

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER- 2 • EXAMINATION – WINTER - 2023

Subject Code:3723024**Date: 06 Jan 2024****Subject Name:Advance Reaction Engineering****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Discuss about various non ideality which exist in various kinds of reactors. **07**
(b) For a diffusion through Ash layer control, derive expression for relation for time required for unreacted core model for spherical particles of unchanging size. Also find time required for complete conversion. **07**
- Q.2** (a) Write in brief about catalysts deactivation. **07**
(b) Explain recycle ratio and derive the performance equation of recycle plug flow Reactors. **07**
- OR**
- (b) Write in detail about different models of fluidized bed reactors. **07**
- Q.3** (a) Write on various criteria used for determination of rate controlling step. **07**
(b) Evaluate quantitatively the behavior of N equal sized mixed flow reactors in series. **07**
- OR**
- Q.3** (a) Give example for fluid particle reaction with solid particles changing in size and remain unchanged during reaction. **07**
(b) Discuss the optimal design of reactors for reversible exothermic reactions with necessary equations. **07**
- Q.4** (a) Discuss the effect of condensing gas on reactor design in brief. **07**
(b) Discuss in detail about dispersion model. **07**
- OR**
- Q.4** (a) Discuss in detail about population balance modeling for reactor. **07**
(b) Discuss semi batch reactor operation with its advantages and limitations. **07**
- Q.5** (a) Discuss about equilibrium constant from thermodynamics. **07**
(b) Discuss various regimes for fluid fluid reaction for mass transfer and chemical reaction both having effect on the rate. **07**
- OR**
- Q.5** (a) Write in detail about temperature control in multiple reactions. **07**
(b) Describe design for deactivating catalyst with equations. **07**
