Printed pages: 01 **Sub Code: REV063**

Paper Id **900061** **Roll No.** | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2018-19
TRANSPORT PROCESS: HEAT AND MASS TRANSFER

Time: 3 Hours ***Total Marks: 70***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a) Explain the terms steady flow.
b) State the Difference between heat and temperature
c) What are the three levels at which transport phenomena can be studied?
d) Is the law of conservation of mass always valid? What are the limitations?
e) Discuss the concept of mass diffusivity.
f) What is meant by rheological properties?
g) How does transient heat transfer differ from steady state heat transfer?

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a) Explain different models for turbulent flux?
b) Discuss the quantitative relations for turbulent boundary layers.
c) Explain about unsteady state one dimensional momentum & heat transfer? Give examples?
d) What is the science of "rheology"?
e) Define effectiveness factor for porous catalysts.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

a) What are Analogies in different transport processes?
b) Derive the equation of continuity of a component in multi component mixture?

4. Attempt any *one* part of the following: **7 x 1 = 7**

a) Write short notes on flow turbulence and boundary layer theory.
b) Obtain the shell balance equation for laminar flow of liquid in an annulus. Also derive the expression for velocity profile in it.

5. Attempt any *one* part of the following: **7 x 1 = 7**

a) Why do we deal only with differences in normal stresses for incompressible liquids.
b) What limitations have to be placed on use of the generalized Newtonian models and the linear visco elastic models?

6. Attempt any *one* part of the following: **7 x 1 = 7**

a) What is meant by Newtonian fluid and Non- Newtonian fluid? Explain with an examples.
b) Explain the types of Non-Newtonian fluids in details.

7. Attempt any *one* part of the following: **7 x 1 = 7**

a) What are the differential driving forces for heat and mass transports?
b) What is diffusion? Explain the temperature & pressure dependence of mass diffusivity?