

## 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 ½ 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.

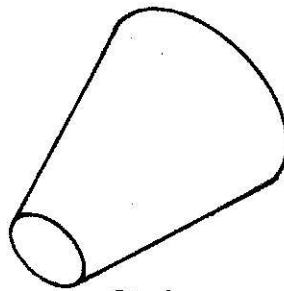


Fig.1

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.

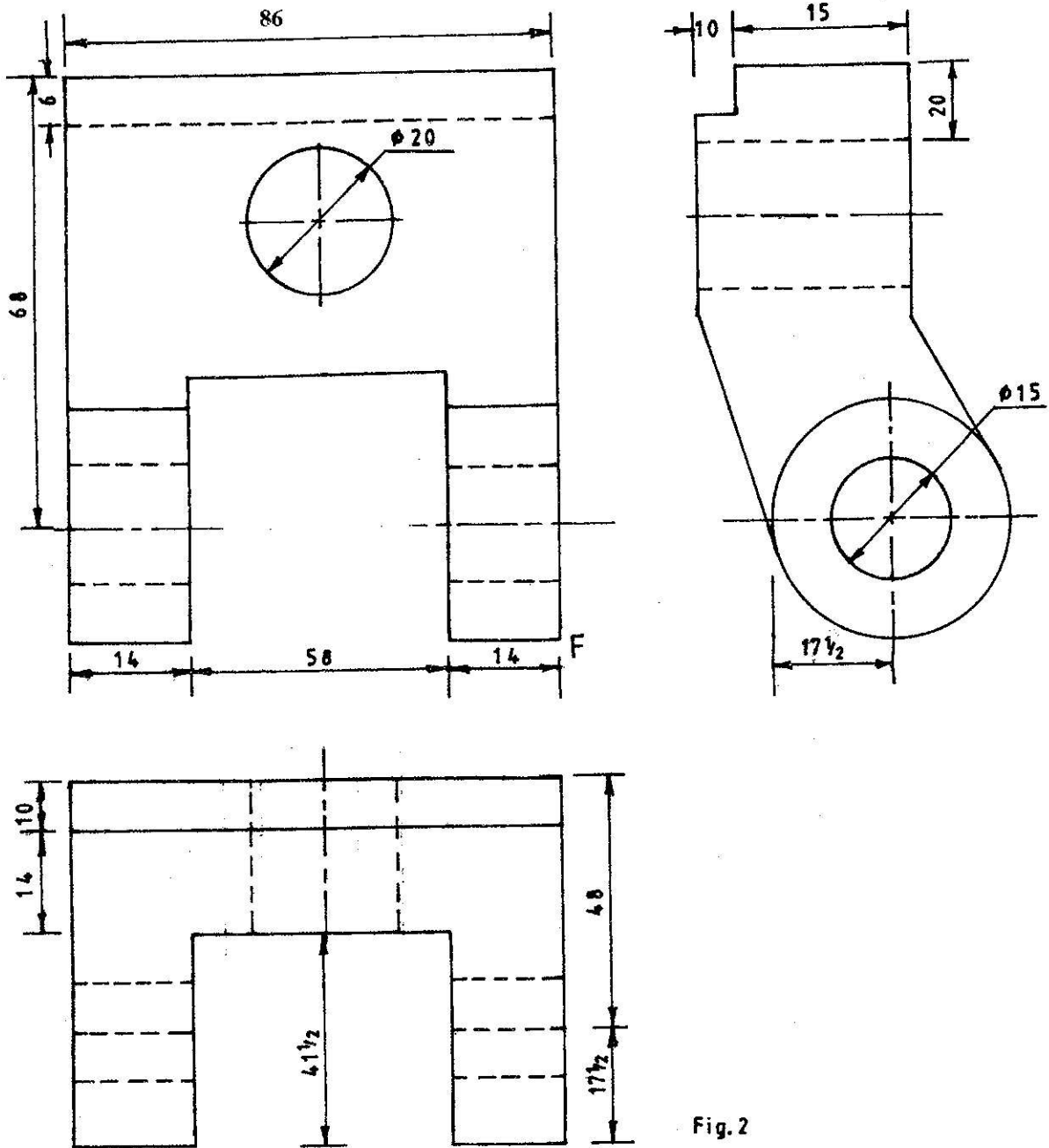


Fig. 2

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:
- (i) 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)