RAVI TEST PAPERS & NOTES, WHATSAPP 8056206308

12TH CBSE CHEMISTRY SLIP TEST

12th Standard

Chemistry

2 Marks 7 x 2 = 14

1) State Raoult's law for a solution containing volatile components.

The vapour pressure of each component is directly proportional to the mole fraction of each component.

2) Rusting of iron is quicker in saline water than in ordinary water. Why is it so?

In saline water, NaCl helps water to dissociate into H^+ and OH^- . Greater the number of H^+ , quicker will be rusting.

3) For a reaction: $H_2 + Cl_2 \overset{hv}{\rightarrow} 2HCl$
Rate = k
(i) Write the order and molecularity of this reaction,
(ii) Write the unit of k.

Answer : (i) For a reaction: $H_2 + Cl_2 \overset{hv}{\rightarrow} 2HCl$
Rate k, suggests that the reaction is of zero order. Further, the molecularity of a given reaction is 2 as two molecules are participating in the reaction. Hence, order = zero and molecularity = two.
(ii) The unit of k for zero order reaction is equal to the rate of a reaction which is mol $L^{-1}s^{-1}$. Hence, the unit of k for the given reaction is mol $L^{-1}s^{-1}$

4) Transition elements exhibit their highest oxidation state in their oxides not in Flourides. Why?

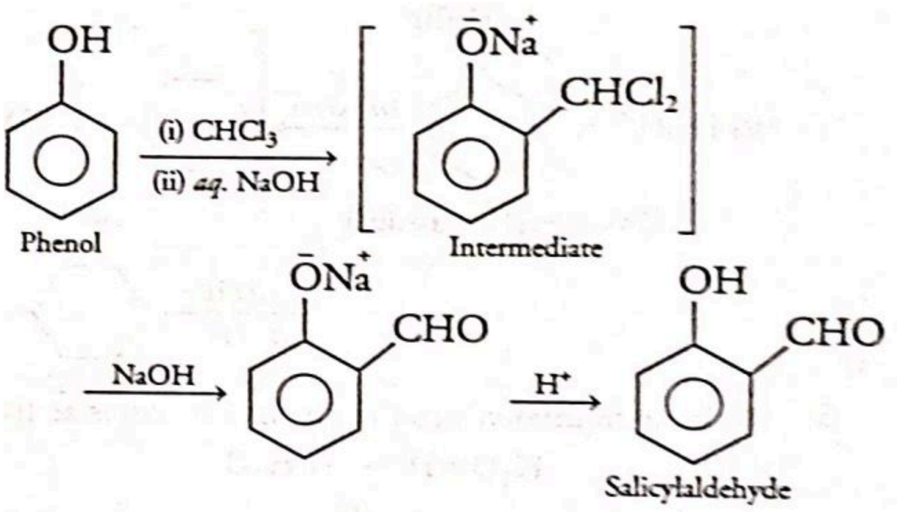
Because oxygen can form covalent multiple bonds.

5) Write the IUPAC name of the complex: $[CoCI_2 (en)_2]^+$

The IUPAC name of the complex $[CoCI_2 (en)_2]^+$ is dichloridobis (ethane -1 2- diarnine) cobalt (Ill) ion.

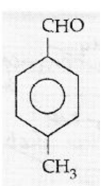
6) Write the equations involved in the
Reimenn-Tiemann reaction.

Answer :



7) Write the structure of p-methyl benzaldehyde molecule.

The structure of p-methyl benzaldehyde



3 Marks 6 x 3 = 18

8) Calculate the freezing point depression expected for 0.0711 m aqueous solution of Na_2SO_4. If this solution actually freezes at -0.320 °C, what would be the value of van't Hoff factor? (K_f for water is 1.86 °C mol^{-1}).

Answer : 0.132°C, 2.42

9) A reaction is of second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is reduced to that half? What is the unit of rate constant of such a reaction?

