CBSE 12th Chemistry 2016 Solved Paper

Outside Delhi

CBSE 12th Chemistry 2016 Solved Paper Outside Delhi

TIME - 3HR. | QUESTIONS - 26

THE MARKS ARE MENTIONED ON EACH QUESTION

SECTION – A

Q.1. Write the structure of an isomer of compound C_4H_9Br which is most reactive towards S_N1 reaction. *1 marks*

Ans. $H_3C - \underset{\underset{CH_3}{|}}{\overset{\overset{Br}{|}}{C}} - CH_3$ is most reactive isomer of C_4H_9Br towards S_N1 reaction because 3^o

Carbocation is most stable.

Q.2. $Pb(NO_3)_2$ on heating gives a brown gas which undergoes dimerization on cooling. Identify the gas. *1 mark*

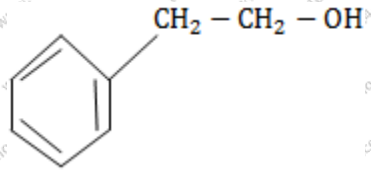
Ans. Nitrogen dioxide gas (NO_2)

$$2\,Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + 4NO_2 + O_2$$
$$2NO_2 \rightarrow N_2O_4$$

Q.3. Give an example each of a molecular solid and an ionic solid. *3 marks*

Ans. Molecular solid $-CH_4$, Ionic solid $-$NaCl.

Q.4. Write the IUPAC name of the given compound. *1 mark*



Ans. IUPAC name: 2-Phenylethanol.

Q.5. What is the reason for the stability of colloidal sols? *1 mark*

Ans. Stability of colloidal sols is due to the fact that the colloidal particles in the sol are electrically charged. Hence, repel one another and do not come close together to form large non-colloidal particles.

Q.6. (i) Gas (A) is more soluble in water than Gas (B) at the same temperature. Which one of the two gases will have the higher value of KH (Henry's constant) and why?

(ii) In non-ideal solution, what type of deviation shows the formation of maximum boiling azeotropes.

Ans. (i) $P_A = K_H X_A$ [Henry's law]

As solubility decreases, K increases $\left[K_H = \frac{P_A}{X_A}\right]$

Hence, for Gas B at the same temperature, K_H value is higher.

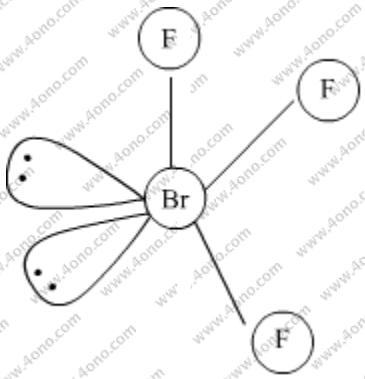
(ii) Non-ideal solution having negative deviation shows the formation of maximum boiling azeotropes.

Q.7. Write the structures of the following: *1 mark*

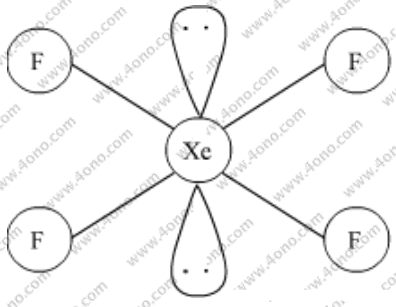
(i) $\mathbf{BrF_3}$

(ii) $\mathbf{XeF_4}$

Ans. (i)



(ii)



OR

What happen when:

(i) SO_2 **gas is passed through an aqueous solution** Fe^{3+} **salt.**

(ii) XeF_4 **reacts with** SbF_5**.**

(i) SO_2 act as reducing agent and hence, reduce an aqueous solution of Fe^{3+} Salt to Fe^{2+} Salt

$SO_2 + 2H_2O \rightarrow SO4^{2-} + 4H^+ + 2e^-$

$2Fe^{3+} + 2e^- \longrightarrow 2Fe^{2+}$

$2Fe^{3+} + SO_2 + 2H_2O \longrightarrow 2Fe^{2+} + SO4^{2-} + 4H^+$

(ii) $XeF_4 + Sb_{+5} \longrightarrow [XeF_3] + [SbF_6]^-$

Q.8. When a coordination compound $CoCl_3.6NH_3$ **is mixed with**$AgNO_3$**, 3 moles of AgCl are precipitated per mole of the compound. Write.** *1 mark*

(i) Structural formula of the complex
(ii) IUPAC name of the complex.

