BSC. PART - II EXAMINATION - 2012

CHEMISTRY SUB/GEN

Answer six questions in all. selecting at least one from each Group in which Q.No.1 is compulsory.

1. Choosing the correct answer or filling the blanks. answer the following :

(i) Activation energy is the energy taken up by normal molecules to form :
(a) Product (b) Active Molecules (c) Energy rich molecules (d) All of these

(ii) $FeCl_3$ is hydrolysed in solution to make it :
(a) Neutral (b) Alkaline (c) Acidic (d) All of these

(iii) Conjugate base of H_3O^+ ion is :
(a) OH^- (b) H_2O (c) Both (i) and (ii)

(iv) Radioactive disintegration is a order process.
(a) Zero (b) 1st (c) 2nd (d) 3rd

(v) Which of the following expressions gives the de-Broglie relationship ?
(a) p = h/mvs (b) λ. = h/mv (c) λ = h/mp (d) λ. m = V/P

(vi) Maximum number of bonds between two atoms of a covalent bond can be:
(a) One (b) Two (c) Three (d) four

(vii) Nitrogen molecule is chemically less active because of its :
(a) Small atomic energy (b) High dissociation energy
(c) High electronegativity (d) Stable electronic configuration

(viii) The higher boiling points of carboxylic acids are due to :
(a) Their acidic nature (b) Intermolecular Hydrogen Bonding
(c) Their demerisation (d) Both (b) and (c)

(ix) Glucose and fructose are : (a) Optical isomers
(b) Functional Group Isomers (c) Chain Isomers (d) Position Isomers

(x) The general formula of arenes is :
(a) C_nH_{2n} (b) C_nH_{2n-4} (c) C_nH_{2n+2} (d) C_nH_{2n-6}

GROUP - A

2. (a) Deduce the kinetic equation for a reaction of first order.
(b) Prove that :
(i) Half life period of a 1st order reaction is constant.
(ii) 1st order reaction is never completed.

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3. (a) Describe Bronsted theory of acids and bases.
   (b) Explain that HCO_3^- Ion is both an acid and a base.
4. (a) Set up an electrochemical cell to determine pH of a solution.
   (b) Calculate pH of 10^{-7} M HCl, given $\text{Log}10^2 = 0.3010$.
5. Explain with examples:
   (a) Isotopes, Isobar, Isotone.
   (b) Balance the following induced unclear reaction :

   (i) $^{14}_{7}N + {}^{1}n_0 \rightarrow {}^{1}P_1 + \ldots\ldots\ldots\ldots$ (ii) $^{16}_{8}O + \ldots\ldots\ldots\ldots \rightarrow {}^{0}r_0 + {}^{17}_{8}O$

   (iii) $\ldots\ldots\ldots\ldots + {}^{1}P_1 \rightarrow {}^{1}n_0 + {}^{14}_{7}N$

GROUP - B

6. (a) Give the shape and structure of s, p and d-orbitals.
   (b) Discuss the significance of the wave function of ψ and ψ^2.
7. (a) Explain V.B. theory of chemical bond and its limitations.
   (b) CO is diamagnetic while NO is paramagnetic.
8. (a) What is the nature of bonding in XeF_2?
   (b) Explain Xe and F_2 form chemical compounds.
   (c) All the noble gases are diamagnetic. Explain.
9. (a) Name two important ores of Cobalt.
   (b) How is it extracted from its important ore ?
   (c) Give its important properties.

GROUP - C

10. (a) How is Oxalic Acid obtained from CO + NaOH?
    (b) What happen when :
    (i) Hydrated Oxalic Acid is heated.
    (ii) Oxalic acid is oxidised with $KMNO_4$ in presence of dil. H_2SO_4.
11. (a). Describe the preparation of pure aniline from nitrobenzene.
    (b) How is phenol obtained from aniline ?
12. (a) Explain electrophilic substitution reaction.
    (b) Describe the mechanism of nitration of benzene.
13. Answer any two of the following :
    (a) How is benzaldehyde obtained from nitrobenzene ?
    (b) Describe the synthesis of citric acid from glycerol.
    (c) Explain stereoisomeism giving with suitable examples.

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