R18

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular Examinations Nov/Dec 2019
FLUID MECHANICS & FLUID MACHINES
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 60

PART-A
(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	Define viscosity.	**2M**
	b	What is flow net?	**2M**
	c	List the minor energy losses in pipes.	**2M**
	d	Define dynamic similarity.	**2M**
	e	Write short notes on Draft tube.	**2M**

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	**a**	Calculate the specific weight, mass density and specific gravity one litre of a liquid and which weight is 7 N.	**5M**
	b	The surface tension of water in contact air at 20^0 C is 0.072 N/m. The pressure inside of water droplet of water is to be 0.02 N/cm^2 greater than the outside pressure. Calculate the diameter of the droplet of water.	**5M**

OR

3	**a**	What do you mean by single column manometer? How are they used for the measurement of pressure?	**5M**
	b	Calculate the capillary raise in a glass tube of 2.5mm diameter when immersed vertically water & mercury. Take surface tension is 0.0725 N/m for water and 0.52 N/m for mercury. The specific gravity of mercury is given 13.6 and angle of contact is 130^0.	**5M**

UNIT-II

4	**a**	Derive Bernoulli's equation.	**5M**
	b	The velocity vector in a fluid flow is V= 4x^{3}i-10x^{2}yj+2tk, find the velocity and acceleration of a fluid particle at (2, 1, 3) at time t=1.	**5M**

OR

5	**a**	Derive momentum equation and impulse momentum equation.	**5M**
	b	Define the terms: Stream line, streak line, path line, stream tube and control volume.	**5M**

UNIT-III

6	**a**	A horizontal venture meter with 30cm diameter inlet and 10cm throat is used for measuring the flow of water through a pipeline. If pressure in pipe is 1.5kpa and the vacuum pressure at the throat is 40cm of mercury, calculate the rate of flow. It may be presumed that 5% of differential head is lost between the pipe main and the throat section. Also make calculations for the discharge co-efficient take specific weight of water = 10kN/m.	**5M**
	b	Explain pitot tube and pitot static tube.	**5M**

OR

7		Explain the principle of orifice meter and derive the equation to find the rate of flow of water through a pipe using the same.	**10M**

UNIT-IV

8 **a** Write a short note on model law.   5M
   b The time period (t) of a pendulum depends upon the length (l) of the pendulum and   5M
       acceleration due to gravity (g). Derive expression for time period.

OR

9 Write a note on   a) Euler's model law   b) Weber model law c) model law.   10M

UNIT-V

10 **a** Derive the expression for velocity triangles and work done for Pelton wheel.   5M
   b Describe briefly definition of heads and efficiencies of a centrifugal pump.   5M

OR

11 A Pelton wheel is to be designed for a head of 60 m when running at 200r.p.m. The Pelton   10M
   wheel develops 95.6475kW shaft power. The velocity of the buckets =0.45times the velocity
   of the jet, overall efficiency =0.85 and co-efficient of the velocity is equal to 0.98.

*** END ***