

Code No: RT21016

R13

SET - 1

II B. Tech I Semester Supplementary Examinations, May/June - 2017
FLUID MECHANICS
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

PART -A

1. a) What is differential manometer? Where it is used? (4M)
- b) What is a flow net? What are its uses? (4M)
- c) Write the Bernoulli's equation for steady flow and state the necessary conditions that need to be satisfied. (4M)
- d) What is Magnus Effect? (3M)
- e) Show the Moody's chart schematically and explain its significance. (4M)
- f) What are notches? Explain any one notch with a neat sketch. (3M)

PART -B

2. a) Derive the equation for capillarity depression when a small glass tube is inserted in mercury. (6M)
- b) The space between two parallel plates kept 3m apart is filled with an oil of dynamic viscosity 0.2 Pa.s. What is the shear stress on the lower fixed plate, if the upper one is moved with a velocity of 1.50 m/sec? (10M)
3. a) What is a centre of pressure? Derive the equation for the centre of pressure for a submerged plane surface in a fluid. (6M)
- b) A triangular plate with base 2 m and height of 4 m is immersed in water and the plane of the plate makes an angle 30° with the free surface of water. The base is parallel to water surface and 2 m below the free water surface. Find out the total pressure acting on the plate and the centre of pressure from free surface of water. (10M)

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4. a) Derive the Euler's equations of motion for three dimensional steady state incompressible non viscous flow. (8M)
- b) A water pipe changes in diameter from 400mm at section A to 800mm at section B which is 7 m above. The pressures at A and B are 100 KPa and 75 KPa respectively. The discharge is 400 litres/sec. Find the direction of flow. (8M)
5. a) Explain the development of boundary layer formation over a flat plate. (8M)
- b) Define drag and lift. Explain how Boundary layer separation takes place. (8M)
6. a) State the principles for flow through branched pipes. (6M)
- b) A pipe line 30 cm in diameter 1500 m long is used to connect two tanks and has a slope of 1 in 100. The water level in the first tank is 10 m above inlet of the pipe and water level in the second tank is 2 m above the outlet of the pipe. Considering only frictional losses, find the flow rate through the pipe. Also draw TEL and HGL lines. Take friction factor as 0.005. (10M)
7. a) Derive an expression for discharge over a broad crested weir. (6M)
- b) A venturimeter is used for measuring the flow of petrol in a pipe line inclined at 35 degrees to horizontal. The specific gravity of the petrol is 0.81 and throat area ratio is 4. If the difference in mercury levels in the gauges is 50mm, calculate the flow if the pipe diameter is 0.3m. Take coefficient of discharge as 0.975. (10M)