Question Paper

Exam Date & Time: 27-Apr-2019 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENES
II SEMESTER B.Sc.(Applied Sciences) IN ENGINEERING END SEMESTER THEORY EXAMINATION-APRIL/MAY 2019
Chemistry [ICH 121/CH 121A]

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

i) Answer any five full questions from the following.
ii) Draw diagram whereever necessary.

1) Explain the characteristic properties of ionic compounds. (8)

A)

B) Explain in detail sp^2 and sp hybridization with respect to carbon. (8)

C) A galvanic cell consists of copper immersed in 10 M solution of $CuSO_4$ and iron immersed in 1M $FeSO_4$ at 298K. If E^0_{cell} = 0.78 V, write the cell reaction, cell representation and calculate E.M.F. of the cell. (4)

2) What is Helmholtz free energy and Gibbs free energy? Derive the Gibbs Helmholtz equation. (8)

A)

B) Distinguish between the following. (8)
i) Intensive and Extensive properties.
ii) closed system and Isolated system
iii) Isothermal process and Adiabatic process
iv) Reversible process and Irreversible process

C) Explain the following with example: (4)
i) Polar and non-polar covalent bonds
ii) Octet rule

3) Derive a relationship between hydrolysis constant, ionic product of water and the dissociation constants for the hydrolysis of sodium acetate and ammonium chloride. (8)

A)

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

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

4) Explain the following with a suitable example (8)
i) Heterolytic fission
ii) Carbanion
iii) Carbenes

A)

iv) Electrophiles

B) Explain the IUPAC rules for naming Alkynes with suitable examples. (8)

C) Write a note on liquid junction potential and explain how to minimize it. (4)

5) A) Define lattice energy. Discuss in detail the Born-Haber cycle for the formation of NaCl crystal. (8)

B) Discuss the band theory to explain the bonding in lithium metal. Explain the conduction and valance band with reference to conductors, semiconductors and insulators. (8)

C) Explain the mechanism of nucleophilic addition reaction with a suitable example. (4)

6) A) Explain the construction and working of standard hydrogen electrode. Give two applications and limitations. (8)

B) Give the important postulates of Arrhenius theory of electrolytic dissociation. What are its limitations? (8)

C) Write different types of orbital overlapping according to VB theory with an example in each case. (4)

7) A) Define the following types of isomerism with a suitable example (8)
i) Position isomerism and Functional isomerism
ii) Metamerism and Tautomerism
iii) Geometrical isomerism
iv) Optical isomerism

B) Discuss the mechanism of S_N1 and S_N2 reaction of alkyl halides. (8)

C) An N/100 solution of formic acid ionised to the extent of 8 %. Find the ionization constant of the acid. (4)

8) A) Derive Arrhenius equation for energy of activation of a reaction and explain the methods for determination of E_a. (8)

B) Derive the expressions for the rate constant of second order reaction (8)
i) having only one reactant
ii) having two different reactants.

C) State the first law of thermodynamics and discuss its limitations. (4)

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