Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2133607 **Date: 05/06/2017**

Subject Name: Physical Chemistry

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What is SHE?	
	2	Define EMF.	
	3	Relation between rate of diffusion & molecular mass of gas.	
	4	State first law of thermodynamics.	
	5	Give two examples of Extensive properties.	
	6	What is degree of freedom?	
	7	Give two examples of catalysts.	
	8	Give any example of exothermic reaction.	
	9	Major utility of electrochemical series?	
	10	What is liquefaction of gasses?	
	11	Write rate law of first order reaction.	
	12	Unit of rate constant for zero order reaction?	
	13	Define surface tension.	
	14	What is critical temperature of CO_2?	
Q.2	**(a)**	Define following: isothermal, isochoric, isobaric processes	**03**
	(b)	Elaborate second law of thermodynamics.	**04**
	(c)	What is Phase rule? Elaborate with an example of Sulphur system.	**07**
		OR	
	(c)	Explain Andrew Isotherm and van der Waals Isotherm of carbon dioxide at different temperature.	**07**
Q.3	**(a)**	Write down the Classification of catalysts.	**03**
	(b)	Write short notes on: Surface active agents & Emulsions	**04**
	(c)	Explain negative catalyst. Also elaborate theories of catalysis.	**07**
		OR	
Q.3	**(a)**	Write short notes on: half cell, oxidation potential, free energy	**03**
	(b)	What are supercritical fluids? Give their major characteristics and applications.	**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**
Q.4	**(a)**	Explain the term Phase. How many phases are present in the following systems: i. Chloroform & Water ii. Monoclinic & Rhombic Sulphur	**03**
	(b)	Write a note on: Pseudo-order reaction & difference between molecularity & order	**04**

(c) Write cell reaction and also calculate E^o of following cell: **07**

$Zn \mid Zn^{2+}$ (0.001M) $\parallel Ag^{+}$ (0.1M) $\mid Ag$

The standard potential for Ag/Ag^{+} half cell is +0.80 V and Zn/Zn^{2+} is -0.76 V.

OR

Q.4 **(a)** Explain term component. How many components are present in following system: **03**

i. Helium & Nitrogen

ii. Sodium chloride & Water

(b) Write IUPAC convention for Zinc-Copper cell. Also write the half cell reactions for the same. **04**

(c) Explain third law of thermodynamics, with suitable expressions. **07**

Q.5 **(a)** Derive relation between free energy and EMF **03**

(b) Discuss details of drop formation method of determining surface tension tension of liquid. **04**

(c) The following data obtained on hydrolysis of methyl acetate by HCl. From the data given below, establish that this is a first order reaction: **07**

t (secs)	0	4500	7140	∞
ml used	24.36	29.32	31.72	47.15

OR

Q.5 **(a)** Determine the feasibility of following cell: **03**

$Zn \mid ZnSO_4$ (aq) $\parallel CuSO_4$ (aq) $\mid Cu$

The standard potential for Zn/Zn^{2+} half cell is +0.76 V and Cu/Cu^{2+} is -0.37 V.

(b) Write short notes on enzyme catalysis. **04**

(c) Explain Gibbs Helmholtz equation in terms energy and enthalpy and internal energy and work function. **07**

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