



**B.Tech III Semester Supplementary Examinations, July 2022**  
**FLUID MECHANICS**  
**(CIVIL ENGINEERING)**

Maximum Marks: 70

Date: 27.07.2022 Duration: 3 hours

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What is Pascal's law
- 2 Give the position of centre of pressure with respect to centre of gravity in general. Also give the reason.
- 3 Define path line and streak line
- 4 What is flownet?
- 5 What does Hydraulic gradient line represent?
- 6 What is a mouth piece?
- 7 Define velocity of approach
- 8 What is Darcy's equation?
- 9 Define boundary layer
- 10 What do you mean by drag lift?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 What do you understand by single column manometer? Deduce the expression for pressure measurement with help of neat sketches. [10]  
OR
- 12 An isosceles triangle of 4 m base and 6 m height is located vertically in the water whose height is parallel to free surface of water and its vertical height from free surface of water is 8 m. determine the pressure force acting on it and location of centre of pressure both vertically and laterally. [10]
- 13 Determine whether the following velocity components satisfy the continuity equation.  
i)  $u = cx, v = -cy$  ii)  $u = -cx/y, v = c \log xy$  [10]  
OR
- 14 Define the equation of continuity. Obtain the expression for continuity equation in three dimensions? [10]
- 15 Explain the principle of venturimeter. Also derive the expression for rate of flow using a venturimeter when there is a flow through a pipe line. [10]  
OR
- 16 Differentiate between broad crested weir and narrow crested weir and derive an expression for broad crested weir [10]
- 17 Find the head lost due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3 m/s using (i) Darcy formula, (ii) Chezy's formula for which  $C = 60$ . [10]

OR

- 18 Derive an expression for head loss due to sudden enlargement in a pipe flow. [10]  
19 Write about separation of boundary layer and also write how to control boundary layer separation [10]

OR

- 20 Find the displacement thickness, the momentum thickness and energy thickness for the velocity distribution in the boundary layer given by  $u/U = 2(y/\delta) - (y/\delta)^2$ . [10]