

**Model Question- 3**  
**Chemistry XII**

**Time :3 hours**  
**Attempt all questions**

**Full marks: 75**

**Group 'A'**

**Tick the correct answer. (11×1 = 11)**

1. 15 ml of N/10 NaOH solution completely neutralizes 12 ml of H<sub>2</sub>SO<sub>4</sub> solution. The normality of the H<sub>2</sub>SO<sub>4</sub> solution will be  
c. N/5                  b. N/8                  c. N/10                  d. N
2. The degree of ionization of an electrolyte depends on upon  
a) nature of solvent    b) nature of solute        c) temperature                  d) all
3. The rate of a gaseous reaction is given by  $k[A][B]$ . If the volume of the vessel containing these gases is reduced to 1/4<sup>th</sup> of the initial volume, the rate of reaction relative to the original rate would be

- a.  $\frac{16}{1}$  b.  $\frac{1}{16}$  c.  $\frac{4}{1}$  d.  $\frac{1}{8}$

4. If the oxidation electrode potential of  $K^+/K$  is +2.93 V. What would be the value of reduction potential at the same temperature  
 a. +2.93 V      b. -2.93 V      c. Zero      d. -1.93 V
5. The first transition element is  
 a. Copper      b. nickel      c. scandium      d. vanadium
6. Malachite is an ore of  
 (a) iron      (b) copper      (c) zinc      (d) Silver
7. Tear gas is  
 a) Chloretone      b) Ethyl carbonate      c) Chloropicrin      d) Methylene chloride
8. Ethanol is an isomer of  
 b) Methoxymethane      b) Propane      c) Ethanol      d) None
9. The lime which has properties of setting are  
 a. Fat lime      b. hydraulic lime      c. quick lime      d. hydrated lime
10. Pulp paper making process was invented in China by  
 a. Song dynasty      b. Tang dynasty      c. Sui dynasty      d. Han dynasty
11. Have same atomic numbers but different atomic masses  
 a. Isotope      b. Atom      c. Radioisotope      d. None of these

### Group 'B'

#### Short answer questions. (8 × 5=40)

1. Concentration of solution is expressed in various ways.  
 a) Define normal solution and molal solution. [2]  
 b) 10 g NaOH was added to 200cc of N/2 (f = 1.5)  $H_2SO_4$  solution and volume was diluted to two-liter. Will the resulting solution be acidic, basic, or neutral? [3]

**Or**

- a. What do you mean by catalysis? [1]  
 b. The experimental data for the reaction  $2A + B_2 \rightarrow 2AB$  are as below.

Exp.	[A] mol L <sup>-1</sup>	[B] mol L <sup>-1</sup>	Rate mol L <sup>-1</sup> s <sup>-1</sup>
1	0.50	0.50	$1.6 \times 10^{-4}$
2	0.50	1.00	$3.2 \times 10^{-4}$
3	1.00	1.00	$3.2 \times 10^{-4}$

- (i) Find the overall reaction and rate constant. [2]  
 (ii) Calculate the rate of formation of AB when the initial concentration of A and B are 2 mol L<sup>-1</sup> and 4 mol L<sup>-1</sup> respectively. [2]
2. What is entropy of fusion? State and explain second law of thermodynamics. [1+4]  
 3. What is tailing of mercury? Mention the factors affecting the formation of complex compound by transition elements. What is crystal field splitting? [1+2+2]

4. Why does zinc become dull in contact with moist air? What happens when corrosive sublimate is allowed to react with stannous chloride till excess? Write the name of any two important ore of copper with molecular formula. [2+2+1]
5. write the possible isomers for the formula  $C_2H_6O$ . write their IUPAC name. which of the isomer is soluble in water and higher boiling point and why? And write the chemical test to distinguish from methanol?

**Or**

The Chloroform can be prepared by heating paste of bleaching powder with ethanol or acetone. What happens when,

- a) Chloroform is warmed with aniline and alc. KOH. [1]  
 b) Chloroform is boiled with KOH solution. [1]  
 c) Chloroform is warmed with phenol and aqueous alkali. [1]  
 d) Chloroform is exposed to sunlight and air for long time. [1]  
 e) Chloroform is heated with Conc.  $HNO_3$ . [1]
6. Draw the structure of possible isomers of  $C_4H_8O_2$ . Also write their IUPAC name. Why do carboxylic acid not show positional isomers?
7. Nitro
8. Cement

### Group 'C'

#### Long answer questions

(3× 8=24)

9. a) How Bronsted –Lowry defines acid and base. What are its advantage and limitation?  
 b) The solubility of AgCl in water at 298 K is  $1.43 \times 10^{-3}$  g/ltr. Calculate its solubility in 0.5 M KCl solution. (Ag = 108). Also, calculate the ppt formed. [2+2+4]

**Or**

- a. Calculate the enthalpy of formation of naphthalene from the following data:  
 $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} : \Delta H = -94.405 \text{ Kcal}$   
 $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O(l) : \Delta H = -136.6 \text{ Kcal}$   
 $C_{10}H_8(s) + 12O_2(g) \rightarrow 10 CO_2(g) + 4H_2O(l) \Delta H = -1231.5 \text{ Kcal}$  [4]
- b. i. What is a standard hydrogen electrode? [1]  
 ii. For a cell:  $Mg(s)/Mg^{++}(1M)//Cu^{++}(1M)/Cu(s)$

Given,  $E^\circ_{Mg^{++}/Mg} = -2.37V$  and  $E^\circ_{Cu^{++}/Cu} = +0.34V$

- (i) Indicate anode and cathode. [1]  
 (ii) Write the reaction taking place at electrode [1]  
 (iii) Calculate the EMF at 1M solution of its ion. [1]
10. You have ethanol, propan-2-ol and 2-methylpropan-2-ol in separate test tube. How would you distinguish them by using Victor's Meyer's method. Write all the reaction involved. And what are the oxidized products of them.
11. A. An organic liquid (A) reacts with sodium nitrite and dil. Hydrochloric acid in ice bath to give compound (B) which on warming with cuprous chloride in dil. HCl gives compound (C). When (C) is heated with NaOH at about  $350^\circ C$  under high pressure followed by acidification, (D) is formed. (D) reacts with aqueous bromine to give white precipitate (E) which on heating with Zn dust gives 1,3,5-tribromobenzene. Identify A, B, C, D and E with necessary chemical reactions. [5]

**B.** Draw the structure of possible isomers of  $C_4H_8O_2$ . Also write their IUPAC name.  
Why do carboxylic acid not show positional isomers? [3]