**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: AERODYNAMICS Time: 3 hours**

**Subject Code: 09AE205 Maximum Marks: 100**

#### **Answer ALL questions**

**PART – A (10 x 1 = 10 MARKS)**

1. Consider an aerofoil with free stream velocity 45m/s. Velocity at a given point on the air flow is 70m/s. The pressure coefficient at that point is \_\_\_\_\_\_\_\_\_\_.

2. The momentum equation for an in viscid flow is called as \_\_\_\_\_\_\_\_\_\_Equation.

3. According to the basic principle of continuity equation, \_\_\_\_\_\_\_\_\_\_ is conserved.

4. Unit of source strength is \_\_\_\_\_\_\_\_\_\_.

5. The angle between free stream line and chord line is called as \_\_\_\_\_\_\_\_\_\_.

6. The combination of source flow and sink flow gives \_\_\_\_\_\_\_\_\_\_.

7. At absolute ceiling, rate of climb is \_\_\_\_\_\_\_\_\_\_.

8. V-n diagram is a plot of \_\_\_\_\_\_\_\_\_\_ Vs \_\_\_\_\_\_\_\_\_\_.

9. The fluids used in Hele-shaw apparatus have same viscosity (True/False)

10. Laser-Doppler velocimetry uses two beams of collimated, \_\_\_\_\_\_\_\_\_\_ and\_\_\_\_\_\_\_\_\_\_ laser light.

**PART – B (5 x 3 = 15 MARKS)**

11. What are the advantages of swept wing?

12. State the importance of Blasius theorem in aerodynamics.

13. How is the induced drag reduced?

14. Define absolute ceiling and service ceiling.

15. Explain the principle of operation of a hotwire anemometer.

**PART – C (5 x 15 = 75 MARKS)**

16. What are the types of drags acting on aircraft components?

(OR)

17. Explain the NACA aerofoil numbering system.

18. State and prove Kutta-Joukowski equation.

(OR)

19. Explain thin aerofoil theory and obtain aerodynamic co-efficient for symmetrical airfoil.

20. Explain the drag reduction methods used in aircraft.

(OR)

21. Discuss the blade element theory of propellers.

[P.T.O]

22. Show that for a propeller driven airplane the maximum rate of climb is given by

Where η=propeller efficiency

P=Brake Horse power

Also discuss its implications.

(OR)

23. Define Take off distance and derive a suitable formula for estimating the same.

24. Explain the flow visualization techniques used in low speed wind tunnel.

(OR)

25. Explain the operation of hot-wire anemometer and Laser-Doppler anemometer.