

# CBCS SCHEME

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18PC81

## Eighth Semester B.E. Degree Examination, June/July 2023 Transport Phenomena

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Write a note on Time-independent fluid and Time-dependent fluids. (10 Marks)  
b. Write Bingham model and Ellis model for non-newtonian fluid. (10 Marks)

OR

- 2 a. Explain Newton's law of viscosity. (10 Marks)  
b. Write a note on Fanning friction factor. (10 Marks)

### Module-2

- 3 Derive an equation for flow through a circular tube. (20 Marks)

OR

- 4 a. Obtain an expression for overall heat transfer coefficient for a composite wall. (10 Marks)  
b. Explain the Fourier's law of heat conduction. (10 Marks)

### Module-3

- 5 Obtain an equation for temperature and heat flux with an electrical heat source. (20 Marks)

OR

- 6 a. Differentiate between forced and free convection heat transfer. (10 Marks)  
b. Explain effectiveness of a Fin. (10 Marks)

### Module-4

- 7 a. Explain concentrations, velocities and mass fluxes. (10 Marks)  
b. Describe the Fick's law of diffusion. (10 Marks)

OR

- 8 Derive an equation for diffusion with heterogeneous chemical reaction. (20 Marks)

### Module-5

- 9 a. Explain types of time derivatives and vector notation. (10 Marks)  
b. Derive an equation for differential equation of continuity. (10 Marks)

OR

- 10 Write short notes on:  
a. Reynold's analogy.  
b. Prandtl's analogy.  
c. Chilton's analogy.  
d. Colburn analogy. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.