R16

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations November-2020
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** Explain the phenomenon of capillarity. Obtain an expression for capillary rise of a liquid. **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 30^0 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 **a** Define the terms: Stream line, streak line, path line, stream tube and control volume. **8M**

b Explain different types of flow. **4M**

OR

4 **a** Explain about energy correction factor, momentum correction factor and total gradient line. **7M**

b A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s. Find the discharge in the pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe. **5M**

UNIT-III

5 **a** Write short notes on: i) Moody's chart ii) Reynolds Experiment. **6M**

b An orifice meter with orifice diameter 10 cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter gives readings of 19.62 N/cm2 and 9.81 N/cm2 respectively. Co-efficient of discharge for the orifice meter is given as 0.6. Find the discharge of water through pipe. **6M**

OR

6 Derive an expression for the loss of head in pipes due to friction by using Darcy - Weisbach equation. **12M**

UNIT-IV

7   **a**   Describe Buckingham's pi- theorem.   **6M**

      b   The time period (t) of a pendulum depends upon the length (l) of the pendulum and Acceleration due to gravity (g). Derive expression for time period.   **6M**

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   **a**   Derive the expression for specific speed.   **6M**

      b   Write a note on minimum starting speed.   **6M**

OR

10   Describe briefly definitions of heads and efficiencies of a turbine   **12M**

*** END ***