

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3133607****Date:26-07-2023****Subject Name:Physical Chemistry****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1**
- (a) Write a short note on surfactants. **03**
 - (b) Explain difference between molecularity and order of reaction. **04**
 - (c) Draw TP phase diagram and explain phase, number of component and degree of freedom for the compound having same chemical formula in every phase. **07**
- Q.2**
- (a) Define the terms: Eutectic point & Eutectic mixture **03**
 - (b) What do you mean by half-life of a reaction. Derive equation for first order reaction. **04**
 - (c) Derive Gibb's Helmholtz equation in terms of internal energy and work function at constant volume. **07**
- OR**
- (c) Derive mathematical expression for the rate constant of a first order reaction. **07**
- Q.3**
- (a) Write a short note on emulsions. **03**
 - (b) Explain working of Denial cell with neat diagram. **04**
 - (c) Show thermodynamically that for an ideal gas $C_p - C_v = R$. **07**
- OR**
- Q.3**
- (a) How will you differentiate between diffusion and effusion? **03**
 - (b) Explain the role of salt bridge in electrochemical cell **04**
 - (c) Derive Young Laplace & Kelvin equation. **07**
- Q.4**
- (a) Write a note on enzyme catalysis. **03**
 - (b) Draw phase diagram of water system and explain only degree of freedom on each phase. **04**
 - (c) Explain collision theory in detail. **07**
- OR**
- Q.4**
- (a) Enlist heterogeneous and homogeneous catalysis with suitable examples. **03**
 - (b) Draw phase diagram of sulphur system and explain only degree of freedom on each phase. **04**
 - (c) What do you mean by parallel reaction? Give examples of it and derive an equation for it. **07**
- Q.5**
- (a) Write a short note on inhibitors. **03**
 - (b) Enlist applications of supercritical CO₂. (any four) **04**
 - (c) Define the following terms with examples: **07**
 - 1.) Supercritical fluid
 - 2.) Rate law
 - 3.) Antropy
 - 4.) Enthalpy
 - 5.) Micelle
 - 6.) Promoters
 - 7.) Adsorption
- OR**
- Q.5**
- (a) Write a note on Promoters. **03**
 - (b) Define surface tension, capillary action. How it plays an important role in bubble formation? **04**
 - (c) Derive an expression for ΔG , ΔH in terms of emf of the cell and temperature coefficient of emf. **07**
