

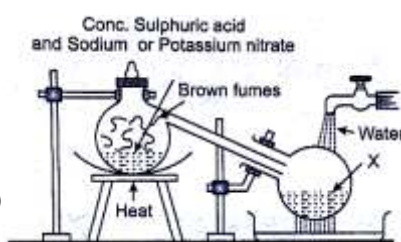
*Attempt **all** questions from **Section A** and **any four** questions from **Section B**.  
The intended marks for question or parts of questions are given in brackets [ ].*

## Section A (40 marks)

### Q.1. Multiple Choice Questions.

15

- The particles present in strong electrolytes are :  
a) Only molecules      b) Mainly ions      c) Ions and molecules      d) Only atoms
- The value of second ionisation energy is \_\_\_\_\_ the first ionisation energy.  
a) more      b) less      c) same      d) none of these
- All ores minerals, while all minerals are not ores because :  
a) Neon      b) Sulphur      c) Sodium      d) Argon
- A solid has properties like high boiling point, high melting point, hard, soluble in polar solvents. Which type of solid is this?  
a) Ionic solid      b) Covalent sulphate      c) Coordinate bond      d) All
- What happens when a solution of an acid is mixed with a solution of a base in a test tube ?  
a) Temperature of the solution decreases.  
b) Temperature of the solution increases.  
c) Temperature of the solution remains the same.  
d) None of the above
- Which of the following is true when lead nitrate is treated with sodium hydroxide solution, and ppt. obtained is dissolved in excess of alkali ?  
a) White ppt. soluble in excess of alkali  
b) White ppt. insoluble in excess of alkali  
c) Green ppt. soluble in excess of alkali  
d) Green ppt. Insoluble in excess of alkali
- What indicates the actual number of constituent atoms in a molecule ?  
a) Empirical formula      b) Molecular formula  
c) Empirical mass      d) Molecular mass
- The addition of water inside the flask containing HCl gas in fountain experiment \_\_\_\_\_ the \_\_\_\_\_ inside the flask.  
a) Lowers; pressure      b) Increase; pressure  
c) Lowers; number of moles      d) Increase; temperature
- Why promoter is used in the Haber's process :  
a) To increase the efficiency of finely divided iron  
b) To increase the pressure  
c) To decrease the rate of reaction  
d) To decrease the temperature
- What is the colour of NaOH in phenolphthalein ?  
a) Red      b) Blue      c) Green      d) Pink
- The compound X in the given figure is :



- a) Sulphuric acid      b) \_\_\_\_\_ acid      c) \_\_\_\_\_ acid      d) Acetic acid
12. An unsaturated hydrocarbon having a triple covalent bond

has 50 hydrogen atoms

in its molecule. The number of "C" atoms in its molecule will be:

- a) 24                                      b) 25                                      c) 28                                      d) 26

13. The molecular formula of A is C<sub>10</sub>H<sub>18</sub>. In which homologous series "A" belongs to"

- a) Alkane                                      b) Alkene                                      c) Alkyne                                      d) None of these

14. Which of the following is not true for electrolysis of NaCl ?

- a) Oxidation occurs in Na                                      b) Reduction occurs at Cl  
c) Oxidation takes place at cathode                                      d) It is a redox reaction.

15. Alkaline earth metals include :

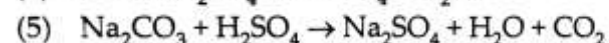
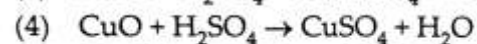
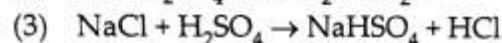
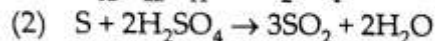
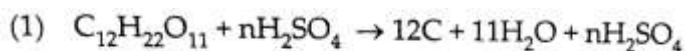
- a) Group 1 element                                      b) Group 2 element  
c) Group 18 element                                      d) Group 17 element

**Q2 A. Select the correct answer from the choices A, B, C and D which are given**

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A. Some properties of Sulphuric acid are listed below. Choose the property A, B, C or D which is responsible for the reaction (1) to (5). Some properties may be repeated:

- (a) Acid                                      b) Dehydrating agent  
(c) Non-volatile acid                                      (d) Oxidising agent



**B. Match the following:**

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Column A	Column B
1. Acid salt	A. Ferrous ammonium sulphate
2. Double salt	B. Contains only ions
3. Ammonium hydroxide solution	C. Sodium hydrogen sulphate
4. Dilute hydrochloric acid	D. Contains only molecules
5. Carbon tetrachloride	E. Contains ions and molecules

