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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester (R16) Regular Examinations November 2017
FLUID MECHANICS
(Civil Engineering)**

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 X 12 = 60 Marks)

UNIT-I

- 1 a Define the following terms:
i) Specific weight ii) Kinematic viscosity 4M
- b The velocity distribution over the plate is given by $u = \frac{2}{3}y - y^2$ in which u is the velocity in m/sec at a distance y m above the plate. Determine the shear stress at $y=0.01$ and 0.2 m. Take $\mu=6$ poise. 8M

OR

- 2 a A 6m deep tank contains 4 m of water and 2m of oil of relative density 0.88. Determine the pressure at the bottom of the tank. 4M
- b Classify various types of manometers in practice. State their merits and demerits. 8M

UNIT-II

- 3 a Define and distinguish between steady and unsteady flow and uniform and non-uniform flow. 4M
- b Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passes through a pipe BC 1.5m. At C, the pipe branches. Branch CD is 0.8m in diameter and carries one-third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE. 8M

OR

- 4 a Define kinetic energy correction factor. State its range for laminar and turbulent flow. 4M
- b In a smooth pipe of uniform diameter 25 cm, a pressure of 50 kPa was observed at section 1 which was at elevation 10.00m. At another section 2 at elevation 12.00m the pressure was 20 kPa and the velocity was 1.25 m/s, determine the direction of flow and the head loss between these two sections. The fluid in the pipe is water. 8M

UNIT-III

- 5 In a hydrosystem the flow availability was estimated as 86.4×10^3 /day. The head of fall was estimated as 600m. The distance from the dam to the power house considering the topography was estimated as 3000m. The available pipe have friction factor 0.014. Determine the pipe diameter for transmitting maximum power, and also calculate the velocity and power transmitted. 12M

OR

- 6 a Distinguish between major energy loss and minor energy loss in pipes? 4M
b Derive expression for head loss in pipe due to a sudden expansion. 8M

UNIT-IV

- 7 a Explain Rotameter (Float meter) with neat sketch? 6M
b A pitot static tube is mounted on an aircraft travelling at a speed 300 kmph against a wind velocity of 20 kmph. If the specific weight of air is 12 N/m^2 determine the pressure difference the instrument will register. 6M

OR

- 8 a Find the expression for the Discharge over a Triangular notch or weir 8M
b What should be the width of a rectangular notch that should be used to measure the water flow rate of $0.5 \text{ m}^3/\text{s}$ in an open channel. The head causing the flow should not exceed half the notch width. Assume the coefficient of discharge of the rectangular notch as 0.6. 4M

UNIT-V

- 9 Derive an expression for the velocity distribution for viscous flow through a circular pipe. Also sketch the velocity distribution and shear stress distribution across a section of the pipe. 12M

OR

- 10 a Define boundary layer thickness. Enumerate various methods of measuring boundary layer thickness 4M
b In a Nuclear power plant located near the sea a chimney of 1.2m diameter and 35 m height has been installed. During a cyclone the wind reaches velocity in the range of 60 kmph. Determine the moment at the base of the chimney. 8M

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