Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – WINTER 2013

Subject Code: 133504 **Date: 03-12-2013**

Subject Name: Physical Chemistry

Time: 02.30 pm - 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.**

Q.1	**(a)**		Explain Principle and working of Danniel cell.	**07**
	(b)		Write a short note on supercritical CO_2 with applications.	**07**
Q.2	**(a)**	i.	Explain Faraday's first law of electrolysis with application.	**05**
		ii.	Define the term: Diffusion and Effusion	**02**
	(b)		Explain first law of thermodynamics. Obtain the mathematical expression for the law with conversions. Explain enthalpy and relation between ΔE and ΔH.	**07**
			OR	
	(b)	i.	Explain Adsorption theory of Catalysis.	**04**
		ii.	What are surfactants? How are they classified depending on their charges?	**03**
Q.3	**(a)**	i.	What is Eutectic point? Explain phase diagram of lead-silver system.	**05**
		ii.	Define the term: Molecularity.	**02**
	(b)		Define Gibbs Helmholtz Equation.	**07**
			OR	
Q.3	**(a)**	i.	What is phase rule? Explain phase diagram of Water system.	**05**
		ii.	Write a short note on Negative catalyst.	**02**
	(b)	i.	Write a note on Standard Hydrogen Electrode.	**04**
		ii.	Discuss various factors affecting the catalysis.	**03**
Q.4	**(a)**	i.	Write a note on Critical micelle concentration CMC.	**03**
		ii.	Derive equation of State for an Ideal Gas	**04**
	(b)		What is chemical kinetics? Derive rate constant K for Parallel reaction if both the reactions are of 1st order.	**07**
			OR	
Q.4	**(a)**		What are Van Der Waals constants? Derive Van Der Waals Equation of state.	**07**
	(b)	i.	Define surface tension, capillary action. How it plays an important role in bubble formation?	**03** **04**
		ii.	A current of 4.5 ampere pass through the solution of copper sulphate for 60 minutes and deposits 2.53 gm of copper metal at the cathode. What is the equivalent weight of copper metal?	
Q.5	**(a)**		Explain collision theory of reaction rate with limitations.	**07**
	(b)	i.	Calculate the entropy change when 36 gm of liquid water evaporates at 373 K (latent heat of vaporization of water is 40.63 KJ $mole^{-1}$.	**05**
		ii.	Define the term: Promoters.	**02**
			OR	
Q.5	**(a)**		What is Reversible reaction? Derive rate constant K for Reversible reaction if both the reactions are of 1st order.	**07**
	(b)	i.	At 373 K, the entropy change for the transition of liquid water to stream is 109 J $mole^{-1}$ K^{-1}.Calculate the change in enthalpy (ΔH).	**04** **03**
		ii.	Define the term: Enthalpy, Internal Energy, Entropy	

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