two months before the expiry of the approval. The local airworthiness office shall also conduct an inspection of the facilities of the institute to ensure compliance with this CAR before effecting renewal of the approval.

10. CONTINUANCE OF APPROVAL

10.1 Facilities, human resources, training and examination standards shall be maintained at standards not lower than those originally approved.

10.2 The institute shall carry out an internal audit of their facilities and submit a report to local airworthiness office at least two months before the expiry of the approval. The local airworthiness office shall also conduct an inspection of the facilities of the institute to ensure compliance with this CAR before effecting renewal of the approval.

- 10.3 Prior written permission shall be obtained from the Director General of Civil Aviation in respect of any material changes in the organisation.
- 10.4 Facilities shall be afforded to the representatives of DGCA to inspect the institute or attend any course for the purpose of monitoring the standard of training. A minimum of two months prior information shall be given to the Director General of Civil Aviation whenever new courses are started or existing approved courses are modified. DGCA may require any amendment to the content or duration of course.
- 10.5 The schools which consistently show poor results in terms of number of candidates passing in the DGCA licence examination shall not be allowed to intake fresh batches of students until the percentage of their candidates passing the DGCA licence examination improves.

(K. Gohain)
Director General of Civil Aviation

DRAFT

FORM CA-182 (Training institutes)

OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE, OPPOSITE SAFDARJUNG AIRPORT
NEW DELHI

(Application for approval of training institute)

1. Name and Address of the institute : _____
2. Category(s) for which Approval is required : G _____
3. Brief Details of the nature of training for which approval is sought : _____

4. Location of the institute : _____
5. Number of employees (inclusive of instructors and inspection staff) : _____
6. Name and qualifications of Chief Instructor and instructors. : _____
7. List of Inspection equipment (including special equipment available) : _____
8. Existing DGCA authority, if any : _____
9. Whether a Training Manual of the institute is attached (write Yes or No) _____
10. Details of Fees remitted : _____

Date : _____

(Signature of the applicant)

Note : Extra sheets may be attached to furnish additional information, if any.

FACILITIES REQUIRED IN THE AME TRAINING SCHOOLS

In addition to the requirements for facilities given in para 4.3 this CAR the following general requirements for workshop facilities shall be complied with by organisations:

1. Workshop Equipment

The greater part of the cost of establishing training facilities for the issue of Basic Licence is in the provision and equipment of adequate workshops. For large-scale training where it is expected that successive groups will be trained over a number of years, the different phases of workshop training should take place in properly equipped specialist workshops. Compromises with this ideal may be accepted in respect of smaller schools or short-term program of training. The list should be adjusted in the light of the school's program by the instructors responsible for the training.

1.1 Basic Metal Workshop

The first stage of mechanic workshop training is the acquisition of manual skill and familiarity with hand tools and precision measuring tools. This shop should be equipped with sturdy benches on which vices should be mounted at approximately 2metre intervals, one vice per 3 students in a batch. Other items required include:

- a) Powered grinding wheel for tool sharpening.
- b) Powered drilling machine.
- c) Large surface table for precision marking-off.
- d) Air compressor suitable for use with pneumatic hand tools.
- e) Blacksmith's hearth, anvil, swage-block, rake, tongs, swages, fullers, flatters, sets and hardies.
- f) Powered hacksaw for cutting stock material.
- g) Chalk board for workshop instruction and works

1.1.1 Each student should have his own personal toolkit

This may be issued on a shop basis, i.e a kit issued in the basic metalwork shop may contain only tools required for training in this shop and be retained by the shop when the student progresses to the next phase, or students may be issued, and retain on a permanent basis, a personal basic, kit which is their own until the

completion of their training. Some schools may require students to purchase their own tools, their kits becoming more complete as their training advances. The following tools should be available to each student for basic metalwork:

- a) Measuring and Marking-off Tools
 - 1) Steel rule, graduated in fractions of inches and millimeters, length 25cm.
 - 2) Outside and inside calipers.
 - 3) Try -square.
 - 4) Dividers 15cm.
 - 5) Scriber.

- b) Fitters' Tools
 - 1) Side cutter pliers.
 - 2) Screwdriver 15cm long.
 - 3) Hacksaw.
 - 4) Selection of files of different sections, lengths and cuts.
 - 5) Hand drill and set of small diameter drills.
 - 6) Set of center and pin punches.
 - 7) 700 gram Ball peen hammer.
 - 8) 200 gram cross peen hammer.
 - 9) 20 cm flat chisel and set of small chisels including flat, cross-cut and round nose.
 - 10) Plastic hammer.
 - 11) Toolbox, with lock and key.
 - 12) Set of tags for checking and equipment in store.

