

CHEMISTRY

[Section 1 is compulsory. Attempt any four questions from Section II]

SECTION I

Question 1

a. Choose the correct alternative from the bracket and fill up.

1. The brown ring test is used for the detection of ----- (NO_3^- , SO_3^{2-})
2. ----- (NH_3 , HCl) gas is dried by conc. H_2SO_4
3. ----- (CaF_2 , NaOH) is used as a solvent for Alumina in the extraction of Al.
4. ----- (Lemon juice, Aqueous NH_3) have p^{H} greater than 7.
5. The functional group present in Propanal is ----- (CHO , $\text{C}=\text{O}$). (5)

b. Give one word or phrase for the following:

1. The process of formation of ions from molecules which are not in the ionic state.
2. Base which on dissociation produce two hydroxyl ion per molecule in aqueous solution.
3. Enriching the ore based on preferential wettability with oil and gangue by water.
4. Illicit liquor made by improper distillation .
5. The law relating the volume and number of molecules (5)

c. Give reason for the following:

1. Ethene is more reactive than Ethane.
2. Covalent compounds are gases, liquids or soft solids.
3. Sodium is converted to sodium amalgam during reactions.
4. Ionisation potential increases across a period.
5. Impurities settle down while bauxite dissolves during leaching in Bayers process. (5)

d. Match the description in column X with appropriate substance in column Y

- | X | Y |
|--|-------------------|
| 1. A dipole molecule | A. Sugar solution |
| 2. Al becomes passive | B. Graphite |
| 3. Compounds having molecules | C. Carbon lining |
| 4. Cathode used in the reduction of alumina | D. Nitric acid |
| 5. Anode used in the electrolysis of molten $PbBr_2$ | E. Water |

(5)

e. Write the structural formula of the two isomers of Butane.

(2)

f. Write balanced chemical equation for each of the following.

1. Action of heat on Copper nitrate.
2. Water is added to calcium carbide.
3. Monochloro ethane is hydrolysed with aqueous KOH.
4. Action of dilute sulphuric acid on potassium bisulphite.
5. Laboratory preparation of nitric acid.

(5)

g. Name the following:

1. A substance that conducts electric current but remains chemically unchanged.
2. Rocky impurities found in ores.
3. The substance formed when SO_3 is dissolved in con. H_2SO_4 .
4. The smallest element in the third period.
5. Measure of hydrogen ion concentration in a solution.

(5)

h. Give reasons for the following:

1. The elements placed in the same group have similar chemical properties.
2. Cryolite is used in the extraction of Aluminium from alumina.
3. The blue colour of $CuSO_4$ solution fades when it is electrolysed using Pt anode.

(6)

i. Draw the electron dot diagram of a covalent molecule having only one lone pair and draw the co-ionic compound formed from it?

(2)

SECTION – II

Answer any four questions from this section

Question -2

- (a) Define: (i) Functional group (ii) Homologous series [2]
- (b) What is the difference between substitution reaction and addition reaction [2]
- (c) Give the IUPAC names of the following compounds: [2]
- (i) $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_2\text{OH}}{\text{CH}} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ [2]
- (ii) $\text{CH}_3 - \underset{\text{CH}_3}{\overset{\text{CH}_3}{\text{C}}} - \text{CH}_2 - \text{CH}_2 - \text{COOH}$
- (d) Write balanced equation for the following: [4]
- (i) Esterification
- (ii) Action of sodium on ethyl alcohol
- (iii) Laboratory preparation of ethane
- (iv) Catalytic hydrogenation of acetylene

Question -3

- (a) A compound contains 92.3% by mass of carbon and 7.7 % by mass of hydrogen. Calculate the empirical formula of the compound. If the RMM of the compound is 78 what is its molecular formula [C = 12, H = 1] [3]
- (b) Explain why: [3]
- (i) In electrolysis direct current is used and not alternating current.
- (ii) Rate of reaction for ionic compounds is greater than covalent compounds.
- (iii) Common salt gets wet during rainy season.
- (c) How will you distinguish between: [2]
- (i) Sodium chloride solution and sodium sulphate solution
- (ii) Lead nitrate and zinc nitrate solution.
- (d) A certain gas X occupies a volume of 100 cm^3 at STP and weighs 0.5 g Find its relative molecular mass. [2]

Question – 4

- (a) 112 cm^3 of hydrogen sulphide is mixed with 120 cm^3 of $\text{Cl}_{(g)}$ at STP to form $\text{HCl}_{(g)}$. Write balanced equation and calculate the volume of gaseous product formed and composition of resulting mixture [2]
- (b) Give balanced equation for the following with one observation: [3]
- Potassium permanganate with concentrated HCl
 - Ammonia with heated lead oxide
 - Burning of ammonia in oxygen
- (c) What is the difference between: [2]
- Acetic acid and glacial acetic acid
 - Pure nitric acid and fuming nitric acid
- (d) Write three balanced equations for purification of Bauxite [3]

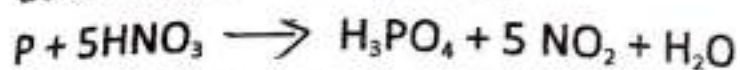
Question -5

- (a) Write the structure of : [2]
- 2 methyl prop – 1- ene
 - Propan – 2- one
- (b) Differentiate between: [2]
- Ore and mineral
 - Calcination and roasting
- (c) Give balanced equation and mention the property of the acid [3]
- HBr with concentrated sulphuric acid
 - Cane sugar with concentrated sulphuric acid
 - Sodium acetate with concentrated sulphuric acid
- (d) Explain why: [3]
- Nitric acid stored in bottles turns yellow
 - Ammonium hydroxide is used as a qualitative reagent
 - Electrolysis of acidulated water is an example of catalysis

Question – 6

- (a) A metal is electroplated with silver. The electrolyte is sodium argento-cyanide
- Why is it preferred over silver nitrate as an electrolyte
 - State one condition to ensure that the deposit is smooth, firm and long lasting

(iii) Write the reaction taking place at anode and cathode
(b) Concentrated nitric acid oxidises phosphorus to phosphoric acid according to the equation [3]



If 6.2 g of phosphorus was used in the reaction calculate:

- (i) Number of moles of phosphorus taken and mass of phosphoric acid formed
 - (ii) Mass of nitric acid consumed at the same time
 - (iii) Volume of steam produced at the same time [3]
- (c) Name the method used for the preparation of the following salts .Give balanced equation [3]
- (i) Green vitriol
 - (ii) Lead chloride
- (d) What do you mean by decrepitation? [1]
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