4.10 AVIATION TECHNOLOGY

4.10.1 Aviation Technology Paper 1 (450/1)

SECTION A (40 marks)

*Answer **all** the questions in this section.*

1 List **four** resources considered when planning to carry out a safe maintenance task on an aircraft. (2 marks)

2 State **three** reasons for alloying metals. (3 marks)

3 (a) State the use of each of the following tools:

(i) oddleg calipers;
(ii) diamond chisel;
(iii) plug gauge;
(iv) dial test gauge. 2 marks)

(b) List **four** methods of joining metals in an aircraft. (2 marks)

4 (a) State the meaning of the term meteorology as applied to aviation industry. (1 mark)

(b) Explain **two** types of information provided by the meteorology department. (2 marks)

5 Sketch and state the use of each of the following aircraft hardware:

(a) stud;
(b) turnbuckle. (3 marks)

6 (a) Describe the behaviour of a totally stable aircraft. (*1* marks)

(b) Give **two** reasons why aircrafts are not designed to enhance total stability. (2 marks)

(c) Explain **two** design features which promote lateral stability. (2 marks)

7 Describe the basic construction members of an aircraft wing. (4 marks)

8 Sketch and name **four** types of aeropiston engine cylinder arrangements. (6 marks)

9 Explain **five** requirements of a basic electrical system. (5 marks)

10 (a) Draw the symbols for each of the following:

(i) transformer;
(ii) diameter;
(iii) internal threads. (1 ½ marks)

(b) Figure 1 shows an isometric view of a truncated cone.

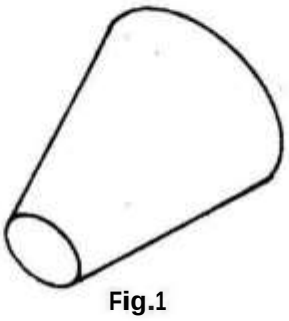

Fig.1

Draw the front and end elevation of the cone in:

(i) first angle orthographic projection;
(ii) third angle orthographic projection. (3 marks)

SECTION B (60 marks)

*Answer question **11** and any other **three** questions from this section.*
Candidates are advised to spend not more than 25 minutes on question 11.

11 Figure 2 shows the three orthographic views of a bracket drawn in first angle projection.

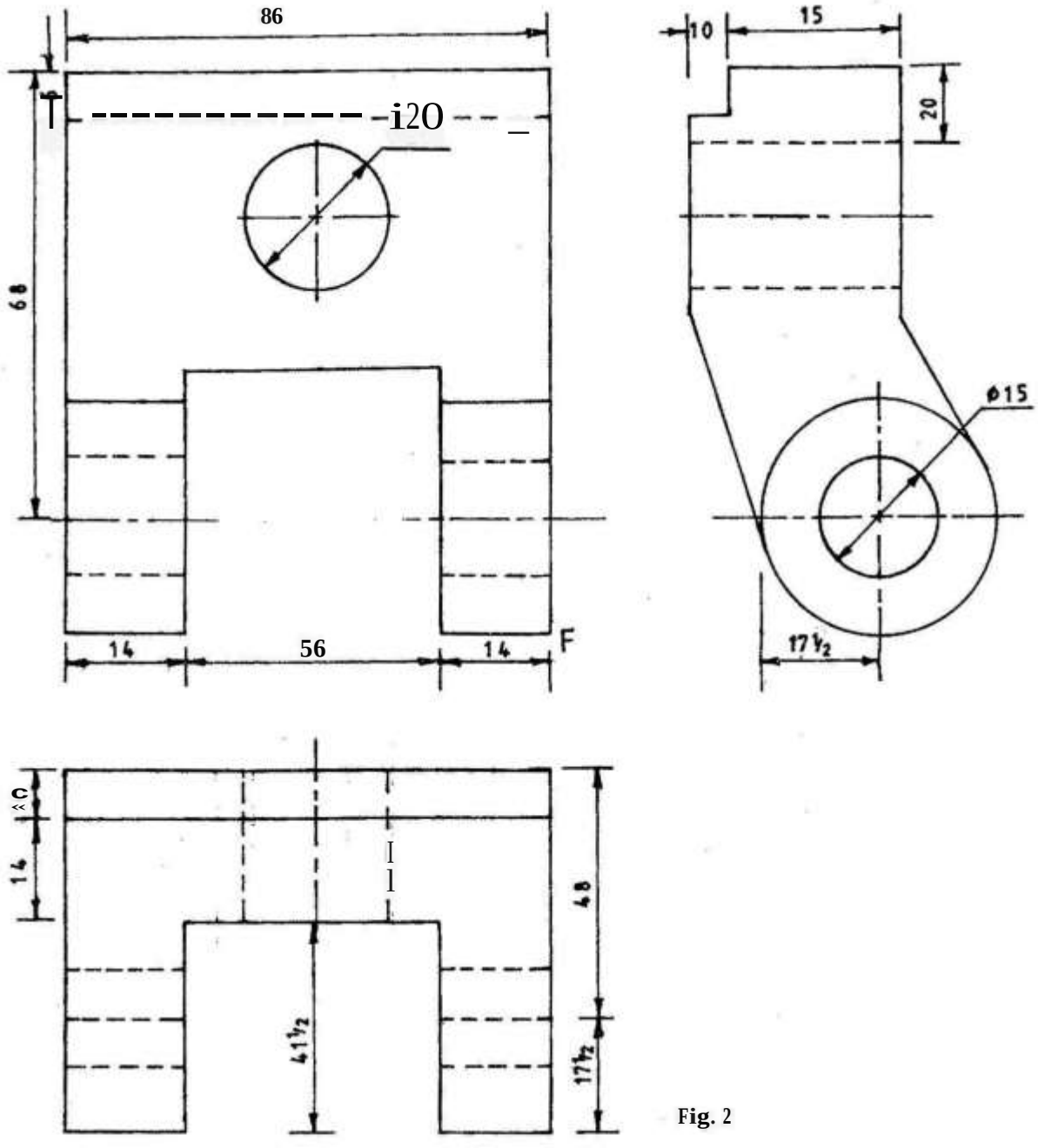

Fig. 2

Draw in good proportion, an isometric view of the bracket taking F as the lowest point.

(15 marks)

12 With the aid of a sketch, explain the operation of a twin spool turbo jet engine. (15 marks)

13 (a) With the aid of sketches, explain how each of the following flaps functions:

O plain;
(ii) fowler;
(iii) slotted. (6 marks)

(b) With the aid of labelled sketches, explain how a normal shock wave is formed on an aircraft within the transonic range. (9 marks)

14 (a) Explain **four** functions of hydraulic system accumulator. (4 marks)

(b) State the principle applied in the transmission of power in fluids. (2 marks)

(c) A hydraulic system has two pistons A and B with diameter 2 cm and 12 cm respectively.

(i) Sketch the arrangement and determine the distance moved by B when A moves 3 cm.
(ii) Explain why the system is used in an aircraft hydraulic system. (9 marks)

15 (a) Explain **five** properties that make aluminium based alloy most suited for the construction of an aircraft fuselage. (5 marks)

(b) Describe each of the following maintenance tasks:

(i) non-destructive testing;
(ii) on condition monitoring;
(iii) random testing;
(iv) destructive testing. (4 marks)

(c) Outline the procedure of carrying out the following methods of testing aircraft parts.

(i) X- Ray
(ii) Fluorescent (6 marks)