1.2 Students under training in the basic metalwork shop will need to use a greater range of tools than those available in their own toolkits. Since it is rarely convenient to provide a separate store for each workshop, additional tools required at each phase of training may be held in a central workshop store.

2. Machine Shop

It is not important for aircraft technicians to acquire a high degree of skill as machine tool craftsmen but enough experience should be obtained to enable the principles of turning, threadcutting, etc., to be understood. For this reason, provision of one or two center lathes is generally sufficient. A small machine shop can be incorporated in the basic metalwork shop or can be housed separately to suit the premises available. The machine tools provided should generally be of simple, robust types suitable for training and might include the following:

- a) 1 High - speed drilling machine.

- b) 1 Grinding machine.
- c) 1 Buffing machine.
- d) 1 Center lathes.
- e) 1 Horizontal milling machine.
- f) 1 Slotting machine.

Note 1 : Alternate arrangements may be made for horizontal milling and Slotting machine.

3. Welding Shop

The purpose of the short course on welding is to impart enough knowledge of welding technique to enable students to assess the airworthiness of welded components in the shop must be equipped to comply with the safety regulations for oxy-acetylene and other types of welding. Metal-screened working bays with metal work benches should be erected according to the number of working stations required. Welding equipment might include the following:

- a) 1 sets of oxy-acetylene welding equipment.
- b) 1 Electric arc welder.
- c) Eye and face shields, goggles, leather gloves and aprons.
- d) Electrodes, welding rods and welding fluxes.
- e) One Electric resistance welding machine for spot welding may be housed in sheet metal shop.

Note 1 : Oxy - acetylene welding torches may also be used for certain types of torch brazing. Appropriate fillers and fluxes must be obtained.

Note 2 : Alternate arrangements may be made for Electronic Arc welding/ Argon arc welding and/or Spot welding.

4. Sheet Metal Shop

Sheet metal training may be given in the same shop used for basic metalwork. But the two types of work should not proceed simultaneously with students at different stages of training. For most students a higher level of accomplishment is required in sheet metal work than in machine tool work or welding and this should be considered in equipping the workshop. Apart from benches and vices, the shop should be equipped with the following heavy tools:

- a) 1 Treadle - operated guillotine (squaring shears).
- b) 2 Hand lever shears.
- c) 1 Cornics brake.
- d) 1 Forming roll.
- e) 2 Sets of sheet metal stakes.

Note 1 : Alternate arrangements shall be made for Cronics

Brake.

The following tools should be issued as additions to students' personal basic toolkits, or made available to them sheet metal shop;

- a) 1 wire end plate gauge.
- b) 1 plain nosed plier.
- c) 1 Round nosed plier.
- d) 1 straight bladed snips.
- e) 1 aviation snips.
- f) 1 hand vice.
- g) feeler gauge

5. Woodwork shop (Optional requirement)

Since few wooden aircraft are built today, the importance of skill in carpentry for aircraft technicians has declined. A case can still be made including some instructions woodwork, in particular in the making and inspection of glued joints. Small wood workshop can also be an asset to a training school since it can be used for manufacturing training aids. The shop should be equipped with carpenter benches with a carpenter's vice at each working station and, either as separate machines as single combination machine have the following combination of powered tools.

- a) 1 woodplanner.
- b) 1 disc sander.

The students should be familiar in using the following tools.

- a) 50 cm panel saw.
- b) 25 cm Dovetail saw.
- c) 30 cm padsaw.
- d) metal jack plane.
- e) 20 cm smoothing plane.
- f) 1 wood type spokeshave.
- g) 2 firmer chisels, 6mm and 20mm
- h) 1 sash-mortise chisel, 12mm.
- i) 1 claw hammer (600-700 gram)
- j) 1 pattern makers' hammer(150 gram)
- k) 1 carpenter's try square.
- l) 1 Adjustable bevel.
- m) 1 Marking gauge.
- n) 1 Folding rule 1 metre.
- o) 1 Ratchet brace and selection of bits and countersinks
- p) 1 Bradawl.
- q) 1 Cabinet pattern screwdriver 30 cm.
- r) 1 ratchet screwdriver 20 cm.
- s) 1 mallet.
- t) 1 carpenter's toolbox with lock and key.

6. Engine Workshop

In general it is necessary that students intended to acquire type II licence in cat 'E' should have the opportunity to dismantle and reassemble completely atleast one type of aero engine without, however, without going through complete overhaul procedures.

