Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

ME-4002-CBGS

B.E. IV Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Fluid Mechanics

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume data suitably.

1. a) Define the Newton's law of viscosity.
   b) State the Pascal's law and its applications.
   c) What is a manometer? How are they classified? Explain any one of them?

2. a) Differentiate between simple and inverted U-tube differential manometer.
   b) Define density, specific volume, weight density and specific gravity of fluid.
   c) 2 litre petrol weights 14N. Calculate the specific weight, mass density, specific volume and specific gravity of petrol with respect to water.

3. a) State Bernoulli's theorem. Mention the assumptions made
   b) The head of water over a rectangular notch is 900 mm. The discharge is 300 lit/sec. Find the length of the notch when Cd = 0.62.

4. a) Derive Bernoulli's equation for frictionless flow. Apply the necessary corrections for frictional flow..
   b) A horizontal venturimeter with inlet and throat diameters 240mm and 120mm respectively is used to measure the flow of water. The pressure intensity at inlet is 130kN/m^2 (gauge), while the vacuum pressure head at the throat is 150mm of mercury. Assuming that 3% of pressure head is lost in between inlet and throat. Find the coefficient of discharge and rate of flow.

5. a) What do you understand by laminar flow? What factor decides the type of flow in pipes?
   b) Obtain an expression for velocity distribution in terms of average velocity for smooth pipes.

6. The pressure difference 'Δp' between any two section for turbulent flow through a pipe depends on the pipe diameter 'D', length 'L', roughness of the pipe 'e', velocity 'v', viscosity 'μ', density 'e' using Buckingham's π theorem. Obtain an expression for 'Δp'

7. a) Derive an expression for total pressure and position of center of pressure for an inclined plane surface immersed in liquid.
   b) Explain the Buckingham-pi method of dimensional analysis with suitable example.

8. Write short notes on
   a) Non-Newtonian fluid
   b) Function of Pitot-Tube
   c) Dynamic similarity
   d) Stream function

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