Question Paper

Exam Date & Time: 30-Nov-2018 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLED SCIENCES
II SEMESTER B.S. ENGINEERING END SEMESTER EXAMINATION- NOVEMBER/DECEMBER 2018
Chemistry [CH 121A]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1) A) Discuss with a suitable example four types of hydrolysis of salt. (8)

B) Obtain the mathematical expression for equilibrium constant (law of mass action). Derive the relationship between Kc and Kp. (8)

C) Calculate E.M.F. of the zinc - silver cell at 25^0C when $[Zn^{2+}]$ = 1.0 M and $[Ag^+]$ = 10 M (E^0_{cell}=1.56 V at 25^0C). Write the cell representation and cell reaction (4)

2) A) Explain the following: (8)
i) Electron sea model of metallic bonding
ii) Resonance

B) Explain sp^3 and sp^2 hybridizations with a suitable example. (8)

C) Explain intra molecular and inter molecular hydrogen bonding. (4)

3) A) Explain the construction and working of galvanic cell. Write four differences between galvanic and electrolytic cell. (8)

B) Explain the construction and working of Weston Cadmium cell. (8)

C) Derive an expression for the degree of dissociation of a weak electrolyte (Ostwald's dilution law). (4)

4) A) Explain the characteristics of covalent compounds. (8)

B) Describe the structures of H_2O and NH_3 molecules in terms (8)

of VSEPR theory. Explain the difference in bond angle in CH_4, NH_3 & H_2O.

C) Give reason: (4)
i) Boiling point of o-nitrophenol lower than that of p-nitrophenol
ii) The reactions between ions in solutions usually very much faster than the reactions between covalent substances.

5) Explain geometrical and optical isomerism. (8)

A)

B) Explain the Homolytic fission and Heterolytic fission of organic compounds with suitable examples. Discuss the mechanism of S_N2 reaction of alkyl halides. (8)

C) What is responsible for the silvery white lustrous surface of metals? Why does the conductivity of metals decrease at high temperatures? (4)

6) Derive an expression for the rate constant of a first order reaction. Explain factors influencing the rate of chemical reaction (8)

A)

B) Define: (8)
i) Extensive property
ii) Second law of thermodynamics
iii) Entropy of a system
iv) Homogeneous system

C) Define order and molecularity of a reaction. Give examples. (4)

7) Define the heat capacity of a system. Obtain the expression for heat capacities at constant volume and constant pressure for one mole of an ideal gas. Show that for an ideal gas Cp-Cv = R. (8)

A)

B) Derive Gibbs-helmholtz equation. Discuss its application and significance. (8)

C) Derive the expressions for the rate constant of second order reaction having only one reactant. (4)

8) Discuss four types of organic reactions with an example each. (8)

A)

B) Explain carbonium ions, carbanions, carbon free radicals, carbenes. (8)

C) Draw the structure of the following molecules (4)
i) 3-bromo-2-chloro-5nitrohexane
ii) 2- Butenal
iii) 1,3-butadiene
iv) 3-penten-1-yne

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