Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E – SEMESTER- III (NEW) – EXAMINATION – SUMMER 2015

Subject code: 2133607 **Date: 02/06/2015**

Subject Name: Physical Chemistry

Time:02.30pm-05.00pm **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)**	Derive the Equation of State and exemplify the fourth variable R using the ideal gas equation and details it value in different units.	**07**
	(b)	What is Phase Rule? What are the possible Phase existing in the Sulphur System? Explain Transition temperature.	**07**
Q.2	**(a)**	Explain Nernst equation with effect to temperature. Derive the calculation of the Half Cell Potential.	**07**
	(b)	What are Surface active agents? Derive Young-Laplace and Kelvin equation with respect to pressure.	**07**
		OR	
	(b)	Define Ist and IIIrd law of thermodynamics with industrial application.	**07**
Q.3	**(a)**	Derive Collision theory of reaction rate and show the effect of increase of temperature on reaction rate.	**07**
	(b)	What is the potential of a half-cell consisting of Zinc electrode in 0.01 M $ZnSO_4$ solution at 25^0C, E^0 = 0.763V.	**07**
		OR	
Q.3	**(a)**	Give characteristic of enzyme catalysis. Discuss Michaelis & Menten's enzyme mechanism in detail to express the rate of reaction with necessary derivation.	**07**
	(b)	For a certain first order reaction $t_{0.5}$ is 100 second. How long will it take for the reaction to be completed 75%?	**07**
Q.4	**(a)**	Derive Helmholtz – Gibb's equation.	**07**
	(b)	Distinguish between Chemisorptions and Physiorption with suitable examples.	**07**
		OR	
Q.4	**(a)**	Discuss Surface Phenomena and discuss in detail the drop formation method of determining surface tension of liquid.	**07**
	(b)	Write a note on molecularity and order of reaction.	**07**
Q.5	**(a)**	Who invented Phase rule? Discuss the application of Phase rule to a two component system of industrial importance.	**07**
	(b)	Distinguish between Homogenous and Heterogenous catalysis in detail.	**07**
		OR	
Q.5	**(a)**	Explain in brief Daniel and Galvanic cell.	**07**
	(b)	Write a note on relation between EMF and Free energy.	**07**

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