Q.P. Code: 16CE106 **R16**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations Nov/Dec 2019

FLUID MECHANICS

(Civil Engineering)

Time: 3 hours Max. Marks: 60

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

UNIT-I

1	**a**	Derive expression for capillary rise.	**6M**
	b	Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in i) water ii) mercury take surface tension 0.0725 N/m for water and 0.52 N/m for mercury in contact with air. The specific gravity of mercury is 13.6and angle of contact 130º.	**6M**

OR

2		Derive expressions for the total pressure and centre of pressure for an inclined plane surface submerge in the liquid.	**12M**

UNIT-II

3	**a**	Define stream line, streak line and path line, stream tube and control volume.	**6M**
	b	A stream function is given by $\psi = 5x - 6y$. Calculate the velocity components and also magnitude and direction of the resultant velocity at any point.	**6M**

OR

4	**a**	State Bernoulli's theorem for steady flow of an incompressible fluid.	**6M**
	b	Water is flowing through a pipe has diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm^2 and the pressure at the upper end is 9.81 N/cm^2. Determine the difference in datum head if the rate of flow through pipe is 40 lit/s.	**6M**

UNIT-III

5		Derive the expression for head loss in pipes due to friction by Darcy - Weisbach equation and chezy's formula.	**12M**

OR

6	**a**	Derive the expression for flow through parallel pipes.	**4M**
	b	A Siphon of diameter 200 mm connects two reservoirs having a difference in elevation of 20 m. The length of the siphon is 500 m and the summit is 3.0 m above the water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100 m. Determine the discharge through the siphon and also pressure at the summit. Neglect minor losses. The co efficient of friction is 0.005.	**8M**

UNIT-IV

7	**a**	Explain Pitot tube with neat sketch.	**6M**
	b	In a 100mm diameter horizontal pipe a venture meter of 0.5 contraction ratio has been Fixed. The head of water on the meter when there is no flow in 3m (gauge). Find the rate of flow for which the throat pressure will be 2m of water is 0.97 take atmospheric pressure head = 10.3m of water.	**6M**

OR

8	**a**	Differentiate between sharp-crested weir and Board-crested weir.	**6M**
	b	Find the discharge over a triangular notch of angle 60 when the head over the V-Notch is 0.3M assume Cd is 0.6	**6M**

UNIT-V

9	An oil of viscosity 0.1 Ns/m^2 and relative density 0.9 is flowing through a circular pipe of diameter 50mm and length 300 m. The rate of flow of fluid through a circular pipe is 3.5 lit/sec. Find the pressure drop in a length of 300m and also the shear stress at the pipe wall.	**6M**
	OR	
10	Explain boundary layer thickness, displacement thickness, momentum thickness and energy thickness.	**6M**

*** END ***