

Total No. of Questions : 8]

[Total No. of Printed Pages : 2

Roll No

CM-7005(1)-CBGS

B.E. VII Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Transport Phenomena

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. Consider the Newtonian fluid flowing through a pipe of changing radius. Assume entering pipe diameter is D_0 and leaving side is D_1 . Obtain the expression for velocity profile and shear stress profile.
2. A plastic resin is in a vertical cylindrical vessel of radius R , which is rotating about its own axis at a constant angular velocity Ω . The height of liquid in the vessel is z_R . Determine the shape of the free surface.
3. a) In what way are Newton's law of viscosity and Fourier's law of heat conduction are similar.
b) Write short notes on Boundary conditions, their significance, importance and selection.
4. Write unsteady state and steady state macroscopic mechanical energy balance and describe each terms involved in it. How is the integral term in the balanced evaluated and under what specific situation it is difficult to evaluate the integral. Discuss.

CM-7005(1)-CBGS

PTO

[2]

5. Explain the following theories:
 - i) Bonssineq's eddy viscosity
 - ii) Prandtl's mixing length
 - iii) Von Karman's similarity Hypothesis.
6. Prove the equivalence of seven different forms of Ficks law.
7. Describe the convective flow transport phenomena in a room with both side of walls maintained at different temperatures. Use appropriate assumption to derive to the fluid flow calculations.
8. Attempt any one from the following:
 - a) Can be Navier Stokes equation applicable for turbulence, if yes, how?
 - b) What are Reynolds stresses? Write the expression for them?
 - c) What are the two approaches for turbulence modeling? Explain them?

CM-7005(1)-CBGS