INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;
Mathematical Tables/non programmable calculator;
Drawing instruments;
A set back development chart/J Chart.

Answer any FIVE of the EIGHT questions in this paper.
All questions carry equal marks.
Maximum marks for each part of a question are as indicated.
1. (a) Explain the relationship between pressure, volume and temperature as applied to an aircraft cabin atmosphere control. (4 marks)

(b) Outline the **four** principles of operation of an aircraft vapour-cycle air cooling system. (4 marks)

(c) With the aid of a labelled sketch, describe the operation of an aircraft vapour-cycle air conditioning system. (12 marks)

2. (a) Describe the application of each of the following aircraft fabrication:

   (i)  jigs;

   (ii) fixtures;

   (iii) developments. (6 marks)

(b) Explain the process of determining the bending allowance (BA) of sheet metal during aircraft repairs. Illustrate your answer. (7 marks)

(c) Given the following data:

   - plate thickness 0.071\";
   - radius of bend \(\frac{5}{32}\";
   - angle of bend 125\°;
   - open leg 7\";
   - flange 5\".

   Determine using the J chart provided the length of the material required to fabricate an aircraft spare part. Illustrate your answer. (7 marks)

3. (a) Outline **six** advantages of rigging aircraft cable controlled flight system. (6 marks)

(b) With the aid of sketches, explain how each of the following aircraft flight system components is specifically used:

   (i)  torque tube;

   (ii) bell crank;

   (iii) fairlead (6 marks)
4. (a) Name any four pieces of equipment used during aircraft painting and doping operation. (2 marks)

(b) Explain any four faults associated with aircraft painting stating the cause of each. (8 marks)

(c) Outline the procedure of painting an aircraft during a major check. (10 marks)

5. (a) (i) Explain the criteria of selecting aircraft brake lining materials. (4 marks)

(ii) State four methods of checking the serviceability of aircraft brakes. (4 marks)

(b) Explain the causes of each of the following aircraft brake faults:

(i) dragging; (2 marks)

(ii) grabbing; (2 marks)

(iii) fading. (2 marks)

(c) Sketch and label an aircraft dual-servo type expanding shoe brake assembly. (6 marks)

6. With the aid of a labelled schematic diagram describe the lay-out and operation of an aircraft pneumatic system. (20 marks)

7. (a) Differentiate between aircraft and engine fuel system. (2 marks)

(b) With the aid of a labelled block diagram, explain the layout and operation of a typical aircraft fuel system of a four engined jet aircraft. (18 marks)

8. (a) List five requirements of fire warning and protection system in accordance with Aircraft Airworthiness Authority. (5 marks)

(b) With the aid of labelled sketch, explain the operation of each of the following aircraft fire detection methods:

(i) smoke; (5 marks)

(ii) overheat; (5 marks)

(iii) thermocouple. (5 marks)
A setback development chart.