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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech II Year I Semester Supplementary Examinations November-2020**

**FLUID MECHANICS**

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

**UNIT-I**

- 1 a** Write short notes on surface tension and derive expression for surface tension on a liquid jet. **6M**
- b** The pressure outside the droplet of water of diameter 0.04 mm is 10.32 N/cm<sup>2</sup> (atmospheric pressure). Calculate the pressure within the droplet if surface tension is given a 0.0725 N/m of water. **6M**

**OR**

- 2 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  $1.53 \times 10^3 \text{ kg/m}^3$ . If the atmospheric pressure is equivalent to 750mm of mercury. The Specific gravity of mercury is 13.6 and density of water =  $1000 \text{ kg/m}^3$  **6M**

**UNIT-II**

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

**OR**

- 4** The velocity vector in a fluid flow  $V = 4x^3 \mathbf{i} - 10x^2 y \mathbf{j} + 2tz \mathbf{k}$ , find the velocity and acceleration of a fluid particle at (2, 1, 3) at time  $t=1$ . **12M**

**UNIT-III**

- 5** The rate of flow of water through a horizontal pipe is  $0.25 \text{ m}^3/\text{s}$ . The diameter of the pipe which is 200 mm is suddenly enlarged to 400mm. The pressure intensity in the smaller pipe is  $1.772 \text{ N/cm}^2$ . Determine: **12M**
- i) Head loss due to sudden enlargement.
- ii) Pressure intensity in the large pipe.
- iii) Power lost due to enlargement.

**OR**

- 6** The difference in water surface levels in two tanks which are connected by three pipes in series of lengths 300m, 170m and 210m and diameters of 300mm, 200mm and 400mm respectively is 4m. Determine the rate of flow of water if coefficients of friction are 0.005, 0.0052, 0.0048 respectively, considering
- i) minor losses
  - ii) neglecting minor losses

**UNIT-IV**

- 7 a** What is a notch? Explain about Classifications of notch? **6M**
- b** Determine the height of a rectangular weir of length 6m to be built across a rectangular channel. The maximum depth of water on the upstream. **6M**

**OR**

- 8** Explain the principle of venturimeter with neat sketch? Also derive the expression of rate of flow of Fluid through on it. **12M**

**UNIT-V**

- 9 a** Explain the Reynolds's experiment with neat sketch. **6M**
- b** Define Reynolds's number and derive the expression for Reynolds's number? **6M**

**OR**

- 10 a** Explain the separation of Boundary layer? **6M**
- b** Find the displacement thickness, the momentum thickness for the velocity distribution in the boundary layer given by  $u/U = y/\delta$ , where  $u$  is the velocity at a distance  $y$  from the plate and  $u=U$  where  $\delta$ =Boundary layer thickness. **6M**

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