**Reg. No. \_\_\_\_\_\_\_\_**

**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination - June 2011**

**Subject Title: AIRCRAFT PERFORMANCE Time: 3 hours**

**Subject Code: 09AE216 Maximum Marks: 100**

#### **(Gas tables and steam tables permitted)**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. Define streamline.

2. \_\_\_\_\_\_\_\_\_ is the drag arising from the resolved components of the tangential stresses on the surface of a body.

3. \_\_\_\_\_\_\_\_\_ is the drag associated with the formation of shock waves in high speed flight.

4. The induced angle of incidence ε is given by ε = \_\_\_\_\_\_\_\_\_.

5. What are the conditions for steady, straight and level flight?

6. Stalling speed depends on \_\_\_\_\_\_\_\_\_.

7. Write the two ways to measuring the landing performance.

8. Retardation of the aircraft is normally caused partially by \_\_\_\_\_\_\_\_\_.

9. What is load factor?

10. The lift increases to the maximum value for the given V1, and hence the load factor \_\_\_\_\_\_\_\_\_ for the given V1.

**PART – B (5 x 3 = 15 MARKS)**

11. Write notes on Lift from a typical wing.

12. Write short notes on comparison of drag for various types of body.

13. Write the significance of E.A.S in level flight.

14. Derive this equation R= V (t2 –t1) = V/g.c. L/D log e (W1/W2).

15. Write the significance of Propeller Co-efficient and explain the power coefficient.

**PART – C (5 x 15 = 75 MARKS)**

16. Describe the details about airfoil characteristics.

(OR)

17. Write short notes on: a. Stream Line b. Skin friction drag c. Reynolds’s Number.

18. Describe the various types of drags formed on aircraft, and methods adopted to minimize it.

(OR)

19. a. What are the various parameters of the plan form geometry?

b. Describe about the pressure distribution on an airfoil.

20. Describe the conditions for Minimum Drag.

(OR)

21. An aircraft weighing 2,50,000 N has a wing area of 80 m2 and its drag equation is CD= 0.016 + 0.04 CL2. Calculate the minimum thrust required for straight and level flight, and the corresponding T.A.S at sea level and at 10,000m (√ρ = 0.58). Calculate also the minimum power required, and the corresponding T.A.S. at the above altitude?

[P.T.O]

22. Derive the calculation of takeoff ground run.

(OR)

23. a. Write short notes on High Lift Devices. (7)

b. An airplane weighs 1, 60,000N has a wing area of 42m2. At a flight speed of 100 m/sec, the engine give a thrust of 27,000N, if the aircraft drag equation is CD=0.014+0.05 CL2. Find the angle and rate of climb at sea level at 100 m/sec flight speed. (8)

24. Briefly explain about the V-n diagram.

(OR)

25. Derive the Froude Efficiency of the propeller system.