

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) $p = h/mv$ (b) $\lambda = h/mv$ (c) $\lambda = h/mp$ (d) $\lambda \cdot m = V/p$

(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 dimerisation (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) $\text{C}_n\text{H}_{2n-4}$ (c) $\text{C}_n\text{H}_{2n+2}$ (d) $\text{C}_n\text{H}_{2n-6}$

GROUP - A

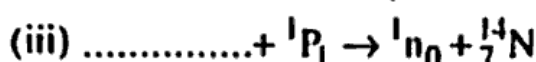
2. (a) Deduce the kinetic equation for a reaction of first order.

(b) Prove that :

(i) Half life period of a 1st order reaction is constant.

(ii) 1st order reaction is never completed.

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 nuclear reaction :



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 $\text{CO} + \text{NaOH}$?
(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 stereoisomerism giving with suitable examples.