Q.P. Code: 16CE112 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations Feb-2021

FLUID MECHANICS & HYDRAULIC MACHINERY

(Mechanical Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	a	State Pascal's law. What do you understand the terms Absolute, Gauge, atmospheric & vacuum pressure?	**6M**
	b	What is the gauge pressure at a point 3m below the free surface of a liquid having a density 1.53 x 10^3 kg/m^3. If the atmospheric pressure is equivalent to 750mm of mercury? The Specific gravity of mercury is 13.6 and density of water=1000 kg/m^3.	**6M**

OR

2		Define Manometer. Briefly explain the types of Manometers in detail?	**12M**

UNIT-II

3	a	Define stream line, streak line and path line, stream tube and control volume?	**6M**
	b	The velocity vector in a fluid flow $V= 4x^3i - 10x^2yj + 2tk$, find the velocity and acceleration of a fluid particle at (2, 1, 3) at time t=1	**6M**

OR

4	a	If for a two – dimensional potential flow, the velocity potential is given by Ø = x(2y–1). Determine the velocity at the point P (4, 5). Determine also the value of stream function Ψ at the point P	**6M**
	b	A 30cm diameter pipe, conveying water, branches into two pipes of diameters 20cm and 15cm respectively. If the average velocity in the 30cm diameter pipe is 2.5 m/s. Find the discharge in the pipe. Also determine the velocity in 15cm pipe if the average velocity in 20cm diameter pipe is 2 m/s	**6M**

UNIT-III

5		Derive the expression for head loss in pipes due to friction by using Darcy – Weisbach equation.	**12M**

OR

6	a	The following data relate to an orifice meter Diameter of the pipe = 240mm Diameter of the orifice = 120mm Specific gravity of oil = 0.88 Reading of differential manometer = 400mm of mercury Co – efficient of discharge of the meter = 0.65 Determine the rate of flow of oil.	**6M**
	b	An orifice meter with orifice diameter 10cm is inserted in a pipe of 20cm diameter. The pressure gauges fitted upstream and downstream of 19.62N/cm^2 and 9.81N/cm^2 respectively co-efficient of discharge for the meter is given as 0.6. Find the discharge of water through pipe.	**6M**

UNIT-IV

7		Describe Froude model law and scale ratios briefly	**12M**

OR

8		What is similitude and describe the types of similarities?	**12M**

UNIT-V

9		Describe briefly definitions of heads and efficiencies of a turbine	12M
		OR	
10	a	Write a note on work done by the centrifugal pump(impeller) on water .	6M
	b	Describe briefly definition of heads and efficiencies of a centrifugal pump.	6M

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