All students training in the engine workshops should add to their tool kit on the same basis as previously described, the following tools :

- a) 1 screw driver 10 cms.
- b) 1 screw driver 20 cms.
- c) 1 screw driver electrician's, 6 cms.
- d) 1 screw driver electrician's, 18 cms.
- e) 1 screw driver Phillips, 15 cms.
- f) 1 screw driver Reed and Prince, 15 cms
- g) Set of double ended open spanners of appropriate range of sizes and appropriate standard type (American, BSF, Unified or Metric) to suit engines available.
- h) Set of socket wrenches with handles and accessories to suit engines available.

6.1 It is necessary for AME students desirous of obtaining Basic licence on Piston Engine should have the opportunity to study the internal construction of piston engines and be able to do top overhaul and testing of engines after top overhaul. For AME desirous of obtaining Basic licence on Jet Engine should have the opportunity to study the internal construction of jet engines.

The following list suggests a suitable range of equipments for the training of type II AMEs in groups of twenty to thirty:

6.1.1. Piston Engine :

- a) Various components of the piston engines such as cylinder, piston, tappet valve, connecting rod etc. for the demonstration purposes.
- b) One piston engine, sectioned, mounted and rotatable for demonstration purposes.
- c) one 4-stroke piston aircraft engine for maintenance experience upto top overhaul.
- d) One or more engines, either mounted on ground running stand with test stand or installed on air frame for

starting, running and trouble shooting practice.

e) Suitable benches and racks designed to facilitate storage of engine parts during dismantling

f) Paraffin washing stand for cleaning parts.

g) Mobile lifting gantry for hoisting engines and heavy equipment

h) Engine slings for each type of engine in shop.

i) Manufacturers tool kits for each type of engine including extractors, assembly jigs etc. for the dismantling of engines.

j) Electro magnetic crack detector (a portable type should be adequate, the students testing an arbitrary selection of items such as gudgeon pin or ball race cages.)

k) Medium sized surface table with v-blocks, DTI stand etc.

6.1.2 Jet Engine :

a) Various components of the jet engines such as axial/centrifugal compressor, ignitor plugs fuel pumps, different types of combustion chambers combustor, turbine etc. for the demonstration purposes.

b) One jet engine, sectioned, mounted and rotatable for demonstration purposes.

c) Suitable benches and racks designed to facilitate storage of engine parts during dismantling

d) Paraffin washing plant for cleaning parts

e) Mobile lifting gantry for hoisting engines and heavy equipment

f) Engine slings for each type of engine in shop.

g) Manufacturers tool kits for each type of engine including extractors, assembly jigs etc. for the complete dismantling of engines.

h) Electro magnetic crack detector (a portable type should be adequate, the students testing an arbitrary selection of items such as gudgeon pin or ball race cages.)

i) Medium sized surface table with v-blocks, DTI stand etc.

j) Arrangement with other agencies for practical demonstration of the jet engine maintenance (essential requirement).

6.2 Associated with the main engine workshop, and either housed in it or close to it, should be work areas or separate small workshops for propellers, carburetors and fuel system components, magnetos and ignition equipment including spark plug cleaning, and a store for consumable items. Some of the additional equipment required is:

- a) Propeller assembly bench with tools for measuring blade torque.
- b) Propeller manufacturer's toolkit for each type of propeller used for removal and installation.
- c) at least one contemporary type of propeller.
- d) Sectioned examples of contemporary propeller controllers.
- e) Carburetor test bench with flow measuring equipment.
- f) Spark plug cleaning plant.
- g) Spark plug tester.
- h) Sectioned examples of various types of magnetos.
- i) Sectioned examples of various types of carburetor and fuel injection equipment.
- j) Sectioned turbo-supercharger.
- k) Benches, racks, shelves and storage bins.

All areas of the engine shop should have adequate electric power points and piped compressed air to operate powered hand tools, and factory safety precautions in respect of fire warning and extinguishing provisions. Periodic inspection of lifting gear, safety screening of electrical equipments, etc., should be carefully observed and schedule of inspection of these items should be prominently displayed.

