3.23 AVIATION TECHNOLOGY (450)

3.23.1 Aviation Technology Paper 1 (450/1)

SECTION A (44 marks)

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

1 Outline the following:

   (a) **Four** safety precautions when using electrical equipment. (2 marks)

   (b) **Two** safety precautions when working on aircraft electrical system. (1 mark)

2 (a) State the use of each of the following types of rivets used in aircraft construction:

   (i) Countersunk head rivet, (2 marks)

   (ii) Mushroom head rivet.

   (b) Explain why aluminium alloy is preferred for use in aircraft construction. (1 mark)

3 (a) Highlight **two** functions for each of the following aircraft structural members:

   (i) Frame, (3 marks)

   (ii) Stringer,

   (iii) Skin.

   (b) Differentiate between eddy current and ultra-sonic methods of non destructive testing. (2 marks)

4 Distinguish between the following as applied in airport operations:

   (a) Flight plan and forecast, (2 marks)

   (b) Flight and ground visibility. (2 marks)

5 (a) Using sketches, explain the operation of each of the following pneumatic system valves:

   (i) Non-return, (2½ marks)

   (ii) Orifice. (2½ marks)
6  (a) Name **four** joining methods used in aircraft construction.  
    (b) State **two** advantages for each method in 6(a).

7  With the aid of a sketch, describe the three aircraft axes.

8  Explain the operation of each of the following jet engine components:
    (a) Compressor, 
    (b) Turbine, 
    (c) Exhaust.

9  Highlight the information given to the aircrew by the air traffic controller.

10 Sketch the symbols for each of the following:
    (a) Internal thread, 
    (b) Bearing, 
    (c) Spring, 
    (d) Long hollow tube or shaft.

**SECTION B** (56 marks)

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

11 **Figure 1** shows an aircraft locking bracket drawn in isometric projection.

    (a) Draw **Full Size** the following views in third angle projection:
        (i) Front elevation in the direction of arrow F.
        (ii) End elevation,
        (iii) Plan.
(b) Show the major dimensions. (4 marks)

Figure 1

12 (a) With aid of a labelled sketch describe the three aircraft propeller blade angles during flight. (10 marks)

(b) Describe the four forces which act on a propeller during flight. (4 marks)

13 (a) With aid of a labelled schematic diagram, explain the functions of each component of a basic hydraulic system. (12 marks)

(b) State four functions of a hydraulic system accumulator. (2 marks)

14 (a) Explain the importance and location of each of the following aircraft crash and rescue equipment:

(i) Escape slide,
(ii) Dinghy,
(iii) Life jacket,
(iv) Life raft. (8 marks)

(b) With the aid of sketches, show the difference between static and dynamic stability. (6 marks)

15 (a) Define each of the following terms as applied in aircraft instrument system:

(i) Dynamic pressure,
(ii) Static pressure. (2 marks)

(b) With the aid of a labelled diagram, describe a typical magneto primary circuit used on aeropiston engine.