

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 – 19 Examination

Semester: 8
Subject Code: 03103451
Subject Name: Transport Phenomena

Date: 29/04/2019
Time: 10:30am to 1:00pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions: (15)

1. What is the industrial importance of transport phenomena?
2. Define momentum flux
3. Give Difference between Laminar and Turbulent fluid.
4. List out examples of Newtonian Fluid.
5. Explain Fourier's law for heat transfer.
6. Give difference between free convection & forced convection.
7. What is the significance of Reynolds number?
8. Write general equation for shell energy balance.
9. Write application of equation of continuity.
10. Define heat flux.
11. What you mean by radiation?
12. Explain Fick's law of diffusion.
13. Explain homogeneous and heterogeneous phases with examples.
14. Give the difference between incompressible and compressible fluid.
15. Define viscosity. Write its unit?

Q.2 Answer the following questions. (Attempt any three): (15)

- A. Derive the equation of continuity.
- B. Discuss the significance of studying Transport Phenomena.
- C. Explain about shell momentum balance and boundary conditions in general.
- D. Define thermal conductivity. Explain the effect of temperature on it.

Q.3 A) Discuss heat conduction with nuclear heat source. (07)

- B) Explain Newton's Law of viscosity. Derive mathematical expression for it. (08)

OR

- B) Derive velocity distribution for a flow of a falling film. (08)

Q.4 A) Find the radial temperature distribution within the wire for heat conduction with an electrical source. (07)

OR

- A) Discuss about diffusion through a stagnant gas film. (07)
- B) Define concentrations, velocities and mass fluxes with reference to mass transport. (08)