

Total No. of Questions : 10]

SEAT No. :

P3651

[5560]-607

[Total No. of Pages : 2

T.E. (Chemical)

TRANSPORT PHENOMENA

(2015 Course) (309349)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data if necessary.

Q1) Derive the expressions for Momentum flux, velocity profile, maximum velocity, average velocity for a flow through circular tube. **[10]**

OR

Q2) Derive the expressions of heat flux and temperature distribution for a nuclear heat source. **[10]**

Q3) Derive the expressions for molar flux, concentration profile and average concentration for diffusion into stagnant gas film. **[10]**

OR

Q4) Explain the different time derivatives. **[10]**

Q5) Derive the Equation of Motion. **[18]**

OR

Q6) a) Derive the Continuity Equation. **[12]**

- b) Glycerine at 26.5°C is flowing through a horizontal tube 1 ft long and 0.1 in. inside diameter. For a pressure drop of 40 psi, the flow rate is 0.00398 ft³/min. The density of glycerine at 26.5°C is 1.261 g/cm³. Find the viscosity of glycerine in centipoises. **[6]**

P.T.O.

Q7) Derive the expression for Fanning Friction factor. **[16]**

OR

Q8) Derive expressions for friction factors for flow in tubes. **[16]**

Q9) Write short note on Reynolds Analogy and Prandtl Analogy. **[16]**

OR

Q10) Derive the correlation for binary mass transfer coefficient in two phases at low mass transfer rates. **[16]**

