

Code No: RT41081

R13

Set No. 1

IV B.Tech I Semester Supplementary Examinations, February/March - 2017

TRANSPORT PHENOMENA

(Chemical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any THREE questions from Part-B

PART-A (22 Marks)

1. a) What is effect of temperature on thermal conductivity of gases & liquids? [4]
- b) Write the assumptions in flow through circular tube? [3]
- c) What is the use of fins in heat exchangers? [3]
- d) Write the assumptions in “diffusion into a falling liquid film”? [4]
- e) Write equation of change in polar coordinates? [4]
- f) What is time smoothing of equation of change? [4]

PART-B (3x16 = 48 Marks)

2. a) Air at 27⁰C flows normal to a 73⁰C, 30 mm o.d. water pipe. The air moves at 1m/s. Estimate the rate of heat transfer per unit length kinematic viscosity=1.624 m²/s, Thermal conductivity=0.0261 W/mk, Npr for air=0.702 [10]
- b) Discuss about theory of diffusion in gasses at low density [6]
3. Derive the equation for creeping flow around a sphere? [16]
4. a) What is a composite wall? Derive the relevant equations for heat conduction through composite wall? [10]
- b) Write the comparison between forced and free convection in a non-isothermal system? [6]
5. Derive the concentration distribution equations for “diffusion into a falling liquid film? [16]
6. a) Derive the equation of continuity of a component in multicomponent mixture? [8]
- b) Write the significance of Navier-stokes equation? [8]
7. a) Explain about unsteady state one dimensional momentum & heat transfer? Give examples? [8]
- b) Explain different models for turbulent flux? [8]