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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   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	State the Newton's law of viscosity. Differentiate kinematic viscosity and dynamic viscosity. Give their dimensions.	6M
	b	The pressure outside the droplet of water of diameter **0.04 mm** is **10.32 N/cm²**. Calculate the pressure within the droplet if surface tension is given as **0.0725 N/m** of water.	6M

OR

2	a	Explain how you would find the resultant pressure on a curved surface immersed in the liquid.	6M
	b	A rectangular plane surface **3 m** wide and **4 m** deep lies in water in such a way that its plane makes an angle of **30⁰** 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.	6M

UNIT-II

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

OR

4	a	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.	7M

UNIT-III

5	The difference in water surface levels in two tanks, which are connected by three 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.	12M

OR

6	An external cylindrical mouth piece of diameter **150 mm** is discharging water under 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.	12M

UNIT-IV

7 What is similitude? Describe the types of similarities.   **12M**

OR

8 a Explain about dimensional analysis.   **6M**

   b The pressure drop in an aeroplane model of size **1/10** of its prototype is **180 N/cm²**. The model is tested in water find the corresponding pressure drop in the prototype. Take density of air = **1.24 kg / m³**. The viscosity of water is **0.01 poise**, while the viscosity of air is **0.00018 poise**.   **6M**

UNIT-V

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**

*** END ***