

# BSC. PART - II EXAMINATION - 2009

## CHEMISTRY SUB / GEN

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

1. Choose the correct answer of the following :

(i) Which reaction is pseudo-unimolecular?

(a)  $H_2 + Cl_2 \rightarrow 2HCl$  (b) Acid catalysed hydrolysis of an ester

(c) Base catalysed hydrolysis of an ester (d)  $N_2O_5 \rightarrow N_2O_4 + \frac{1}{2} O_2$

(ii) The  $t_{\frac{1}{2}}$  of a reaction is doubled as the initial concentration of the reaction is

doubled. The order of reaction is : (a) 1 (b) Zero (c) 2 (d)  $1\frac{1}{2}$

(iii) If the specific resistance of a solution of concentration C gm. equivalent liter<sup>-1</sup> is R, then its equivalence conductance is:

(a)  $\frac{100R}{C}$  (b)  $\frac{RC}{1000}$  (c)  $\frac{1000}{RC}$  (d)  $\frac{C}{1000R}$

(iv) Induced radioactivity was discovered by:

(a) Henry Becquerel

(b) Rutherford

(c) Soddy and Fajans

(d) Fredrick joliot and Iren Curie

(v) de-Broglie wave equation is :

(a)  $\lambda = \frac{h}{m}$

(b)  $\lambda = \frac{h}{mv}$

(c)  $\lambda = \frac{mv}{h}$

(d)  $mvr = n \cdot \frac{h}{2\pi}$

(vi) The shape of  $H_3O^+$  ion is :

(a) Tetrahedral (b) Angular (c) Pyramidal (d) Triangular Planar

(vii) The paramagnetic character of  $O_2$  molecule is explained by :

(a) Molecular orbital theory

(b) Valence bond theory

(c) Crystal field theory

(d) None of these

(viii) Lactic acid is :

(a) Propionic acid

(b) Butanoic acid

(c)  $\alpha$ -hydroxy propionic acid

(d)  $\beta$ -hydroxy propionic acid

(ix) Nitration of Benzene is :

(a) Nucleophilic substitution

(b) Nucleophilic addition

(c) Electrophilic substitution

(d) Electrophilic addition

(x) Benzaldehyde on treatment with 50% aqueous NaOH solution gives sodium benzoate and benzyl alcohol. The reaction is called :

(a) Cannizzaro reaction

(b) Perkin reaction

(c) Aldol condensation

(d) Benzoin condensation

### GROUP - A

2. (a) Discuss half life and van't Hoff's differential method for the determination of order of a reaction.
- (b) For a second order reaction, deduce the rate constant when the initial concentration of the reactants are the same.
3. (a) Define the terms specific conductance and equivalent conductance of an electrolyte.
- (b) Explain the effect of dilution on equivalent conductance.
- (c) Calculate the equivalent conductivity of 2M  $H_2SO_4$  solution when its specific conductivity at 25°C is  $0.0125 \text{ ohm}^{-1} \text{ cm}^{-1}$ .

4. (a) State and explain Group Displacement Law.  
 (b)  ${}_{92}\text{U}^{238}$  emits four  $\alpha$ -rays and two  $\beta$ -rays. What is the product?  
 (c) Discuss the use of e.m.f. measurement for the determination of valency of ion.
5. (a) Define buffer solution and explain buffer action. Prove that  $\text{pH} + \text{pOH} = 14$   
 (b) What is electrode potential? Discuss the origin of electrode potential.

#### GROUP - B

6. (a) Starting from chromite ore, how the followings are obtained?  
 (i)  $\text{K}_2\text{Cr}_2\text{O}_7$  (ii)  $\text{CrO}_2\text{Cl}_2$  (iii) Cr-metal  
 (b) Calculate the equivalent wt. of  $\text{K}_2\text{Cr}_2\text{O}_7$  in acid medium.
7. (a) Explain valence bond theory of Covalent bond. How does the theory explain the directional nature of Covalent bond?  
 (b) On the basis of VSEPR theory, explain the shape of  $\text{NH}_3$  and  $\text{SF}_4$  molecules.
8. Name two ores of nickel. How is nickel extracted from one of its ores? Name two important alloys of nickel with their composition.
9. Write notes on any two of the following: (i) de-Broglie concept of dual nature of electron and his wave equation (ii) Structure and bonding in  $\text{XeO}_3$  and  $\text{XeF}_4$  molecule. (iii) Hydroxylamine (iv) Marshall's acid

#### GROUP - C

10. (a) How is tartaric acid obtained from grape juice? How is ethylene converted into tartaric acid?  
 (b) Discuss the optical isomerism of tartaric acid.
11. How is phenol obtained from coal tar? How would you convert phenol into:  
 (i) Benzene (ii) Picric acid (iii) Salicylaldehyde
12. Write notes on any two of the following:  
 (i) Cannizzaro reaction (ii) Reimer-Tiemann reaction (iii) Cis-trans isomerism
13. (a) What are carbohydrates? How are they classified?  
 (b) Establish the open chain structure of glucose. Write two main objections against this structure.