

3.24 AVIATION TECHNOLOGY (450)

3.24.1 Aviation Technology Paper 1 (450/1)

SECTION A (44 marks)

Answer all questions in this section in the spaces provided.

1. Outline **three** roles of the 1st officer or co-pilot. (3 marks)
2. (a) Give the reasons why the following safety equipment must be carried on an aircraft.
 - (i) Raft
 - (ii) Axe(2 marks)
- (b) Outline **two** safety precautions to observe when using each of the following tools:
 - (i) Hand files
 - (ii) Taps(2 marks)
3. (a) List the type of clouds which:
 - (i) can project up into the stratosphere
 - (ii) would cause moderate to severe aircraft icing(1 mark)
- (b) Distinguish between the compass swing and the engine test areas. (2 marks)
4. (a) Sketch the following types of locking devices.
 - (i) Spring washer
 - (ii) Shake proof washer(2 marks)
- (b) State **four** properties of aluminium alloy which makes it suitable for aircraft construction. (2 marks)
5. (a) Explain the meaning of each of the following terms as applied in aviation:
 - (i) Indicated airspeed
 - (ii) Mach number
 - (iii) Viscosity(3 marks)
- (b) With the aid of sketches, describe each of the following wing configurations:
 - (i) Mid-wing

- (ii) Dihedral (4 marks)
6. (a) Outline **three** functions of the aircraft bulkhead. (3 marks)
- (b) State the use of an inspection mirror in aircraft non-destructive testing. (1 mark)
7. (a) Draw a cross-section of a cylinder piston assembly and show the following: (4 marks)
- | | |
|----------------------|-------------|
| (i) Cylinder | (ii) Piston |
| (iii) Connecting rod | (iv) Stroke |
- (b) Explain the application of Newton's third law of motion to a gas turbine engine. (2 marks)
8. (a) Outline **three** methods of flight control systems. (3 marks)
- (b) Name the type of instrument used to indicate each of the following: (1 mark)
- | |
|-----------------------------------|
| (i) Aircraft pitching up and down |
| (ii) The rate of altitude change |
9. Outline the procedure of cutting internal threads. (6 marks)
10. Draw the symbol for each of the following as used in technical drawing. (1 mark)
- | | |
|----------------------------|----------|
| (a) First angle projection | (1 mark) |
| (b) Switch socket outlet | (1 mark) |
| (c) External threads | (1 mark) |

SECTION B (56 marks)

Answer any four questions from this section in the spaces provided.

11. (a) With the aid of a labelled sketch, show each of the following: (6 marks)
- | |
|--------------------------|
| (i) Angle of attack |
| (ii) Anhedral |
| (iii) Angle of incidence |
- (b) State **four** factors that determine aircraft drag. (2 marks)
- (c) With the aid of a labelled sketch, explain how the moments are balanced in flight. (6 marks)

12. With the aid of a labelled sketch, show the construction and airflow on a high bypass gas turbine engine. (14 marks)

13. Describe each of the following areas of the airport:

- (a) (i) Threshold
(ii) Runway
(iii) Touch down zone (3 marks)

- (b) (i) Outline **five** major causes of accidents in the aviation environment.
(ii) Name **four** ways of communicating on the airside. (7 marks)

- (c) Explain the following aircraft tasks:
(i) Parking
(ii) Picketing
(iii) Jacking
(iv) Trestling (2 marks)

(b) Draw and label a cross section of unbalanced double acting actuator. (2 marks)

(c) With the aid of a labelled cross-sectional sketch, describe an airspeed indicator. (10 marks)

15. **Figure 1** shows an aircraft engine bracket drawn in isometric projection. In good proportion, draw in first angle projection the following views:

- (a) Font elevation in the direction of arrow F.E.
- (b) End elevation in the direction of arrow E.E.
- (c) Plan

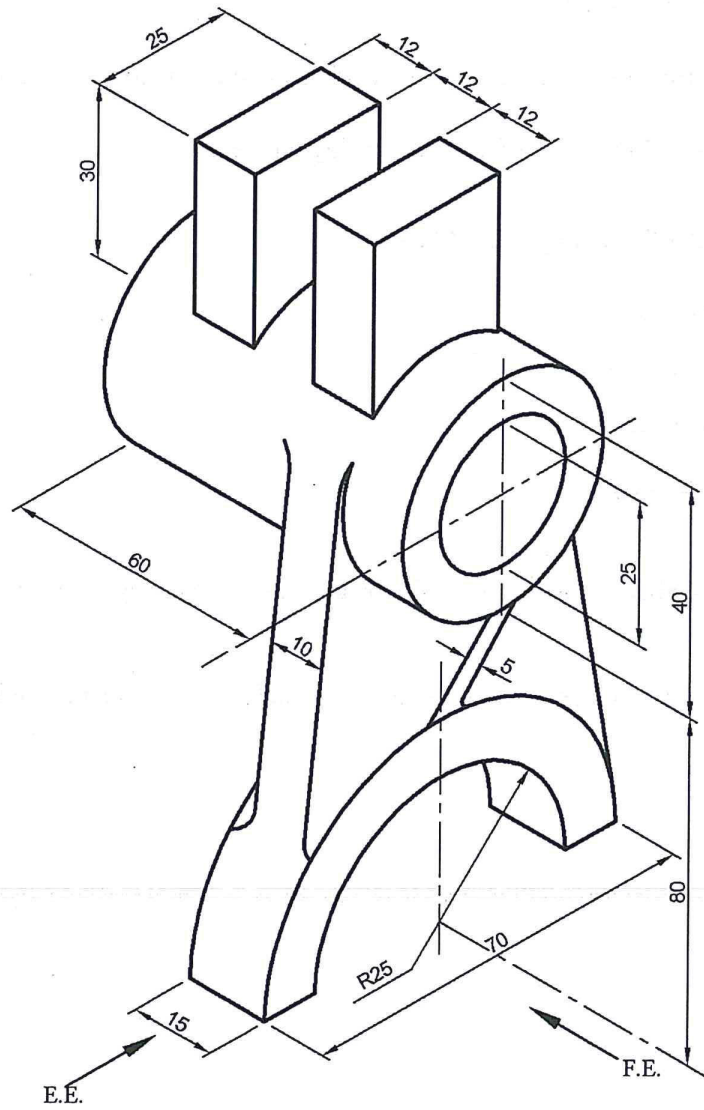


Figure 1

(14 marks)