

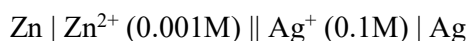
Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (New) EXAMINATION – WINTER 2018****Subject Code: 2133607****Date: 05/12/2018****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	(a) Write a short note on surfactants.	03
	(b) Explain adsorption theory of catalysis with examples.	04
	(c) Draw TP phase diagram and explain phase, number of component and degree of freedom for the compound having same chemical formula in every phase.	07
Q.2	(a) Explain the role of salt bridge in electrochemical cell	03
	(b) Enlist heterogeneous and homogeneous catalysis with suitable examples.	04
	(c) Derive Gibb's Helmholtz equation in terms of internal energy and work function at constant volume.	07
	OR	
	(c) Derive mathematical expression for the rate constant of a second order reaction.	07
Q.3	(a) Define the terms: Eutectic point & Eutectic mixture	03
	(b) Explain Daniel cell in detail.	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
	OR	
Q.3	(a) Write a note on molecularity.	03
	(b) Find ΔE , q and w if 2 moles of hydrogen at 3 atm pressure expand isothermally at 50°C and reversibly to a pressure of 1 atm.	04
	(c) Derive Young Laplace & Kelvin equation.	07
Q.4	(a) Write a short note on emulsions.	03
	(b) Draw phase diagram of sulphur system and explain only degree of freedom on each phase.	04
	(c) What do you mean by critical constants? Explain Andrew Isotherm of carbon dioxide at different temperature.	07
	OR	
Q.4	(a) The half-life of a substance in a first order reaction is 15 minutes. Calculate the rate constant.	03
	(b) Write a note on Supercritical fluids.	04
	(c) What do you mean by consecutive reaction? Give examples of it and derive an equation for it.	07
Q.5	(a) Write a short note on promoters.	03
	(b) Write cell reaction and also calculate E° of following cell:	04



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

- (c) Show thermodynamically that for an ideal gas $C_p - C_v = R$. 07

OR

- Q.5** (a) Explain term component. How many components are present in following system: 03

- i. Helium & Nitrogen
- ii. Sodium chloride & Water

- (b) Give the characteristics of catalytic reactions. 04

- (c) Derive an expression for ΔG , ΔH in terms of emf of the cell and temperature coefficient of emf. 07

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