7. Airframe workshop

A large building, preferably a hangar, is required to house fuselages, wings, aircraft parts, and as far as can be

provided, complete aircraft. Associated with the main airframe workshop, and either housed in it or close to it should be work area or separate small workshops for fabric and dope work, wheels and tyres, wire and cablework and aircraft systems. The aircraft systems shop tends to assume such importance today that a fairly generous space allocation may be necessary. For work in the airframe workshop students will require the same tools issued for the engine shop. The actual aircraft or parts may be of obsolete types or be salvaged from damaged aircraft but this need not render them useless for teaching the principles of structural inspections, control rigging etc. In addition the following should be provided:

7.1 Light Aircraft

a) An aircraft of all metal construction complete with engine in running order, instruments, in running order. The aircraft need not have a valid certificate of airworthiness but should be maintained as nearly airworthy as possible by carrying out periodic inspection or applicable to any airworthy aircraft.

b) 1 or 2 fuselage single engine aircraft preferably of stressed skin type such as sporting or training aircraft suitable for dismantling and reerection, and for practicing minor repair and inspection.

c) 2 all metal wings suitable for practicing repair and inspection duties.

d) Various control surfaces suitable for practicing repair, fabric covering, mass balancing, etc .

e) Lifting jacks, trestles, fuselage cradles, lifting slings towing cables and tow bars dihedral and incidence boards, work platforms and special tools to suit aircraft types provided.

f) Desk for manuals and notices.

g) Display board for inspection worksheets.

h) Battery cart.

i) Apron type fire extinguisher trolley.

j) Hangar furniture such as benches, trestles, ladders, chocks, etc.

k) Mobile lifting equipment, i.e. small crane or overhead gantry.

- l) Room or hangar area with forced ventilation (extractor fan) and compressed air supply for doping.
- m) Spray guns, and suitable equipment/tools for aircraft doping and fabric testing, repair etc.
- n) Tyre levelers, tube repair kits and spot vulcanizing kit.
- o) Oil and fuel replenishing barrels.
- p) Cable swaging machines.
- q) Riveting equipments.
- r) Measuring equipments.

7.2 Heavy Aircraft

- a) Arrangements with other approved maintenance agencies for practical demonstration maintenance of the heavy aircraft.
- b) 1 or 2 fuselage of heavy aircraft preferably of stressed skin type suitable for dismantling and reerection, and for practicing repair and inspection.
- c) 2 wings of stressed, metal construction one each of and all metal types suitable for practicing repair and inspection duties.
- d) Various control surfaces suitable for practicing repair, mass balancing, etc .
- e) Hydraulic lifting jacks, trestles, fuselage cradles, lifting slings towing cables and steering bars dihedral and incidence boards, work platforms and special tools to suit aircraft types provided.
- f) Desk for manuals and notices.
- g) Display board for inspection worksheets.
- h) Battery cart.
- i) Apron type fire extinguisher trolley.
- j) Hangar furniture such as benches trestles, ladders, chokes, etc.

- k) Mobile lifting equipment, i.e. small crane or overhead gantry.
 - l) Room or hangar area with forced ventilation (extractor fan) and compressed air supply for doping.
 - m) Tyre levelers, tube repair kits and spot vulcanizing kit.
 - n) Oil and fuel replenishing barrels.
 - o) Cable swaging machining.
8. System components workshop (Electrical, instrument, radio)

General requirements

This shop should be provided with workbenches with either metal or formica tops, perhaps one vice to every 5 students and shelves and racks around the walls to store components. Representative examples of components from a variety of aircraft should be accumulated and for each component appropriate manufacturers manual should be displayed. Oil containing component, e.g hydraulic pumps or jets should be segregated from pneumatic or electric components e.g. cabin pressure controllers or electrically actuated cocks typical of the item on which students should obtain practical experience are the following :

- a) Hydraulic system components: pumps, of different types relief valves, selector, actuating jacks, accumulators, pressure switches, reservoirs brake mechanism.
- b) Landing gear components shock struts, anti shimmying devices, nose wheel steering, gear servo and disc type brake mechanism.
- c) Pneumatic system components, airborne compressors, pressure regulators, selectors, actuators, control valves door seals, wind screen wipers, pneumatic deicing gear.
- d) Flying controls pulley and lever assemblies, cable tensioning devices, screw jacks actuators for power assisted power operated controls, artificial feel devices spring tab devices, etc.
- e) Cabin air control cabin blowers flow control devices heat exchangers cold air units and vapor cycle coolers, cabin pressure controls, discharge valves, pressure control safety valves humidity fire, etc
- f) Oxygen systems storage bottles and flow control devices, liquid oxygen converter, control valves mass, etc.

g) Deicing system components representative samples of power control and actuating devices from mechanical fluid and thermal deicing system (electrical heating devices for thermal deicing are best covered in the electrical workshop).

h) Miscellaneous items: CO detection equipment, fire detection and smoke warning devices, Fire extinguishers water systems, galley installation safety belts harness, life jackets, dinghies, survival kit, etc.

As far as it is consistent with the condition of the above components, and having regard to the expense involved some test rigs (either improvised or of the pattern recommended by the manufacturers) should be available to enable the students to check the performance of components after dismantling and reassembly.

