M. TECH. –II (CHEMICAL ENGINEERING) (CBCS – 2015 COURSE) : SUMMER - 2018

SUBJECT: CHEMICAL REACTOR ANALYSIS & DESIGN

Day: **Wednesday** | **S-2018-3020** | Time: **11.00 AM TO 02.00 PM**
Date: **13/06/2018** | Max Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer books.

SECTION – I

Q.1 The decomposition of acetaldehyde according to the reaction takes place $CH_3CHO \xrightarrow{K} CH_4 + CO$. 0.1 kg/s of acetaldehyde vapor is to be decomposed at 520^0C and 1 atm in a tubular reactor. The reaction under these conditions is known to be irreversible and second order with respect to CH_3CHO. The velocity constant k is 0.43 m^3/kg mol.sec. What will be the volume of reactor required? **[10]**

a) For 35% decomposition of feed acetaldehyde.
b) For 90% decomposition.

OR

Derive simplified form of the "Generalized energy equation".

Q.2 What is mean by optimal design of reactors? Explain with all parameters. **[10]**

OR

Give design parameters for fluidized bed reactor.

Q.3 Illustrate multiple steady states operation with example. **[10]**

OR

Write on "Tubular reactor with heat exchange".

SECTION – II

Q.4 Write notes on: **[10]**

a) Unsteady operation of plug flow reactor
b) Adiabatic operation of batch reactor

OR

Give energy balance for batch reactor.

Q.5 Give detail design of fixed bed catalytic reactor at non-isothermal condition. **[10]**

OR

Give detail design of fixed bed catalytic reactor at adiabatic condition.

Q.6 How dispersion is estimated in non-ideal flow? Give example. **[10]**

OR

Give design aspects of reactors with non-ideal flow.

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