Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016

Subject Code:2133506 **Date:09/01/2017**

Subject Name:Physico-chemical Processes

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	NH_4OH becomes weaker in the presence of NH_4Cl due to (a) ionization (b) hydrolysis (c) neutralization (d) common ion effect	1
	2	In a suspension the diameter of the dispersed particles is of the order (a) 10 Å (b) 100 Å (c) 1000 Å (d) 2000 Å	1
	3	NaCN on hydrolysis produces a solution which has (a) pH > 7 (b) pH = 7 (c) pH < 7 (d) pH = 0	1
	4	Define the term inhibitor with example.	1
	5	In any electrochemical cell, the cathode is always _____. (a) a nonmetal (b) attached to a battery (c) the electrode at which some species gain electrons (d) the electrode at which some species lose	1
	6	A catalyst will affect the rate of the forward reaction by changing the (a) activation energy (b) heat of reaction (c) heat of formation (d) potential energy of the products	1
	7	In a colloidal solution, the diameter of dispersed particle is in the range (a) 10 Å to 100 Å (b) 10 Å to 500 Å (c) 10 Å to 1000 Å (d) 10 Å to 2000 Å	1
	8	Define the term eutectic point in phase diagram.	1
	9	NH_4F, NH_4CN and CH_3COONH_4 are the salts of _____ acid and _____ bases. (*a*) strong, strong (*b*) strong, weak (*c*) weak, strong (*d*) weak, weak	1
	10	Which one of the following statements is not true? (a) enzymes require optimum temperature (b) enzymes required optimum pH (c) enzymes increase activation energy (d) enzymes are highly specific in nature	1
	11	A saturated solution of sodium chloride is a (a) one phase system (b) two phase system (c) three phase system (d) none of these	1
	12	Define the term normality.	1
	13	Define the term order of reaction.	1
	14	In lyophobic sols, the dispersed phase has no _____ for the medium or solvent (a) repulsion (b) attraction (c) solvation (d) hydration	1
Q.2	**(a)**	Determine the pH of 0.10 M NaOH solution.	**03**
	(b)	A litre of solution containing 0.1 mole of CH_3COOH and 0.1 mole of CH_3COONa 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 examples.	**07**

OR

	(c)	Explain phase rule and its terms in details.	**07**
Q.3	**(a)**	Calculate the emf of the cell. Zn/Zn^{+2} (0.001M)// Ag^{+}(0.1M)/Ag. The standard potential of Ag/Ag^{+} half-cell is + 0.80 V and Zn/Zn^{2+} is – 0.76 V.	**03**
	(b)	Give examples of acid base catalysis and explain their mechanism.	**04**
	(c)	Explain electrophoresis and electro osmosis in details.	**07**

OR

Q.3	**(a)**	Write a note on characteristics of catalyst.	**03**
	(b)	A buffer solution contains 0.25 M NH_3 and 0.40 M NH_4Cl. Calculate the pH of the solution. Kb for ammonia = 1.8×10^{-5}.	**04**
	(c)	Explain second order reaction with examples.	**07**
Q.4	**(a)**	Define the term indicators. Explain any one theory of indicator.	**03**
	(b)	Write a note on stability of colloids.	**04**
	(c)	Define the term buffer solution. Derive Henderson equation to find out pH of buffer solution.	**07**

OR

Q.4	**(a)**	Define the term colloids. Give the classification of collides.	**03**
	(b)	Explain ultrafiltration and electrodialysis method of purification of sols.	**04**
	(c)	Define the term order of reaction. Derive equation for first order reaction.	**07**
Q.5	**(a)**	Write a note on effect of temperature on reaction rate.	**03**
	(b)	Explain relation between free energy and EMF.	**04**
	(c)	Define the term phase rule. Explain curves, area and triple point by taking example of H_2O.	**07**

OR

Q.5	**(a)**	Define the term half-cell reaction and give various examples of it.	**03**
	(b)	Explain relation between hydrolysis constant and degree of hydrolysis.	**04**
	(c)	What do you mean by condensed system? Explain phase rule for any one condensed system.	**07**

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