Printed Pages: 3 **ECH-054**

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 151854	**Roll No.**

B.TECH.

Theory Examination (Semester-VIII) 2015-16

MULTIPHASE REACTOR DESIGN

Time : 3 Hours ***Max. Marks : 100***

Note: Attempt all three sections.

Section-A

1. Define the following: (2×10=20)

(a) Catalyst Activity

(b) Promotors and Inhibitors

(c) Rate of Reaction

(d) Comparision of Batch and Continuous flow reactors

(e) Exothermic and Endothermic reactions

(f) Yield and selectivity

(g) Void fraction in catalyst pellet

(h) Supported catalyst

(i) Effect of temperature on Equilibrium conversion

(j) Performance equation of Ideal Tubular Reactor

Section-B

2. Attempt any five parts of the following. (10×5=50)

(a) Describe Multiphase reacting system. Mention two complicating factors that must be accounted for reactor design.

(b) Write a short note on Optimum Temperature Progression and its importance for exothermic reactions in a reactor.

(c) Describe the various methods of catalyst preparation.

(d) List important characteristics of a catalyst and write the methods for their determination.

(e) For a solid catalyzed reaction, discuss the heat effects during the reaction. Write equations for Particle ΔT and Film ΔT.

(f) Describe the Shrinking Core Model for a fluid-particle non-catalytic reaction A(g)+bB(s) Products.

(g) Describe an expression relating change in adiabatic temperature and equilibrium conversion.

(h) Write the factors to be considered for selecting a contactor for gas-liquid reactions.

Section-C

Note: Attempt any two parts of the following. (15×2=30)

3. Show that $t/\tau = X_B$ for diffusion through gas film controlling the reaction rate, considering SCM for spherical particles of unchanging size in a fluid-particle non-catalytic reaction.

4. Discuss the reaction behavior from Instantaneous reactions to very slow reactions in a gas-liquid reaction and determine the location of the reaction zone.

5. Explain in detail, the method of Reactor design using Global rates of actualtemperature and connection profile.