

Total No. of Questions : 4]

SEAT No. :

PC-383

[Total No. of Pages : 2

[6359]-503

S.E. (Civil Engineering) (Insem.)

FLUID MECHANICS

(2019 Pattern) (Semester - III) (201003)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Answer Q.1 or Q.2, Q.3 or Q.4.
- 2) Answer to the all questions should be written in single answer book.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Figures to the right indicate full marks.
- 5) Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator (non programmable) and steam tables is allowed.
- 6) Assume suitable data, if necessary.

Q1) a) Define i) Specific Gravity ii) Specific Volume iii) Vapor pressure  
iv) Mass Density v) Capillarity vi) Viscosity vii) Surface Tension  
viii) Specific Weight. [8]

b) Derive the expression with usual notations for the total pressure and centre of pressure on inclined plane surface. [7]

OR

Q2) a) Calculate the specific weight, specific mass, specific volume and specific gravity of a liquid having a volume of  $6 \text{ m}^3$  and weight 45 kN. [5]

b) Differentiate between Real Fluid and Ideal Fluid. [2]

c) A 3.6 m by 1.5 m wide rectangular gate BC is vertical and is hinged at point 0.15 m below the centre of gravity of the gate. The total depth of water is 6.1 m What horizontal force must be applied at the bottom of the gate to the keep the gate closed? [8]

Q3) a) The water is flowing through a tapering pipe having diameters 300 mm and 150 mm at section 1 and 2 respectively. The discharge through the pipe is 42 lit/s. The section 1 is 10 m above datum and section 2 is 6 m above datum. Find the pressure at section 2 if that at section 1 is  $401 \text{ kN/m}^2$ . [7]

b) Derive the continuity equation for three-dimensional flow with usual notations. [8]

OR

P.T.O.

**Q4) a)** Explain in brief with neat sketch : i) Venturimeter ii) Pitot Tube iii) Rotameter. [3+3+2=8]

b) For a two-dimensional flow  $\psi = 3xy$  and  $\phi = \frac{3}{2}(y^2 - x^2)$ . Determine the velocity components at the points (1, 3) and (3, 3). Also, find the discharge passing through the points given above. [7]