9. Electrical Workshop

According to the accommodation available this may either be a separate self contained shop or may be combined with electronic training or instrument training group. The students personal basic toolkit should now be supplemented by the following items or they should be made available on loan while working in the electrical workshop:

- a) 1 electric soldering iron (soldering copper) with 5mm point.
- b) 1 wire stripper for removing insulation.
- c) 1 close quarter screwdriver, 25mm blade.
- d) Selection of small screwdrivers, including Phillips.
- e) 1 Adjustable hook wrench, 18 to 50 mm.

Other special tools and test meters should be available from the store. The range and variety of electrical equipment on the modern aircraft is very considerable and as wide a selection as possible should be obtained, but the following items should certainly be included :

- a) Different types of cable lengths of aircraft cabling for practicing wire work and making up looms.
- b) Specimens of aircraft looms, with typical canon plugs, sockets, bulkhead sealing bungs etc.
- c) aircraft magnetos and ignition harnesses

d) selection of switches, fuses, thermal circuit breakers, wire connecting devices, junction boxes and other electrical system elements.

e) Specimens of airborne batteries, both lead acid and alkaline, some sectioned, some serviceable and chargeable.

f) DC Generators and AC alternators

g) Carbon pile voltage regulators and other types of current limiting devices such as vibrator types and variable resistance types

h) DC and AC motors of various types, including engine starters, continuously rated motors, rotary and linear actuators.

i) Rotary invertors and specimens of other types of current conversion devices such as rectifiers and transformers.

j) Specimens of various types of airborne electrical instruments, including instruments embodying principles of the voltmeter, ammeter, ohmmeter, wheat stone bridge thermocouple, ratiometer, selsyn, autosyn etc.

k) Specimens of aircraft electrical heating devices such as Pitot heads, thermal de-icing shoes etc.

l) Specimens of aircraft lighting appliances such as cabin fluorescent lamps, landing lamps, navigation lights etc.

The Electrical workshop should be equipped with demonstration mock-ups representing typical aircraft circuits; if made realistically these can be of value for practicing adjustments and trouble shooting as well as for demonstration. benches should be smooth topped and be provided with sufficient vices and power points for soldering irons to suit the size of class planned. The following items of major equipment should also be available:

a) Workshop test unit for testing electrical machines (universal types are available for testing a wide variety of generators and motors).

b) Battery charging Plant : This is preferably housed in separate, well ventilated charging room and should be of the series type suitable for charging several batteries at different rates.

10. Instrument Workshop

The delicate nature of aircraft instruments renders it necessary that this shop should be a 'clean area' i.e., it should be protected from dust, workshop fumes and industrial contaminants. Ideally, a separate building or room with filtered ventilation is desirable. In very humid climates, air conditioning is essential. Benches should be topped with smooth hard wood or with formica top. If air conditioning is not installed, it may be necessary to provide sealed cabinets with silica gel for air drying for storing some of the test equipment and instrument specimens. Students' personal basic tool kits should be supplemented by the following items or they should be made available on loan while working in the instrument workshop:

- a) One kit of watchmakers' screw drivers
- b) One kit of miniature spanners
- c) One electric soldering iron with fine point (similar to that issued in the electrical workshop).

For the training of Type II AMEs to be rated for an aircraft in its entirety a selection of the more widely used instruments and a limited range of calibration equipment, sufficient to demonstrate the main characteristics of aircraft instruments is adequate. For training for Basic licence in Instrument systems or for overhaul of instruments, a more complete range of aircraft instruments and test apparatus is necessary. A reasonable arrangement for training purposes would be to teach the main principles of cabin air control and pressurisation under the heading of 'Aircraft Systems'. But to consider the construction and maintenance of the controller and the special valves as coming under 'Aircraft Instruments'.

A shop equipped only for type II AME general training should contain examples of the instruments that are complete but not necessarily airworthy on a scale of one instrument to every 2 students for dismantling and one complete and serviceable instrument of each type for demonstrating, testing and calibration. The following instruments should be available :

- a) Boost or manifold pressure gauge
- b) Hydraulic pressure gauge
- c) Engine oil pressure gauge, electrical type
- d) Engine oil pressure gauge, Bourdon tube type
- e) Air Speed indicator
- f) Pitot static head
- g) Altimeter (simple and sensitive types)
- h) Rate of Climb indicator
- i) Turn and Slip indicator (air driven and electrical types)
- j) Directional gyroscopes (air driven and electrical types)
- k) Artificial Horizon (air driven and electrical types)
- l) Engine speed indicator (DC and AC types)

- m) Oil thermometer (Physical and electrical types)
- n) Cylinder Head or jet pipe thermocouple
- o) Fuel content gauge (float operated and capacitance type)
- p) Magnetic compass
- q) Simple type of auto pilot (non-electrical)

