#### Q.P. Code: 16CE112



Reg. No:

#### SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR (AUTONOMOUS)

#### B.Tech II Year I Semester Supplementary Examinations August-2021 FLUID MECHANICS & HYDRAULIC MACHINERY

(Common to ME & AGE)

Time: 3 hours

1

Max. Marks: 60

(Answer all Five Units  $5 \times 12 = 60$  Marks)

# UNIT-I

- **a** State the Newton's law of viscosity. Differentiate kinematic viscosity and **6M** dynamic viscosity. Give their dimensions.
- b The pressure outside the droplet of water of diameter 0.04 mm is 10.32 N/cm<sup>2</sup>. 6M Calculate the pressure within the droplet if surface tension is given as 0.0725 N/m of water.

#### OR

- 2 a Explain how you would find the resultant pressure on a curved surface immersed 6M in the liquid.
  - b A rectangular plane surface 3 m wide and 4 m deep lies in water in such a way 6M that its plane makes an angle of 30° with the free surface of water. Determine the total pressure force and position of center of pressure, when the upper edge is 2 m below the free surface.

### UNIT-II

3 Obtain an expression for continuity equation for three - dimensional flow. 12M

#### OR

- 4a Derive momentum equation and impulse momentum equation.5M
  - b A vertical wall is of 8 m height. A jet of water is coming out from a nozzle with a velocity of 20 m/s. The nozzle is situated at a distance of 20 m from the vertical wall. Find the angle of projection of the nozzle to the horizontal so that the jet of water just clears the top of the wall.

# UNIT-III

5 The difference in water surface levels in two tanks, which are connected by three 12M pipes in series of lengths 300 m, 170 m, 210 m and of diameters 300 mm, 200 mm, 400 mm respectively, is 12 m. Determine the rate of flow of water if co-efficient of friction are 0.005, 0.0052 and 0.0048 respectively, considering :(i) minor losses also (ii) neglecting minor losses.

#### OR

6 An external cylindrical mouth piece of diameter 150 mm is discharging water under 12M a constant head of 6 m. Determine the discharge and absolute pressure head of water at venacontracta. Take  $C_d=0.855$  and  $C_c$  for venacontracta = 0.62 and atmospheric pressure head = 10.3 of water.

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	UNIT-IV	
7	What is similitude? Describe the types of similarities.	12M
	OR	
8	a Explain about dimensional analysis.	6M
	<ul> <li>b The pressure drop in an aeroplane model of size 1/10 of its prototype is 180 N/ cm<sup>2</sup>. The model is tested in water find the corresponding pressure drop in the prototype. Take density of air = 1.24 kg / m<sup>3</sup>. The viscosity of water is 0.01 poise, while the viscosity of air is 0.00018 poise.</li> </ul>	6M
9	Explain the working principle of Pelton wheel turbine with a neat sketch.	12M
	OR	
10	Describe briefly about pumps in series and pumps in parallel.	12M

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