Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code:2133506 **Date:23/12/2015**

Subject Name: Physico-chemical processes

Time: 2:30pm to 5:00pm **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	Define the term promoter with example.	1
	2	Define the term tyndall effect.	1
	3	In anionic hydrolysis the pH of solution is (*a*) greater than 7 (*b*) equal to 7 (*c*) less than 7 (*d*) less than zero	1
	4	Which salt out of the following will be hydrolyzed to give basic solution? NaCN, NaCl, $NaNO_3$, NH_4Cl (*a*) NaCN (*b*) NaCl (*c*) $NaNO_3$ (*d*) NH_4Cl	1
	5	Define the term EMF	1
	6	For any chemical reaction at equilibrium, the rate of the forward reaction is (*a*) less than the rate of the reverse reaction (*b*) greater than the rate of the reverse reaction (*c*) equal to the rate of the reverse reaction (*d*) unrelated to the rate of the reverse reaction	1
	7	A colloidal solution consists of (*a*) a dispersed phase (*b*) a dispersion medium (*c*) a dispersed phase in a dispersion medium (*d*) a dispersion medium in a dispersed phase	1
	8	Define the term triple point in phase diagram.	1
	9	A solution of ammonium acetate is _____ and its pH value is ____? (*a*) acidic, less than 7 (*b*) basic, more than 7 (*c*) neutral, less than 7 (*d*) basic, more than 14.	1
	10	Define the term enzyme catalysis.	1
	11	Explain the term component. How many components are present in the following systems? (*a*) Water and Water vapour (*b*) KCl + Water and KCl hydrate.	1
	12	Define the term normality and molality.	1
	13	Define rate laws and rate of equation.	1
	14	The movement of sol particles under an applied electric potential is called (*a*) electrophoresis (*b*) electro-osmosis (*c*) electro filtration (*d*) none of these	1
Q.2	**(a)**	Derive Nernst equation showing effect of electrolyte concentration on the potential of an oxidation-reduction electrode.	**03**
	(b)	Define the term electrochemistry. Explain reversible cell in detail.	**04**
	(c)	Explain phase rule for condensed system.	**07**

OR

	(c)	State and explain the phase rule. Explain various terms involved.	**07**
Q.3	**(a)**	Write a note on effect of temperature on reaction rate.	**03**
	(b)	Define the term redox reaction. Explain half-cell reaction with examples.	**04**
	(c)	Draw and explain the phase diagram of one component three phase system.	**07**

OR

Q.3	**(a)**	Define the term colloids. Give the classification of collides.	**03**
	(b)	Define the term indicators. Explain quinonoid theory of indicator.	**04**
	(c)	Define the term order of reaction. Derive equation for first order reaction.	**07**
Q.4	**(a)**	Explain any two method of dispersion to prepare sols.	**03**
	(b)	Write a note on application of colloids.	**04**
	(c)	Define the term buffer solution. Derive Henderson equation to find out pH of buffer solution.	**07**

OR

Q.4	**(a)**	Explain homogeneous catalysis with examples.	**03**
	(b)	Define the term acid base catalysis. Give examples of acid base catalysis and explain their mechanism.	**04**
	(c)	Write a note on purification techniques of colloids.	**07**
Q.5	**(a)**	What is the cell potential half-cell consisting of zinc electrode in 0.01M ZnSO4 solution at 25°C, E° =0.763V.	**03**
	(b)	A buffer solution contains 0.015 mole of ammonium hydroxide and 0.025 mole of ammonium chloride. Calculate the pH value of the solution. Kb for ammonium hydroxide is 1.8×10^{-5}.	**04**
	(c)	Explain zero order and pseudo order reaction with examples.	**07**

OR

Q.5	**(a)**	Calculate the pH of 0.1 M acetic acid. Ka for acetic acid is 1.8×10^{-5}.	**03**
	(b)	A liter of solution containing 0.1 mole of acetic acid and 0.1 mole of sodium acetate provides a buffer of pH 4.74. Calculate the pH of solution after the addition of 0.02 mole NaOH. Ka = 1.8×10^{-5}.	**04**
	(c)	Define the term adsorption and explain adsorption theory of catalysis with suitable example.	**07**

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