It may not be practicable to provide test equipment for the full range of instruments listed above, but it is recommended that the following be provided :

- a) Dead weight tester for pressure gauges
- b) Altimeter test chamber with sub-standard instruments
- c) Mock-up of ASI system for leak test practice
- d) Gyroscopic instrument test table
- e) Mock up for compass swinging practice, i.e., an old aircraft or a specially made trolley which can be used as an out door site selected as compass base.
- f) Bridge megger for insulation testing of electrical items

11. Electronics and Radio Workshop (AVIONICS)

The workshop for airborne electronic and radio equipment should also be a 'clean area'. The training schools may have a combined shop for instruments, electronics and electrical components. The increasing convergence of instruments and radio technology renders the combined shop particularly convenient for overhaul work, although separation may be more suitable wherever training schedules require that instruments, radio and electric be taught as well separated subjects. The following workshop equipment should be available:

- a) Variable stabilized power supply unit
- b) Signal generator (high grade)
- c) Signal generators for bench work (one to each 5 or 6 students)
- d) Signal generator (UHF/VHF)
- e) Audio frequency oscillators (one to each ten students)
- f) 'Q' meter
- g) Cathode ray oscilloscopes (one to each 5 or 6 students)
- i) Moving coil, volt-ohm-milli ampere, multimeters (one to each 3 students)
- j) Variacs (one to each 3 students)
- l) Valve and transistor characteristics tester
- m) AC valve voltmeter and sensitive AC valve voltmeter

Each students should be loaned or may be issued with, a radio technician's tool kit, which should include an electric soldering iron with a fine point. The workshop should be provided with power drills. A selection of airborne electronic and radio equipment should be available for demonstration and testing and should include as far as

possible the following :

- a) VHF transmitter/receiver
- b) HF transmitter/receiver
- c) ILS/VOR equipment
- d) Glide path receiver
- e) Marker receiver
- f) ADF receiver
- g) Gee and /or Loran
- h) Area coverage airborne navigation equipment
- i) Radio altimeter
- j) Search radar
- k) Instrument systems with electronic amplifiers, e.g., capacitance type fuel contents gauges, cabin temperature controllers, automatic pilots.

Additional receivers for bench work should also be provided and maximum use should be made of assembly kits, such as

- a) A kit of transformers
- b) kit of fixed capacitors
- c) kit of vacuum tubes and bases
- d) kit of meters (single range)
- e) kit of variable capacitors
- f) kit of fixed resistors
- g) kit of wire, terminals etc.
- h) kit of inductances
- i) kit of misc. items
- j) kit for assembly of simple receivers

The 'kits' referred to are obtainable from suppliers of radio equipment either in the form mentioned or as 'pack-up kits' of specific items or radio equipment.

Electronic trainers manufactured and sold commercially are a very useful training aid for teaching basic electronics. These can be used for illustrating basic circuits and the functioning of components and various combination circuits can be set up by inter connections.

Screened rooms or 'cages' to prevent undue radiation from equipment under test and to provide an interference-free region for fine measurement should be available. Although it is desirable to have these adjoining the radio workshop, they should not be close to sources of interference such as an electrical overhaul shop or spark plug testing equipment. As a further safeguard against interference, all power supplies to the radio workshop should be filtered and outgoing interference should be suppressed by adequate screening of aerial cables and artificial aerials. The following power supplies will be required:

- a) AC mains supply for lighting, heating, air conditioning,

mains rectifiers, test instruments, soldering irons etc. This will be at the standard voltage for the locality and the supply should be wired throughout in screened conduit.

b) 30 volt DC supply, surge free and of adequate capacity for the size of the workshop. A ring main supply from lead acid or alkaline cells, ripple free and filtered is suitable or a mains rectifier/regulator can be used.

c) 15 volt DC supply, also surge free.

d) 115 volt, 400 cycle single phase AC supply. This should be frequency monitored and can be taken from a rotary inverter.

e) 115 volt, 400 cycles 3-phase AC supply frequency monitored and wired to the working benches by screened cable.

f) 26 volt, 400 cycles, single phase AC supply, taken from the 115 volt AC supply through a transformer.

g) Compressed air and vacuum supplies should be provided.

