

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – SUMMER 2019****Subject Code: 2133607****Date: 11/06/2019****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.

MARKS

- Q.1**
- | | | |
|-----|--|-----------|
| (a) | Explain the role of salt bridge in electrochemical cell. | 03 |
| (b) | Write a note on acid base catalysis. | 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) | Enlist heterogeneous and homogeneous catalysis with suitable examples. | 04 |
| (c) | Derive Gibb's Helmholtz equation in terms of internal energy and work function at constant volume. | 07 |

OR

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|-----|---|-----------|
| (c) | Derive mathematical expression for the rate constant of a first order reaction. | 07 |
|-----|---|-----------|
- Q.3**
- | | | |
|-----|---|-----------|
| (a) | Write a short note on surfactants. | 03 |
| (b) | Explain working of any electrochemical cell with neat diagram. | 04 |
| (c) | How will you differentiate between diffusion and effusion? If a gas X diffuses at a rate of one half as fast as oxygen, find the molecular mass of the gas. | 07 |

OR

- Q.3**
- | | | |
|-----|---|-----------|
| (a) | Write a note on molecularity. | 03 |
| (b) | Write a note on enzyme catalysis. | 04 |
| (c) | Derive Young Laplace & Kelvin equation. | 07 |
- Q.4**
- | | | |
|-----|--|-----------|
| (a) | Write a short note on emulsions. | 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) | What do you mean by half-life of a reaction. Derive equation for first order reaction. | 03 |
| (b) | Define surface tension, capillary action. How it plays an important role in bubble formation? | 04 |
| (c) | What do you mean by parallel reaction? Give examples of it and derive an equation for it. | 07 |

- Q.5**
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|-----|--|-----------|
| (a) | Write a short note on inhibitors. | 03 |
| (b) | Enlist applications of supercritical CO ₂ . (any four) | 04 |
| (c) | Define the following terms with examples:
1.) Supercritical fluid 2.) Rate law 3.) Entropy 4.) Enthalpy
5.) Micelle 6.) Promoters 7.) Adsorption | 07 |

OR

- Q.5 (a) Explain Nernst equation with effect to temperature. 03
(b) Give the characteristics of catalytic reactions. 04
(c) Derive an expression for ΔG , ΔH in terms of emf of the cell and temperature coefficient of emf. 07

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