Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – SUMMER 2013

Subject Code: 133504 Date: 31-05-2013

Subject Name: Physical Chemistry

Time: 02.30 pm - 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.**

Q.1	**(a)**	State the phase rule and explain various terms used in phase rule with suitable examples.	**07**
	(b)	Discuss the salient features of phase diagram of sulphur system.	**07**
Q.2	**(a)**	Define the term molar heat capacity. Define the relation $C_p - C_v = R$. Calculate the value of æE and æH on heating 64.0 g of oxygen from 0^oC to 100^oC. C_v and C_p on an average are 5.0 and 7.0 cal mol^{-1}.	**07**
	(b)	Explain chemical potential and its variation with temperature and pressure.	**07**
		OR	
	(b)	Derive the equation for free energy and work function and for its variations with temperature and pressure.	**07**
Q.3	**(a)**	Derive Nernst equation. What is the potential of a half-cell consisting of zinc electrode in 0.01M $ZnSO_4$ solution at 25^oC, $E^o = 0.763V$.	**07**
	(b)	Explain second order reaction with suitable examples.	**07**
		OR	
Q.3	**(a)**	Explain first order reaction with suitable examples	**07**
	(b)	Explain phase rule for two component silver and lead system	**07**
Q.4	**(a)**	Derive van der Waals reduced equation of state. The reduced volume and reduced pressure of a gas are 10.2 and 0.7. What will be its pressure if itôs critical pressure is 4.25 atm	**07**
	(b)	Write a note on liquefaction of gases with one example	**07**
		OR	
Q.4	**(a)**	Explain second law of thermodynamics. Derive an expression for entropy change for ideal gas associated with temperature and pressure changes.	**07**
	(b)	Write a note on acid base catalysis	**07**
Q.5	**(a)**	Define the following terms with examples: 1. Inhibitor 2. Triple point 3. Intensive and extensive properties 4. Electrochemical cell 5. Catalysis 6. Critical constants 7. Third law of thermodynamics.	**07**
	(b)	Write a note on enzyme catalysis	**07**
		OR	
Q.5	**(a)**	Explain surface active agents.	**07**
	(b)	Write a note on emulsions	**07**

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