GUIDELINES FOR PREPARATION OF TRAINING MANUAL

Training Manual shall contain atleast the following Chapters:

1. Location and layout of the institute.
2. The Scope of approval of the institute and the list of approved courses along with duration of training period.
3. The names, qualifications and experience of all regular instructors and their field of specialisation, if any.
4. The qualification of the individuals who would be admitted to the course and criteria and method of selection for admission.
5. Syllabus for each course phase wise for which approval is required. The syllabus shall list the Headings under which the subject matter will be presented and the sequence in which training will be imparted along with details of the subject that will be covered. The syllabus should also include appropriate time allotted to each topic.
6. Details of training aids including aircraft, engine, systems, mock-ups and equipment available.
7. Details of technical literature, periodicals and books available and the manner of making them available to the students.
8. Details of practical training that will be imparted to the candidates along with approximate period to be spent for each portion of the practical training.
9. The manner of conducting semester examination to assess the performance of trainees continuously.
10. The qualifying marks which a trainee must secure for being declared as successful.
11. The manner in which the trainees failing in a few subjects would be coached additionally and examined subsequently.
12. Samples copies of Marksheets/ Certificates to be issued to candidates after successful completion of semester/ full course, respectively.

**MINIMUM RECOMMENDED TEXT BOOKS
AIRCRAFT MAINTENANCE ENGINEERING TRAINING INSTITUTE**

The following books prescribed by Central Examination Organisation of DGCA should be available with the institute library:

Paper I :

Aircraft Manual
Civil Aviation Requirements (Section 2- Airworthiness)
Aeronautical Information Circulars
(relating to Airworthiness)
Airworthiness Advisory Circulars
Aircraft Maintenance Engineers' Notices

Paper II :

Civil Aircraft Inspection Procedures
(CAP 459-Part I, Basic)
Airframe & Powerplant Mechanics
(General Handbook EA-AC 65-9A)
Shop Theory by James Anderson Earl E. Tatro
Training Manual General Section Book 1 thru 7 by Dale Crane.
Aircraft Materials & Processes by Titterton
Machine Drawing by AC Parkinsons
Advanced Composites (EA-358) by Cindy Foreman
Digital Fundamentals by Malvino and Leech
Standard Aviation Maintenance Handbook EA-282-0
Standard Aircraft Handbook (5th Edition) -Larry Reithmaier

PAPER III

AIRFRAME : (LIGHT AEROPLANES)

Airframe and Powerplant Mechanics (AC 65-15A)-Airframe Hand Book
Aircraft Materials and Processes- by George F.Titterton.
Mechanics of Flight By -A.C.Kermode
Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
Aircraft Maintenance and Repair (6th Edi) -By Kroes, Watkin and Delp
Acceptable Methods, Techniques and practices
(FAA)-EA-AC 43.13-1 A&2A
Aircraft Construction Repair and Inspection
-by Joe Christy

Light Aircraft Maintenance-by J.E.Heywood
Light Aircraft Inspection-by J.E.Heywood
Aircraft Electrical Systems-by E.H.J.Pallet
Aircraft Instruments-by E.H.J.Pallet
Automatic Flight Controls-by E.H.J. Pallet
Advanced Composites (EA-358) -by Cindy Foreman
Airframe and Powerplant Mechanics-
(EA-AC 65-9A)-General Hand Book

PAPER III

AIRFRAME : (HELICOPTERS)

The helicopter and How to Fly-by John Fay
basic helicopter maintenance-by Joseph Schafer
(Order No.EA-HF-2) IAP inc.
Basic Helicopter Hand Book-by FAA EA
AC 61-13B
Helicopter Aerodynamics-by R.W.Prouty
Aircraft Materials and Processes -
-by George F. Titterton
Advanced Composites(EA-358)-by Cindy Foreman
Civil Aircraft Inspection Procedure
(CAP 459) Part II Aircraft.
Rotary Wing Aerodynamics-by W.Z.Stepniewski
(Dover Publication Inc)
Basic Helicopter Aerodynamics-by J.Seddon (BSP Professional Books)
Aircraft Electrical System-by E.H.J.Pallett
Aircraft Instruments-by E.H.J.Pallett
Automatic Flight Control-by E.H.J.Pallett

PAPER III

AIRFRAME : (HEAVY AEROPLANE)

Airframe and Powerplant Mechanics(AC 65-15A) -Airframe Hand Book
Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
Advanced Composites(EA-358)-By Cindy Foreman
Any Books of Manuals covering all basic systems
of Modern Heavy Transport Airplane
Aircraft Repair Manual (FAA-AC-43.13)- By Larry Reithmaier
Aerodynamics-By Clancey
Aircraft Construction Repair and Inspection -By Joe Christy
Practical Aircraft Electronics System- by Albert Helfrick
Aircraft Materials and Processes-by George F.Titterton
Mechanics of Flight-by A.C.Kermode
M. GUILLON:'Hydraulic Servo Systems', McGraw- Hill co., New York
Aircraft Instruments-by E.H.J.Pallett

