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Total Number of Pages: 2

B.Tech
BS1103

2nd SEMESTER BACK EXAMINATION 2016-17

CHEMISTRY - I

BRANCH: ALL

Time: 3 Hours

Max Marks: 70

Q.CODE: Z776

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)**
- a) What is the value of ∂G for liquid water vaporizing at 337K and 1atm pressure?
 - b) What do you mean by Degrees of Freedom ?What is its value above and below critical point.
 - c) Enthalpy/mole is extensive or intensive property. Justify your answer.
 - d) What is the order of a reaction if half-life period and units of K depend inversely on concentration?
 - e) What is the relationship between free energy and equilibrium constant of a reaction.
 - f) Construct a galvanic cell for the reaction
$$\text{Zn}_{(s)} + \text{HCl}_{(aq)} \leftrightarrow \text{ZnCl}_{2(aq)} + \text{H}_{2(g)}$$
 - g) What do you mean by component? What is the maximum no of phases that can be in equilibrium at one point for one component system(T&P Constant)
 - h) What is state function and path function? Give example of each.
 - i) Calculate Free energy change when 5 mole of oxygen at 300K and 5bar pressure expand isothermally to 1 bar pressure.
 - j) What do you mean by enzyme catalyst? Give an example of enzyme catalytic reaction.
- Q2 a) What do you mean by the LCAO? What is the difference between Atomic orbital and Molecular orbital? (5)**
- b) How can you find the pH of a solution with help of the Quinhydrone Electrode .Discuss its merit and demerits? (5)**
- Q3 a) If $\partial U = T\partial S - P\partial V$ Then Prove that $\left\{ \frac{\partial T}{\partial V} \right\}_S = -\left\{ \frac{\partial P}{\partial S} \right\}_V$ (5)**
- b) The pH of solution in cell
 $\text{Pt}/\text{H}_2(\text{g})/\text{HCl}(\text{aq})/\text{AgCl}(\text{s})/\text{Ag}$ is 0.65. Calculate the EMF of the above cell. Given that $E^0 \text{Cl}^-/\text{AgCl}, \text{Ag} = 0.2224\text{V}$ (5)**

- Q4** a) What is catalysis? Explain that catalytic reactions are highly specific. (5)
b) Write the difference between reversible and irreversible cell. (5)
- Q5** a) Write down the construction and electrode reaction of Standard Hydrogen Electrode. Why it is called as Reference electrode? (5)
b) What do you mean by Defects in crystal? Discuss various types of Defects with example (5)
- Q6** a) What do you mean by reaction rate? Discuss the effect of temperature on reaction rate and also derive the Arrhenius equation. (7)
b) The rate constant of a reaction is found to be tripled when the temperature is increased from 25°C to 60°C. Calculate the activation energy of the reaction. (3)
- Q7** Draw the phase diagram of a one component system which contain more than one solid phase and Explain the following with help the diagram . (10)
(i) Triple points
(iii) Univariant system
- Q8** **Write short Notes on**
a) Born-Haber cycle (5)
b) Theory of heterogeneous catalyst. (5)