No. of Printed Pages : 03 **Roll No. .....**

18BB1351

M. Tech. EXAMINATION, May 2019

(Second Semester)

(C Scheme) (Main Only)

CHE

CHE502C

Advanced Transport Phenomena

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Apply Shell Momentum Balance for flow of a viscous fluid along an inclined flat plate and hence develop expression for maximum velocity and average velocity. **15**

2. Apply Mass balance over a fluid volume element and hence develop equation of continuity. What shall be its expression for incompressible fluid ? **15**

Unit II

3. Derive expression for thermodynamic Boundary Layer for Laminar flow over a flat plate. **15**

4. Analyze Transient heat flow in a semi-infinite solid and derive expression for Temperature Distribution. **15**

Unit III

5. In context of diffusion in heterogeneous systems, discuss and derive expression for effectiveness factor for a cylindrical pore catalyst. For which cases, value of effectiveness factor is greater than one. **15**

6. Carry out time smoothing of equation of continuity for a component 'A' and hence discuss semi-empirical expressions for Turbulent Mass Flux. **15**

Unit IV

7. In context of interphase transport in Multicomponent systems, discuss film theory and penetration theory. **15**

8. Apply Macroscopic balance over a packed Tower absorber and carry out steps for calculation of Height of a Packed Tower Absorber. **15**