Code.No: 37149 | R05 | SET-2

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**IV.B.TECH - I SEMESTER REGULAR EXAMINATIONS NOV/DEC, 2009**
**FLIGHT VEHICLE DESIGN**
**(AERONAUTICAL ENGINEERING)**

**Time: 3hours** **Max.Marks:80**

**Answer any FIVE questions**
**All questions carry equal marks**

\- - -

1. Explain in detail, the various steps involved in sizing of an aircraft in the context of initial phase (16)

2. a) Prove that $\frac{L}{D}_{crvise}$ for a propeller air craft is same as $\frac{L}{D}_{\max}$ (8)

   b) It is observed that propeller aircraft is designed for a loiter of three hours at a distance of 8000 km. The crew weight is 300 Kg and pay load weight is 5000 Kg. The aircraft revises at a mach 0.8 at an attitude of 7.5 Km where the speed of the sound can be considered as 320m/sec. The maximum value of L/D is 16. Calculate the total take-off weight. Take specific fuel consumption of 0.015 gm/n/sec and $\frac{We}{Wo} = \frac{2.05}{Wo - 0.18}$ stop calculations after one or two iterations (8)

3. What are the factors influencing the choice of high, mid and low wings for an aircraft by considering all aspects of design affected by this factor? (16)

4. Design a fuselage with high wing to accommodate 100 passengers and 120 tones of cargo? (16)

5. a) What is meant by `layout` of an aircraft? (8)

   b) Explain various steps involved in the drawing of the layout of an aircraft? (8)

6. a) Describe vectored thrust with a neat sketch. (8)

   b) Derive the expression for thrust vector angle for a sustained turn. (8)

7. Discuss in details about various types of drags? (16)

8. Explain in detail about the following factors affect the aerodynamic design of an air craft.
   a) Wing – Fuselage integration (8)
   b) High lift devices (8)

*****