Total Number of Pages:02   **B.TECH**
                                                                                BS1103

2nd Semester Back Examination 2015-2016

CHEMISTRY- I
Branch: ALL
Time: 3 Hours
Max Marks: 7
Q. CODE: W631
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) The latent heat of fusion of ice is 5.99 Kj mol-1 at it melting point Calculate ∂S For fusion of 900 gm ice.
   b) What do you mean by Unit cell?How many no of atom present in BCC and CCP Unit cell
   c) The latent heat of fusion of ice is 5.99 Kj mol-1 at it melting point Calculate ∂S For fusion of 900 gm ice.
   d) Arrhenius equation showing relationship between rate constant and temperature is……..
   e) Show that packing factor for simple cubic structure is 52%
   f) Difference between Zero order and Non zero order reaction.
   g) What is state function and path function? Give example of each.
   h) The heat of neutralization of $CH_3COOH_{(aq)}$ and $NaOH_{(aq)}$ is -55.23kJ mol^{-1}. Calculate the enthalpy of dissociation of acetic acid.
   i) What is the relationship between free energy and equilibrium constant of a reaction?
   j) Enthalpy/mole is extensive or intensive property. Justify your answer.

Q2 a) What do you mean by the Phase Diagram ?Discuss phase Diagram of Sulphur system .along with Metastable curve   **(5)**
   b) For a certain first order reaction carried out at 298 K The use of a catalyst increase the rate by ten times .Calculate the decrease in activation energy caused by the catalyst.   **(5)**

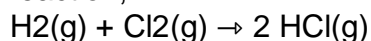**Q3 a)** What is a fuel cell? Write the construction and cell reaction of Hydrogen-oxygen fuel cell.   **(4)**
   b) Explain the potentiometric method to determine the emf of a cell.   **(3)**
   c) It can be seen now that both fcc and Hexagonal Primitive Structure have the same packing fraction. Moreover this is also the highest packing fraction of all the possible unit cells with one type of atom with empty voids. Can you explain this?   **(3)**

Q4 **a)** Why O_2 Is Paramagnetic while F_2 Is Diamagnetic? Explain with molecular orbital diagram **(4)**

b) If $\partial U = T\partial S - P\partial V$ Then Prove that $\{\partial T/\partial V\}_S = -\{\partial P/\partial S\}_V$ **(6)**

Q5 **a)** Consider the reaction, **(5)**
$$H2(g) + Cl2(g) \rightarrow 2\ HCl(g)$$
How does the value of ∂G change when the pressures of the gases are altered as follows at 25^0C?
$H_2 = 0.25$ atm; $Cl_2 = 0.45$ atm; , HCl = 0.30 atm
Standard free energy of HCl $=-95.27$ kj/mol

b) Prove that $C_P - C_V = R$ **(5)**

Q6 **a)** What do you mean by Defects in crystal? Discuss various types of Defects with example. **(5)**

b) What do you mean by the Lattice energy .How can you lattice energy with help of Born-Haber cycle explain with help of example. **(5)**

Q7 **a)** Calculate the equilibrium constant of cell reaction **(4)**
$2Ag++zn\leftrightarrow2Ag+Zn+2$
Occurring in the Zinc –Sliver cell at 250C.when concentration of Zn+2 is 0.10M and Ag+ is 10M .The EMF of the cell is found to be 1.62Volts
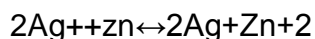
b) Write down the time independent –Schrödinger equation for a particle of mass m With a potential energy V .Discuss the Physical significance of ψ and ψ2 **(6)**

Q8 Write notes on (any two): **(5 x 2)**
a) Standard Hydrogen electrode.
b) Collision theory of reaction Rate
c) Enzyme catalysis
(d) Write the cell reactions of lead-acid storage cell during charging and discharging process