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SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E – Aeronautical
Title of the Paper: Industrial Aerodynamics — Max. Marks: 80
Sub. Code: 526E08 — Time: 3 Hours
Date: 11/03/2011 — Session: FN

PART - A (10 X 2 = 20)

Answer ALL the Questions

1. Define Turbulence intensity.
2. What is Logarithmic wind profile?
3. Define Power Coefficient with respect to wind energy collector.
4. Compare industrial gas turbine with aircraft gas turbines.
5. Define Froude Number.
6. What are the wind loads on buildings estimated in wind tunnel tests?
7. State briefly on different aspects of Architectural Aerodynamics.
8. What is flow induced vibrations?
9. Draw neatly different flow patterns around a very tall chimney with circular rectangular cross section.
10. Differentiate between laminar body and bluff body.

PART – B (5 x 12 = 60)

Answer ALL the Questions

11. What are the types of winds in the atmosphere and what is it formed?

(or)

12. Explain the function and working principle of the following instruments:
    (a) Cup anemometer (b) Windmill anemometer

13. Derive an expression for power coefficient in case of ideal horizontal axis wind turbine with suitable assumptions.

(or)

14. Derive one-dimensional momentum theory with the assumptions.

15. What are the types of drag in case of road vehicles and how is it minimized?

(or)

16. Explain in detail the aerodynamics of different kinds of train by illustrating proper example along with neat figures.

17. Classify buildings briefly and sketch the wind forces acting over it.

(or)

18. Explain the design procedure for wind forces on buildings.

19. Write short notes on:
    (a) Vortex induced vibrations
    (b) Galloping and stall flutter

(or)

20. What is the effect of Reynolds number and Strohaul number on wake formation of Bluff Shapes?