

Registration No. :

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Total number of printed pages – 3

B. Tech
BS 1103

First Semester (Back/Special) Examination – 2013

CHEMISTRY – I

BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, EC,
EEE, EIE, ELECTRICAL, ETC, FASHION, FAT, IEE, IT, MANUFACT,
MECH, MINERAL, MINING, MM, MME, PLASTIC, TEXTILE

QUESTION CODE : D 173

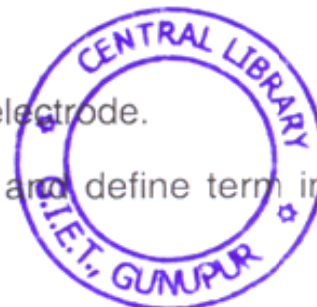
Full Marks – 70

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) What is Degree of Freedom ? What is value above and below critical point ?
- (b) Write down electrode reaction of quinhydrone electrode.
- (c) Write down the Gibbs's-Helmholtz equation and define term involved there in.
- (d) What is the coordination number of both the ions in CsCl structure ?
- (e) Calculate the standard potential of the cell
 $\text{Pt(s)}|\text{H}_2(\text{g})|\text{H}^+(\text{aq}) = \text{Ag}^+(\text{aq})|\text{Ag(s)}$.
Given : $E^0_{\text{Ag}^+/\text{Ag}} = +0.8\text{V}$
- (f) What do you mean by the Zero –order reaction ? Give an example.
- (g) Aqueous solution of glucose has one phase. Whereas aqueous solution of carbon tetrachloride has two phase.



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- (h) What do you mean by the Entropy and Absolute Entropy ?
- (i) What happens when Lead-Acid storage Battery Discharge ?
- (j) What do you mean by the planes of symmetry and Center of symmetry ?
2. (a) What do you mean by the Eutectic Point ? Discuss Eutectic point with the help of suitable diagram. Discuss its application. 5
- (b) Write the construction, cell representation and cell reaction of standard hydrogen electrode. 5
3. (a) What is the standard EMF of the Electrochemical cell made of Cd Electrode in a 1.0M $\text{Cd}(\text{NO}_3)_2$ Solution and Cr electrode in 1.0M $\text{Cr}(\text{NO}_3)_3$ solution $E^0(\text{Cd}/\text{Cd}^{+2}) = -0.40\text{v}$ $E^0(\text{Cr}^{+3}/\text{Cr}) = -0.74\text{v}$? 5
- (b) It was found that a canesugar solution in water was hydrolyzed to the extent 25 per cent in one hour. Calculate the time that will be taken for sugar to be hydrolyzed to the extents of 50%. Assuming that reaction is of first order. 5
4. (a) What do you mean by Order and molecularity ? Derive an expression for second order reaction when two reactant are different. 5
- (b) What are the factor that affects Rate of reaction ? Discuss with example. 5
5. (a) State Hess's law of constant Heat of summation. Calculate Heat of formation of Ethane. 5
 Given : Heat of combustion Ethane = -372.8Kj/mol
 Heat of combustion of Carbon = -94.5Kj/mol
 Heat of combustion of Hydrogen = -68.4KJ/mol
- (b) What do you mean by atomic packing factor ? Calculate atomic packing factor for simple cubic and face centered cubic lattice (1) 5
6. (a) Prove that $C_p - C_v = [P + \left\{ \frac{\partial U}{\partial V} \right\}_T] \left[\frac{\partial V}{\partial T} \right]_p$ 5

- b) The heat of reaction for $\text{N}_2 + \text{H}_2 \rightarrow 2\text{NH}_3$ at 27°C is -91.94 KJ . What will be its value at 500 C , if molar heat capacities at constant pressure and 27°C for N_2 and H_2 , NH_3 are 28.45 , 28.32 and 37.07 J respectively. 5
7. (a) BY how much is the oxidizing power of $\text{MnO}^{-4}/\text{Mn}^{+2}$ Couple decreased if the H^+ concentration is decreased from 1 M to 10^{-4} at 25°C ? Assume other species have no change in concentration. 5
- (b) What do you mean by the catalytic poisoning? Discuss the various types of catalytic poisoning. with example. 5
8. Write short notes on any **two** of the following : 5×2
- (a) Fuel cell and Dry cell
- (b) Unit cell and Bravais lattice
- (c) Hexagonal close packing and cubic close packing
- (d) Homogeneous catalysis and Heterogeneous catalysis.

