Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2133506 **Date: 18/06/2019**

Subject Name:Physico-chemical Processes

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)**	Write a note on effect of temperature on reaction rate.	**03**
	(b)	Explain the rate law, rate equation and order of reaction with suitable examples.	**04**
	(c)	What do you mean by electromotive force? Derive the relation between free energy and EMF.	**07**
Q.2	**(a)**	Derive Nernst equation showing effect of electrolyte concentration on the potential of an oxidation-reduction electrode.	**03**
	(b)	For a certain first order reaction $t_{0.5}$ is 100 sec. how long will it take for the reaction to be completed 75%?	**04**
	(c)	Draw and explain the phase diagram of one component three phase system.	**07**
		OR	
	(c)	Write a note on purification techniques of colloids.	**07**
Q.3	**(a)**	Explain promoters, inhibitors and catalytical poisoning with examples.	**03**
	(b)	Explain any two method of dispersion to prepare sols.	**04**
	(c)	Define the term acid base catalysis. Give examples of acid base catalysis and explain their mechanism.	**07**
		OR	
Q.3	**(a)**	Define the term indicators. Explain any one theory of indicator.	**03**
	(b)	Write a note on parallel reaction.	**04**
	(c)	Define the term adsorption and explain adsorption theory of catalysis with suitable example	**07**
Q.4	**(a)**	What is the cell potential half-cell consisting of zinc electrode in 0.01M $ZnSO_4$ solution at 25°C, E° =0.763V	**03**
	(b)	Draw phase diagram for four phase and one component system	**04**
	(c)	Explain Patterson's process for desilversiation of lead from argentiferous lead.	**07**
		OR	
Q.4	**(a)**	Calculate the pH of 0.1 M acetic acid. Ka for acetic acid is 1.8×10^{-5}.	**03**
	(b)	Define the term colloids. Give the classification of collides.	**04**
	(c)	Define the term buffer solution. Derive Henderson's equation to calculate pH of a buffer solution. The *Ka* of propionic acid is 1.34×10^{-5}. What is the pH of a solution containing 0.5 M propionic acid, C_2H_5COOH, and 0.5 sodium propionate, C_2H_5COONa. What happens to the pH of this solution when volume is doubled by the addition of water?	**07**
Q.5	**(a)**	Write a note on molecularity of reaction.	**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**
		OR	
Q.5	**(a)**	Define the term half-cell reaction and give various examples of it.	**03**
	(b)	Write a note on application of colloids.	**04**
	(c)	Explain second order reaction with example.	**07**

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