Ans. (i) Structural formula of complex: $[Co(NH_3)_6]Cl_3$

(ii) Hexamine cobalt

(iii) Chloride

SECTION - B

Q.9. For a reaction: *2 mark*

$$H_2 + Cl_2 \xrightarrow{hv} 2HI$$

(i) Write the order and molecularity of this reaction.
(ii) Write the unit of k.

Ans. (i) Order of reaction = 0, molecularity = 2
(ii) Unit of k = mol L^{-1}time^{-1}

Q.10. Write the chemical equations involved in the following reactions: *2 mark*
(i) Hoffmann-bromoimides degradation reaction
(ii) Carbylamines reaction

Ans.(i) Hoffmann-bromoimide degradation reaction: It is given by the primary amine having one carbon less.

$$R - CONH_2 + Br_2 + 4KOH \longrightarrow RNH_2 + K_2Co_3 + 2KBr + 2H_2O$$
1^o amide (1^o amine)

(ii). Carbylamines reaction: Both aliphatic and aromatic 1^o amines when warmed with chloroform and alcoholic KOH solution, produce isocyanide.

$$R - NH_2 + CHCl_3 + 3KOH(alc) \xrightarrow{\Delta} R - NC + 3KCl + 3H_2O$$
(1^o amine) (isocyanide)

Q.11. An element crystallizes in b.c.c. lattice with cell edge of 500 pm. The density of the elements is 7.5g cm-3. How many atoms are present in 300 g of the element. *2 mark*

Ans. $f = \frac{ZM}{a^3 \times Na}$ [Z for bcc $= 2$]

$$7.5 = \frac{2 \times M}{(500 \times 10^{-10})^3 \times 6.022 \times 10^{23}}$$

$$M = \frac{7.5 \times 500 \times 500 \times 500 \times 10^{-30} \times 6.022 \times 10^{23}}{2}$$

$$M = 282.3 \frac{\text{g}}{\text{mol}}$$

282.3g of element contains $= 6.022 \times 10^{23}$ atoms.

300 g of element contains $= \frac{6.022 \times 10^{23}}{282.3} \times 300 = 6.399 \times 10^{23}$ atom

Q.12. For the first order thermal decomposition reactions, the following data were obtained C2H3Cl(g) C2H4(g) + HCl(g). *2 marks*

Time/Sec	Total pressure/atm
0	0.30
300	0.50

Calculate the rate constant
(Given: log 2 = 0.301, log 3 = 0.4771, log 4 = 0.6021)

Ans. $C_2H_5Cl(g) \longrightarrow C_2H_4(g) + HCL(g)$

$$\text{K} = \frac{2.303}{t} \log \frac{P_0}{2P_0 - Pt}$$

$$\text{K} = \frac{2.303}{300} \log \frac{0.30}{2 \times 0.30 - 0.50}$$

$$\text{K} = \frac{2.303}{300} \log \frac{0.30}{2 \times 0.30 - 0.50} \Rightarrow \frac{2.303}{300} \log \frac{0.30}{0.10}$$

$$\text{K} = \frac{2.303}{300} \log^3 = \frac{2.303}{300} \times 0.4771$$

$$\text{K} = 3.66 \times 10^{-3}\ \text{sec}^{-1}$$

Q.13. Define the following terms: *2 marks*

(i) Lyophilic colloid

(ii) Zeta potential

(iii) Associated colloids

Ans. (i) Lyophilic colloid: They are prepared easily by directly mixing with liquid dispersion medium. Ex-Gelation, starch etc. They are reversible in nature and are quite stable are not easily precipitated or coagulated.

(ii) Zeta potential: When one type of ions of electrolyte are adsorbed on the surface of colloidal particles it forms a fixed layer. It attracts the counter ions to form second layer which is mobile is called diffused layer. The potential difference between the fixed layer and diffused layer is known as Zeta potential.

(iii) Associated colloids: They are formed by the aggregation of large no. of ions in concentrated solution. Their molecular masses are high. The aggregate parties thus formed are called micelles.