

Total No. of Questions : 12]

SEAT No. :

**P4594**

[Total No. of Pages : 3

**[4957] - 224**

*Time : 3 Hours]*

*[Max. Marks :100*

*Instructions to the candidates:*

- 1) *Attempt Q1 or 2, Q3 or 4, Q5 or 6, Q7 or 8, Q9 or 10, Q11 or 12.*
- 2) *Figures to the right indicate full marks.*
- 3) *Use of electronic calculators is allowed.*
- 4) *Draw neat sketch where ever necessary.*

**SECTION - I**

- Q1)** a) For water at 30°C, convert a kinematic viscosity of 0.01 cm<sup>2</sup>/ sec to Centi-stoke , Pa-sec, poise and centipoise. [8]
- b) Distinguish between (i) Newtonian and Non-Newtonian fluids (ii) Adhesion and Cohesion (iii) Dynamic and Kinematic viscosity. [8]

OR

- Q2)** a) Give the applications of Newton's law of viscosity. [8]
- b) Draw the rheological diagram and show various types of fluids in it. Give at least two examples of each. [8]
- Q3)** a) Explain the applications of fluid kinematics. [9]
- b) Explain the velocity potential function and stream function. Derive the laplace equation for both functions. [9]

OR

**P.T.O.**

- Q4)** a) Write a short note on the stream function and the velocity potential function. [9]
- b) With a neat diagram show absolute pressure, positive and negative gauge pressures, standard atmospheric pressure with the gauge pressure. Convert pressure of 2000 Pa into GPa absolute and other any 2 pressure units. [9]
- Q5)** a) Derive Euler's equation of motion and hence obtain the Bernoulli equation from it. Explain the 4 modifications to the Bernoulli equation with examples. [8]
- b) A 35 cm throat diameter and 55 cm inlet diameter venturimeter is installed in a vertical pipe carrying water. The flow is in upward direction. The difference between the levels of throat and inlet is 85 cm. the water - mercury differential manometer gives deflection of 17.5 cm of mercury. Find the discharge of water. Take coefficient of discharge of meter as 0.98. [8]

OR

- Q6)** a) Explain principle and construction of Venturimeter. Derive the expression for flow rate through venturimeter. [8]
- b) A Pipeline carrying oil of specific gravity 0.9 changes in diameter from 200 mm at position 1 to 500 mm diameter at position 2 which is 4 meters at higher level. If the pressures at 1 and 2 are 100 KN/m<sup>2</sup> and 60 KN/m<sup>2</sup> respectively and the discharge is 0.2 m<sup>3</sup>/sec, determine the loss of energy in terms of head and justify the direction of flow. [8]

### SECTION - II

- Q7)** a) Explain the utility of Moody's Chart. [8]
- b) Explain the following : [8]
- Hydraulic diameter.
  - Equivalent length.
  - No slip condition.
  - Hydrodynamic rough boundary.

OR

