

**B.TECH. SEM -VII (CHEMICAL 2014 COURSE (CBCS) : WINTER -
2017**

SUBJECT: MULTIPHASE REACTION ENGINEERING

Day: **Monday**
Date: **22/01/2018**

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

W-2017-2257

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** Derive criteria of chemical reaction equilibrium. (10)
OR
- Q.1** Enumerate the relationship between Gibbs free energy change and reaction coordinate with neat diagram. (10)
- Q.2** Classify impellers. Enumerate the pattern of flow generated by impeller with neat sketch. (10)
OR
- Q.2** What is critical impellers speed (N_{cr}) of solid suspension? What is the effect of physical properties of solid and liquid phase on N_{cr} . (10)
- Q.3** What is axial dispersion model (ADM)? Enumerate with assumption made during deriving ADM (10)
OR
- Q.3** What is the effect of physical properties of solid and liquid phase on liquid mixing in solid liquid fluidized bed (SLFB) (10)
- Q.4** With reference to mechanically agitated contactor (MAC), enumerate the effect of impeller speed and liquid properties on heat transfer coefficient (HTC). (10)
OR
- Q.4** With reference to SLFB, enumerate the effect of superficial liquid velocity on mass transfer coefficient (MTC) with suitable empirical correlation. (10)
- Q.5** What is drag coefficient? Enumerate methods of estimation in SLFB. (10)
OR
- Q.5** What is effect of superficial gas velocity on gas hold-up in bubble column (BC)? Enumerate with neat sketch. (10)
- Q.6** Derive an expression for velocity-voidage relationship in SLFB in laminar regime. (10)
OR
- Q.6** What is an importance of hydrodynamics study in multiphase reactors? Enumerate with any one example of industrial relevance. (10)