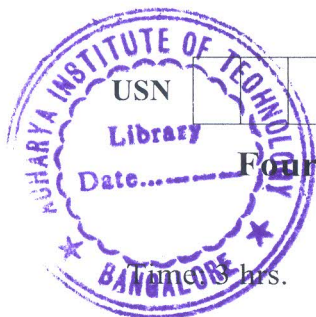


CBCS SCHEME



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17MT42

Fourth Semester B.E. Degree Examination, July/August 2021

Fluid Mechanics and Machines

hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Define the following properties of the fluid:
(i) Mass density (ii) Kinematic viscosity (iii) Surface tension
(iv) Dynamic viscosity (v) Specific gravity (vi) Weight density (12 Marks)
b. State and prove Pascal law. (08 Marks)
- 2 a. Derive an expression for hydrostatic law and state the statement of hydrostatic law. (08 Marks)
b. Define Manometer. Classification of Manometer. (06 Marks)
c. 500 Litre oil weights 60 kN. Calculate specific weight, mass density, specific volume, specific gravity. (06 Marks)
- 3 a. Define the following fluid flow:
(i) Steady and unsteady flow
(ii) Laminar and turbulent flow
(iii) Compressible and incompressible flow (09 Marks)
b. Derive an expression for continuity equation in 3 dimensional form with assumption. (11 Marks)
- 4 a. With assumption made, derive an expression for Bernoullies equation of motion starting from Euler equation of motion. (10 Marks)
b. A water is flowing through a taper pipe of length 100 mtr having diameter 600 mm at the upper end and 300 mm at lower end at the rate of 50 ltr/sec. Pipe has a slope of 1 in 30. Find the pressure at the lower end if pressure at the higher end is 19.62 N/mm². (10 Marks)
- 5 a. Write the procedure for solving Buckingham's π theorems and Raylie's method for solving fluid problems. (10 Marks)
b. Describe the following dimensionless number:
(i) Reynolds number (ii) Euler's number (iii) Webber number
(iv) Mach's number (v) Froude's number (10 Marks)
- 6 a. Derive an expression for discharge through venturimeter. (10 Marks)
b. Derive an expression for discharge through V-notch. (10 Marks)
- 7 a. Define turbo machine. Explain parts of turbo machines. (08 Marks)
b. Comparisons between turbo machines and positive displacement machines. (08 Marks)
c. Write classification of turbo machines. (04 Marks)
- 8 a. Derive an expression for Euler's turbine equation. (10 Marks)
b. Derive an expression for alternative form of Euler's equations. (10 Marks)
- 9 a. Derive an expression for maximum efficiency of Pelton turbine. (10 Marks)
b. With a neat sketch, explain working of Kaplan and Francies turbine. (10 Marks)
- 10 a. With a neat sketch, explain pressure compounding, velocity compounding. (10 Marks)
b. Derive an expression for maximum efficiency of single state steam turbine. (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.