Answer : Rate reduces to $1/4^{th}$, units of k = L mol^{-1} s^{-1}

10) (a) How would you account for the following?
(i) Transition metals and their compounds show catalytic properties.
(ii) Mn shows highest oxidation state of +7 with oxygen but with fluorine it shows the highest oxidation state +4.
(b) Complete the following equation:
$3MnO_4^{2-} + 4H^+ \longrightarrow$

Answer : (a) (i) Transition metals show variable oxidation states, therefore, they and their compounds act as catalyst.
(ii) Oxygen can form double bond, therefore, it can form Mn_2O_7 , whereas 'F' cannot form double bonds, so, it can form MnF_4 .
(b) $3MnO_4^{2-} + 4H^+ \longrightarrow MnO_2 + 2MnO_4^- + 2H_2O$

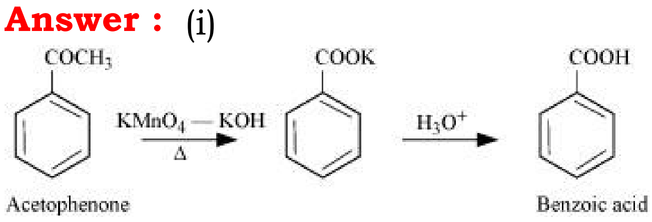
11) Write the name, the state of hybridization, the shape and the magnetic behaviour of the following complexes:
$[Ni(CN)_4]^{2-}$, $[CoCl_4]^{2-}$,$[Cr(H_2O)_2(C_2O_4)_2]^-$ (At. No: Co = 27, Ni = 28, Cr = 24)

Answer :

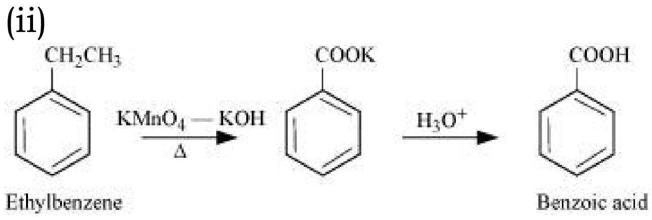
Complexes	IUPAC Name	Hybridization	Shape	Magnetic Behaviour
$[CoCl_4]^{2-}$ $[Ni(CN)_4]^{2-}$ $[Cr(H_2O)_2(C_2O_4)_2]^-$	tetrachloridocobaltate (II) ion tetracyanonickelete (II) ion diaquadioxalatochromat (III) ion	sp^3 dsp^2 d^2sp^3	Tetrahedral Square planar Octahedral	Paramagnetic Diamagnetic Paramagnetic

12) How can you convert each of the following compounds to benzoic acid?
1. Acetophenone
2. Ethylbenzene
3. Bromobenzene

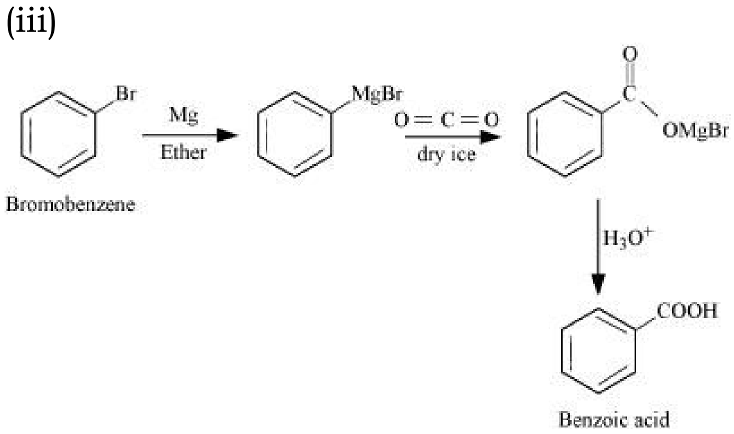
Answer : (i)



(ii)



(iii)



13) Amino acids may be acidic, alkaline or neutral. How does this happen? What are essential and non-essential amino acids? Name one of each type.

Answer : Amino acids may be acidic, basic or neutral depending upon the relative number of amino and carboxyl groups present in the molecule. Equal number of amino and carboxyl groups makes it neutral, more number of amino than carboxyl groups makes it basic and more carboxylic groups as compared to amino groups makes it acidic.
Essential Amino Acids: Amino acids which can't be created in our body but can only be received from proper food or diet are called Essential Amino Acids. Examples- Histidine, Isoleucine, Lysine.
Non- essential amino acids: Amino acids which can be created in our body itself are Non- essential amino acids. Examples-alanine, arginine, asparagine, aspartic acid. Examples- Histidine, Isoleucine, Lysine.

