

Registration No. :

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Total number of printed pages – 3

B. Tech
BS 1103

First Semester Back Examination – 2014

CHEMISTRY – I

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

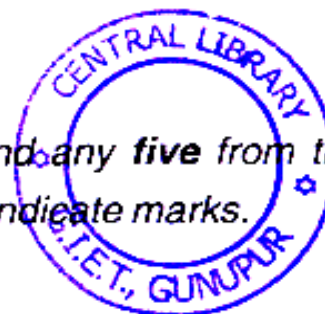
QUESTION CODE : L 353

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) From a reaction mixture when portion is removed for analysis the rate of reaction is not affected why ?
 - (b) How you will verify the reaction is first order or not ?
 - (c) When does cell formulation represent non spontaneous activity of galvanic cell ?
 - (d) For cell reaction $\text{Cu(s)} + 2\text{Ag}^+(\text{aq}) \rightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{Ag(s)}$ calculate equilibrium constant at 298, when $E^\circ_{\text{CELL}} = 0.46\text{V}$.
 - (e) In a body centred unit cell the body diagonal contained extra atom. Find the no. of atom present per unit cell.
 - (f) Explain why frenkel defects does not change density of solids.
 - (g) Show that N_2 molecule has greater bond dissociation energy than N_2^+ .
 - (h) Compare σ and π molecular orbital.

P.T.O.

- (i) Explain why mixture of water and alcohol is a one phase system where as water and carbon tetra chloride is two phase system.
- (j) State Krichoff equation. What is its significances ?
2. (a) The heat of formation of CH₄, CO₂ and H₂O are, -75, -390 and -286 kJ respectively. Calculate the heat of combustion of methane at ordinary temperature. 5
- (b) Derive a second order reaction rate equation for the reaction 2A → PRODUCT. Explain the half life period depend upon the initial concentration of reactants. 5
3. (a) A galvanic cell is constructed by connecting Cd²⁺/Cd and Cu²⁺/Cu half cell by a salt bridge. Represent the cell, and calculate the standard cell potential. Given that E⁰ for Cd²⁺/Cd = -0.40V, and for Cu²⁺/Cu = 0.34V. Also write the half cell reaction. 5
- (b) What do you mean by the metastable equilibrium ? Discuss the metastable equilibrium of water and sulphur system. 5
4. (a) For a certain 1st order reaction carried out at 298. The use of a catalyst increase the rate by ten times. Calculate the decrease in activation energy caused by catalyst. 5
- (b) What is the basis of Heisenberg's uncertainty principle ? State Heisenberg's principle and discuss its relevance for microscopic particle. 5
5. (a) A solid A⁺ and B⁻ has NaCl type closed packed structure. if anion has radius of 250 pm, what should be ideal radius for cation ? Can a cation c⁺ having radius 180 pm be slipped in to tetrahedral site of crystal A⁺, B⁻. Give the reason for your answer. 5
- (b) Prove that $C_p - C_v = [P + \{\partial U / \partial V\}_T][\partial V / \partial T]_p$ 5
6. (a) Give a comparison between collision theory and Transition theory of reaction rate. 5
- (b) What do you mean by the Lattice energy ? How do you calculate the lattice energy of NaCl ? Explain. 5

7. (a) The rate constant of a reaction is found to be tripled when the temperature increased from 25°C to 60°C. Calculate the activation energy. 5
- (b) How pH is measured by a glass electrode ? 5
8. Write short notes on any **two** of the following : 5×2
- (a) Liquid junction potential
 - (b) Eutectic system
 - (c) Metallic bonding
 - (d) Heterogeneous catalysis.

