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Total number of printed pages – 3

B. Tech  
BS 1103

First Year Special Examination – 2014

CHEMISTRY – I

BRANCH : AEIE, BIOTECH, CHEM, CIVIL, CSE, EC, EEE, ELECTRICAL, ETC,  
FASHION, IEE, IT, MANUFACT, MECH, MME, TEXTILE

QUESTION CODE : G 416

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- (a) Calculate the range of frequency of Visible light
- (b) While studying the decomposition of  $N_2O_5$  It is observed that a plot of its partial pressure VS time is linear. What kinetic parameter can be obtained from this observation ?
- (c) Endothermic reaction is spontaneous at higher temperature explain.
- (d) How the  $T \partial S$  does Determines the spontaneous of reaction ?
- (e) Cation frenkel Defects is more common than anion frenkel defects. Explain.
- (f) What is difference between the triple point and critical point explain with example ?
- (g) Extensive properties can be converted to intensive properties how this can be possible explain with example.

P.T.O.

- (h) What do you mean by the auto catalyst explain with example.
- (i) Two moles of perfect gas are expanded from a pressure of  $20\text{Nm}^{-2}$  to  $1\text{Nm}^{-2}$  at 300K. What is the free energy ?
- (j) Write down the cell reaction of Hydrogen-oxygen Fuel cell.
2. (a) What do you mean by the vapour pressure ? Explain the vapour pressure curves in water and sulphur system with phase Diagram. 5
- (b) A compound CuCl has FCC structure It Density is  $3.4\text{gcm}^{-3}$ . What is the edge length of the cell ? 5
3. (a) Iodine Molecule Dissociate in to atom after Absorbing radiation of  $4500\text{Å}$ . If one quantum of radiation is absorbed by each molecule .Calculate lattice energy of Iodine atom. (Bond energy of iodine= $240\text{KJ}$ ) 5
- (b) Write down the time independent –Schrödinger equation for a particle of mass  $m$  With a potential energy  $V$ . Discuss the Physical significance of  $\psi$  and  $\psi^2$ . 5
4. A substance having a half life period of 30 min decomposes according to the first order rate law. 10
- (a) What fraction of this will be decomposed and what will be remained behind after 1.5 Hr ?
- (b) How long will it take to be 60% decomposed if its initial concentration is Doubled ?
5. (a) Calculate the equilibrium constant of cell reaction  $2\text{Ag} + \text{Zn} \leftrightarrow 2\text{Ag} + \text{Zn} + 2$  Occurring in the Zinc – Silver cell at  $25^\circ\text{C}$ . When concentration of  $\text{Zn} + 2$  is  $0.10\text{M}$  and  $\text{Ag}^+$  is  $10\text{M}$  ? The EMF of the cell is found to be  $1.62\text{Volts}$ . 5
- (b) What do you mean by the EMF ? Write an application of EMF with example. 5
6. (a) What do you mean by the Lattice energy ? How do you calculate the lattice of NaCl explain. 5

- (b) Calculate the Bond order of  $N_2$ ,  $O_2$ ,  $CO$ ,  $NO$  and Explain the magnetic properties of these molecule with help of MO diagram 5
7. (a) What do you mean by the Reaction rate ? Discuss the effect of temperature on reaction rate(Derive the Arrhenius equation). 5
- (b) What do you mean by the Crystal system ? Discuss the seven crystal system along with lattice parameter and example. 5
8. Write short notes on any two of the following : 5 × 2
- (a) Hydrogen electrode
- (b) L.C.A.O
- (c) Ledubrite and pearlite
- (d) Collosion theory of reaction Rates.

