

SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act,1956)

Course & Branch :B.E - AERO

Title of the Paper :Industrial Aerodynamics

Max. Marks :80

Sub. Code :526E08/AEE07

Time : 3 Hours

Date :08/03/2010

Session :AN

PART - A

(10 x 2 = 20)

Answer ALL the Questions

1. How is earth's atmosphere classified?
2. What is Coriolis Force?
3. What is a Windmill and what are its types?
4. Define Betz coefficient.
5. Draw the flow field of a Notch back Car.
6. List out the aerodynamic problems of Trains.
7. What is meant by Buildings Ventilation?
8. State the difference between laminar flow and turbulent flow in terms of Reynolds Number for an external flow.
9. What is an aero elastic model?
10. What is meant by Vortex Induced Vibrations?

PART – B

(5 x 12 = 60)

Answer All the Questions

11. What are the factors responsible for the creation of wind, Generation of wind and the variation of wind?
(or)
12. Explain how the earth's atmosphere is analyzed from an Industrial aerodynamics point of view. Discuss the generation of Atmospheric Boundary Layer.

13. A horizontal shaft, propeller type wind turbine is located at a place where wind speed is 12 m/s. Calculate the relevant important values if the wind turbine diameter is 51 m, wind turbine's rpm is 31, and the max. efficiency of the propeller is 23%.

(or)

14. Using momentum theory, derive the fundamental equation for the maximum efficiency and power of a wind turbine.

15. Explain in detail the Aerodynamic Problems on trains along with reasonably good figures.

(or)

16. (a) Explain how the aerodynamic drag can be reduced in a road vehicle.

(b) Operating principal of Hovercraft with sketch.

17. How is Atmospheric boundary Layer simulated in wind tunnels? How are the profiles dealt mathematically?

(or)

18. Explain the importance of wing tunnel balances and pressure scanners in wind engineering and explain the working principle of both.

19. Write notes on the following.

(a) Types of Flutter and its effect on Building structure.

(b) Divergence and galloping vibrations.

(or)

20. Write notes on effects of Reynolds Number on Wake Formation of Bluff Shapes with proper sketches.