**PAPER III
POWER PLANT : (PISTON ENGINES)**

Airframe and Powerplant Mechanics (EA-AC 65-12A)
-Power Plant Hand Book
Power Plant-By Bent and Mckinley
Civil Aircraft Inspection Procedure (CAP 459) Part II Aircraft
Aircraft Propeller and Controls-by Frank Delp
A&P Tecnicians Powerplant Text book- (EA-ITP-P)
Aircraft Piston Engines-By Herschel Smith
Airframe and Power Plant mechanics-General
Hand Book (EA-AC65-9A)

**PAPER III
POWER PLANT : (TURBINE ENGINES)**

IRWINE TREAGER: 'Aircraft Gas Turbine Tecnology
McGraw-Hill Book Company.
ROLLS ROYCE LIMITED:The Jet Engine' Product
Support (Graphics)Limited Derby, England.
UNITED TECHINOLOGIES P&W OPER/INSR 200(Latest
Edition): The Aircraft Gas Turbine Engine and
Its Operation 'United Aircraft Corporation.
Any Books or Manual covering all basic systems of Modern Jet Engine
JACK V. CASAMASSA and RALPH D.BENT:'Jet Aircraftpower Systems' -
McGrawhill Co..
TRANING NOTES: 'Gas Turbine Engines' Turbomeca,
Bordes,France.
DALE CRANE and NEAR CARLSON : 'Encyclopaedia
for Aviation Tecnologies' Distributor
-The English Book Store, Connaught Circus New Delhi
M.GUILLON: 'Hydraulic Servo Systems', McGraw-Hill co., New York
JOHN ANDERSON: 'Introduction to Flight',
McGraw-Hill Co., New York
Civil Aviation Authority:'Civil Aircraft Inspection
Procedure (CAP459) Part-II
M.J.KROES, T.W.Wild, R.D.Bent and J.L.McKINLEY;
'Aircraft Power Plants' McGraw-Hill co., New York.
FRANK DELP : 'Aircraft Propellers and Controls'
Distributor-The English Book Store
Cannought Circus, New Delhi
E.MANGHAM, A.PEACE : 'Jet Engine Manual',
Distributor-The English Book Store,
Cannought Circus, New Delhi

PAPER III

ELECTRICAL SYSTEM

Electrical Technology-by B.L.Theraja
Aircraft Electrical System-by E.H.J.Pallett
Basic Electronics-Bernard Grob
Digital Computer Fundamentals-by Malvino
Micro Electronics Aircraft System- by E.H.J.Pallett
Basic Electricity-by Dale Crane
Aviation Electronics Vol.I(Every Pilot Guide to Aviation Electronics-by John
M.Ferrara -Air and Space Company)
Principles of Servo mechanism-by A Typers & R.B.Miles
Aircraft Electricity and electronics-by Bent Mekinley and also by Eismen/ Bent
Mekinley (M.C.Graw Hill Publication)
Civil Aircraft Inspection Procedure-Part II
Integrated Electronics-Millman and Halkias

PAPER III

INSTRUMENT SYSTEM

Aircraft Instruments-by E.H.J.Pallett
Automatic Flight Control-by E.H.J.Pallett
Digital Principles and Applications-by Malvino and Leech
Basic Electronic -by Bernard Grob
Aircraft Instruments-by C.A.Williams
Integrated Electronic-Millman and Halkias
Aircraft Engineers hand Book No. 4 Instruments - by R.W.Sloley and W.H.Coulthard
Civil Aircraft Inspection Procedure-Part II
Electrical Technology-by B.L.Theraja
The Mechanism of Inertial Position and Heading Indication by Winston Merkey John
Hovorka
Principles of Servomechanism-by A Typers and R.B.Miles
Aircraft Oxygen System (AMP Technical Publications)- by Robert Scheppler and Dale
Crane

PAPER III

RADIO COMMUNICATION AND NAVIGATION SYSTEMS

Aircraft Radio System-by J.Powell
Electronic Communication System by George Kennedy
Integrated Electronics-Millman and Halkias
Digital Fundamentals-By Malvino and Leech
Avionics System-by Donald & Middleton
Manual of Avionics -by Brian Kendal
Microelectronics in Aircraft Systems- by E.H.J.Pallett
Communication Engineering-by Anner
Basic Radio Vol.1 to 4-by M.Trepper
Aviation electronics- by Keith W.Bose
Aircraft-Electricity and Electronics
(5th Edition)-by Thomas K.Eismen
Communication Principles Vol.I-Ashok Raj.

-END-