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17AE752

Seventh Semester B.E. Degree Examination, July/August 2022
Wind Tunnel Techniques

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Write a short note on Need of Wing Tunnel Testing. (10 Marks)
b. The efficiency η of a fan depends on the density ρ , the dynamic viscosity μ of the fluid, the angular velocity W , diameter D of the rotor and the discharge Q , express η in terms of dimensionless parameter. (10 Marks)

OR

- 2 a. Explain Buckingham's π - Theorem. (10 Marks)
b. Describe the following : i) Geometric similarity ii) Kinematic similarity
iii) Dynamic similarity. (10 Marks)

Module-2

- 3 a. Explain with neat sketch, Blow down wind tunnel. (10 Marks)
b. Discuss the following : i) Power losses in a wind tunnel ii) Losses in diffuser. (10 Marks)

OR

- 4 a. Discuss with neat sketch, Low speed open circuit wind tunnel. (10 Marks)
b. Explain the following Flow Regime : i) Subsonic ii) Transonic. (10 Marks)

Module-3

- 5 a. Write a short note on Hot Wire Anemometer. (10 Marks)
b. With neat sketch, explain following Flow Angularities :
i) Claw yaw meter ii) Turbulence sphere. (10 Marks)

OR

- 6 a. Derive the column height to which the liquid column will rise in the tube at standard conditions. (10 Marks)
b. Write a note on following: i) Rakes ii) Surging. (10 Marks)

Module-4

- 7 a. With neat sketch, explain Micro manometer. (10 Marks)
b. Explain the working principle of Pitot – Static tube. (10 Marks)

OR

- 8 a. Briefly explain Supersonic Static Probe. (10 Marks)
b. Describe the working concept of Fluid Jet Anemometer. (10 Marks)

Module-5

- 9 a. Write a short note on Small Tunnels. (10 Marks)
b. Discuss Working of Piston tube. (10 Marks)

OR

- 10 a. Explain with neat sketch, Measurement of Wall shear using Fence technique. (10 Marks)
b. Describe with neat sketch, the working principle of Drag Body flow meter. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.