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

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Describe Buckingham's π -theorem. (08 Marks)
b. Describe various types of Wind Tunnel with applications. (08 Marks)

OR

- 2 a. Write a short note on Dimensional Homogeneity. (08 Marks)
b. The pressure difference Δp in a pipe of diameter D and length ℓ due to turbulent flow depends on the velocity V , Viscosity μ , density ρ and roughness K , using Buckingham's π - theorem, obtain an expression for Δp . (08 Marks)

Module-2

- 3 a. With a neat sketch, explain Blow down type wind tunnel. (08 Marks)
b. Explain with neat sketch : i) Honey combs ii) Screens. (08 Marks)

OR

- 4 a. Discuss with neat sketch, Return type Subsonic Wind Tunnel. (08 Marks)
b. Write short note on Flow Irregularities in Subsonic Wind Tunnel. (08 Marks)

Module-3

- 5 a. Explain Calibration of Wind Tunnel. (08 Marks)
b. Discuss how to calculate the Test Section Airspeed. (08 Marks)

OR

- 6 a. Explain with neat sketch, U - tube and Multi tube Monometers. (08 Marks)
b. A subsonic wind tunnel of square test section runs at 30m/s with pressure 97.325 KPa and temperature 22° C in the test section. A turbulence sphere with theoretical surface finish offering 4% blockage experiences critical Reynolds number at this state. Determine the test section height. (08 Marks)

Module-4

- 7 a. Explain with neat sketch, Inclined Monometer. (08 Marks)
b. Discuss with neat sketch, Dial - type pressure gauge. (08 Marks)

OR

- 8 a. Explain with neat sketch, Strain gauge type pressure transducer. (08 Marks)
b. Discuss the factor effecting Pitot - tube performance. (08 Marks)

Module-5

- 9 a. Discuss on Rotating Vane flow meter. (08 Marks)
b. Write a short note on Contraction section. (08 Marks)

OR

- 10 a. Explain with neat sketch, measurement of Wall Shear using Floating Element method. (08 Marks)
b. Briefly explain with neat sketch : i) Venturi ii) Flow nozzle iii) Orifice. (08 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.