

Total No. of Questions : 10]

SEAT No. :

P3554

[5560]-207

[Total No. of Pages : 2

T.E. (Chemical)

TRANSPORT PHENOMENA
(2012 Course) (Semester-II) (309349)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Neat diagrams must be drawn wherever necessary.*
- 2) Figures to the right side indicate full marks.*
- 3) Use of logarithmic tables slide rule mollier charts electronic pocket calculator and steam table is allowed.*
- 4) Assume suitable data if necessary.*

Q1) Derive expression of velocity distribution for falling film with variable viscosity. **[10]**

OR

Q2) Derive the expression of temperature distribution for viscous heat source for Newtonian fluid. **[10]**

Q3) Derive expression of molar flux for diffusion with polymerization instantaneous chemical reaction. **[10]**

OR

Q4) a) Explain thermal energy balance equation. **[5]**

b) Explain boundary conditions to solve momentum transfer problems. **[5]**

Q5) Derive equation of motion for Cartesian coordinate system. **[18]**

OR

P.T.O.

Q6) a) Use Navier stokes equation of motion and derive expression of velocity distribution for laminar flow of fluid through the tube. [12]

b) Explain different types of derivatives used in equation of change. [6]

Q7) Derive expressions of pressure rise and friction loss occurring in sudden enlargement of a pipeline. [16]

OR

Q8) a) Derive the expression of friction factor for turbulent flow. [8]

b) Derive the expression of fanning friction factor. [8]

Q9) a) Explain Chilton-Colburn analogy. [8]

b) Explain Reynold's and Prandlt analogy. [8]

OR

Q10)a) Discuss transfer coefficients at high transfer rates by penetration theory.[8]

b) Explain binary mass transfer coefficient in one phase at low mass transfer rates. [8]

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