

**B.TECH. SEM -VII (CHEMICAL 2014 COURSE (CBCS) :
SUMMER - 2018**

SUBJECT: MULTIPHASE REACTION ENGINEERING

Day: **Friday**
Date: **25/05/2018**

S-2018-2469

Time: **02.30 PM TO 05.30 PM**
Max Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the right indicate **FULL** marks.
 - 3) Use of non programmable **CALCULATOR** is allowed.
 - 4) Assume suitable data if necessary.
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Q.1 Classify multiphase reactors. Detail any one of industrial importance. (10)

OR

Q.1 Enumerate importance of multiphase reactors in chemical process industry with reference to one case study. (10)

Q.2 What is the role of thermodynamics in heterogeneous system? (10)

OR

Q.2 Derive following equation: (10)
 $\Delta G^\circ = -RT \ln K$

Q.3 Derive an expression to estimate power requirement of impeller in mechanically agitated contactor (MAC) (10)

OR

Q.3 Differentiate between bubble column (BC) and MAC. Comment on bubble hold up in BC with reference to gas- liquid system (10)

Q.4 Enumerate significance of mixing study in multiphase reactors. How would you measure mixing time in MAC? (10)

OR

Q.4 What are the methods of measurement of RTD in multiphase reactors? Enumerate with mathematical equation for RTD function. (10)

Q.5 Derive an expression to estimate overall heat transfer coefficient in limpet coil reactor. (10)

OR

Q.5 What are the methods to measure mass transfer coefficient in multiphase reactors. Enumerate any one. (10)

Q.6 Derive an expression to determine pressure drop in solid liquid fluidized bed (SLFB) in laminar regime. (10)

OR

Q.6 What are the major steps involved in the design of multiphase reactors? Enumerate with reference to any one multiphase system. (10)

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