Case Study Questions 2 x 4 = 8

14) **Read the passage given below and answer the following questions:**

At 298 K, the vapour pressure of pure benzene, C_6H_6 is 0.256 bar and the vapour pressure of pure toluene
$C_6H_5CH_3$ is 0.0925 bar. Two mixtures were prepared as follows:
(i) 7.8 g of C_6H_6 + 9.2 g of toluene
(ii) 3.9 g of C_6H_6 + 13.8 g of toluene

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) The total vapour pressure (bar) of solution 1 is
(a) 0.128 (b) 0.174 (c) 0.198 (d) 0.258

(ii) Which of the given solutions have higher vapour pressure?
(a) I **(b) II**
(c) Both have equal vapour pressure **(d) Cannot be predicted**

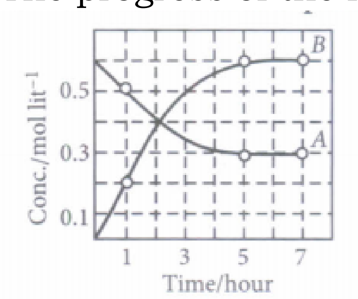
(iii) Mole fraction of benzene in vapour phase in solution 1 is
(a) 0.128 (b) 0.174 (c) 0.734 (d) 0.266

(iv) Solution I is an example of a/an
(a) ideal solution **(b) non-ideal solution with positive deviation**
(c) non-ideal solution with negative deviation **(d) can't be predicted**

Answer : (i) (b) : Moles of C_6H_6 = $\frac{7.8}{78} = 0.1$
Mole $C_6H_5CH_3$ = $\frac{9.2}{92} = 0.1$
Mole fraction of C_6H_6 = $\frac{0.1}{0.1+0.1} = 0.5$
= > Mole fraction of $C_6H_5CH_3$ = 0.5
Vapour pressure of toluene = Vapour pressure of pure toluene x mole fraction of toluene
= 0.0925 x 0.5 = 0.04625
Vapour pressure of benzene = 0.256 x 0.5 = 0.128
Total vapour pressure of solution = 0.17425
(ii) (a) : Moles of benzene in solution-II = $\frac{3.9}{78} = 0.05$
Moles of toluene in solution-II = $\frac{13.8}{92} = 0.15$
Vapour pressure of solution
= 0.256 x 0.05 + 0.0925 x 0.15
= 0.0128 + 0.013875 = 0.026675
(iii) (c) : Mole fraction of benzene in vapour phase
$y_{\text{benzene}} = \frac{p_{\text{benzene}}}{P_{\text{total}}} = \frac{0.128}{0.17425} = 0.734$
(iv) (a) : Benzene and toluene form an ideal solution.

15) **Read the passage given below and answer the following questions :**

The progress of the reaction, $A \rightleftharpoons nB$ with time is represented in the following figure.



The following questions are multiple choice questions. Choose the most appropriate answer:

(i) What is the value of n?

(a) 1 **(b) 2** **(c) 3** **(d) 4**

(ii) Find the-value of the equilibrium constant

(a) 0.6 M **(b) 1.2M** **(c) 0.3M** **(d) 2.4M**

(iii) The initial rate of conversion of A will be

(a) 0.1 mol L^{-1} hr^{-1} **(b) 0.2 mol L^{-1} hr^{-1}** **(c) 0.4 mol L^{-1} hr^{-1}** **(d) 0.8 mol L^{-1} hr^{-1}**

(iv) For the reaction, if $\frac{d[B]}{dt} = 2 \times 10^{-4}$, value of $-\frac{d[A]}{dt}$ will be

(a) 2 x 10^{-4} **(b) 10^{-4}** **(c) 4 x 10^{-4}** **(d) 0.5 x 10^{-4}**

Answer : **(i) (b) :** According to the figure, in the given time of 4 hours (1 to 5) concentration of A falls from 0.5 to 0.3 M, while in the same time concentration of B increases from 0.2 to 0.6 M.

Decrease in concentration of A in 4 hours

= 0.5 - 0.3 = 0.2 M

Increase in concentration of B in 4 hours

= 0.6 - 0.2 = 0.4 M

Thus, increase in concentration of B in a given time is twice the decrease in concentration of A. Thus, n = 2

(ii) (b) : $K = \frac{[B]^2}{[A]} = \frac{(0.6)^2}{0.3} = 1.2\text{M}$

(iii) (a) : From t = 0 to t = 1 hr,

For A, dx = 0.6 - 0.5 = 0.1 mol L^{-1}

$\therefore$ Initial rate of conversion of $A = \frac{dx}{dt}$

$= \frac{0.1 \text{ mol L}^{-1}}{1\text{hr}} = 0.1 \text{ mol L}^{-1}\text{hr}^{-1}$

(iv) (b) : $A \rightleftharpoons 2B$

$-\frac{d[A]}{dt} = +\frac{1}{2}\frac{d[B]}{dt} = \frac{1}{2} \times 2 \times 10^{-4} = 10^{-4}$