**C. Fill in the blanks from the choices given within brackets:**

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- (a) The basicity of acetic acid is \_\_\_\_\_ (3, 1, 4)  
(b) The compound formed when ethanol reacts with sodium is \_\_\_\_\_  
(sodium ethanoate, sodium, ethoxide, sodium propanoate.)  
(c) Quicklime is not used to dry HCl has because \_\_\_\_\_  
(CaO is alkaline, CaO is acidic, CaO is neutral).  
(d) Ammonia gas is collected by \_\_\_\_\_ (an upward displacement of air,  
a downward displacement of water, a downward displacement of air).  
(e) Cold, dilute nitric acid reacts with copper to form \_\_\_\_\_  
(Hydrogen, nitrogen dioxide, nitric oxide).

**D. State one relevant observation for each of the following reactions:**

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- (a) Ethyne is passed through Fehling solution.  
(b) Hydrogen chloride gas is passed through silver nitrate solution.  
(c) Sodium hydroxide solution is added to zinc sulphate solution first a little and then in excess.  
(d) Ammonium hydroxide solution is added to iron (II) chloride solution.  
(e) Sugar crystals are added to a hard glass test tube containing concentrated sulphuric acid.

**E. (a) Draw the structure of the following:**

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- (1) Iso-butane                      (2) Neo-pentane                      (3) 2-methyl propane
- (b) Define:**
- (1) Functional group                      (2) Gangue or matrix

**Section B (40 marks)**  
**(Attempt any 4 out of 6 main questions)**

**Q3.**

- (i) Identify the gas evolved in each of the following cases: 2
- (a) A colourless gas liberated on decomposition of nitric acid.
- (b) Dilute hydrochloric acid is added to zinc sulphide.
- (ii) State the following: 2
- (a) The process of converting ammonia into nitric acid industrially.
- (b) The reagent used to dry ammonia gas during its laboratory preparation.
- (iii) Arrange the following according to the instructions given in brackets: 3
- (a) K, Pb, Ca, Zn. (In the increasing order of the reactivity)
- (b)  $Mg^{2+}$ ,  $Cu^{2+}$ ,  $Na^{+}$ ,  $H^{+}$  (In the order of preferential discharge at the cathode)
- (c) Li, K, Na, H (In the decreasing order of their ionization potential)
- (iv) Fill in the blanks with the choices given in brackets. 3
- (a) The energy required to remove an electron from a neutral isolated gaseous atom and convert it into a positively charged gaseous ion is called electronegativity (electron affinity, ionisation potential, (water, ammonia, carbon
- (b) The compound that does not have a lone pair of electrons is, tetra chloride).
- (c) When a metallic oxide is dissolved in water, the solution formed has a high concentration of ions. ( $H^{+}$ ,  $H_3O^{+}$ ,  $OH^{-}$ ).

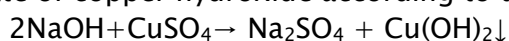
**Q4.**

- (i) Name the metals which can be extracted from the following ores: 2
- (a) Bauxite                      (b) Haematite
- (ii) A compound has the following percentage composition of its elements. 2
- H = 2.47%, P = 38.25%, O = 59.28%, (At. Mass : H=1, P=31, O=16)
- (a) Find the empirical formula of the compound.
- (b) If the vapour density of the compound is 81, find its molecular formula.
- (iii) The following questions are based on the preparation of ammonia gas in the laboratory: 3
- (a) Name the compound normally used as a drying agent during the process.
- (b) How is ammonia gas collected ?
- (c) Explain why it is not collected over water.
- (iv) State the observation for the following, when: 3
- (a) Ethanol is heated with conc.  $H_2SO_4$  at  $170^{\circ}C$ .
- (b) Silver nitrate solution is added to dilute hydrochloric acid.
- (c) Explain why it is not collected over water:

**Q5. (i) State the relevant reason for the following: 2**

- (a) Concentrated hydrochloric acid cannot be used in place preparation of nitric acid.
- (b) There are fumes in the air when the stopper of a bottle full of hydrogen chloride gas is opened.

**(ii) Copper sulphate solution reacts with sodium hydroxide solution to form a precipitate of copper hydroxide according to the equation: 2**



- (a) What mass of copper hydroxide is precipitated by using 200 gm of sodium hydroxide?

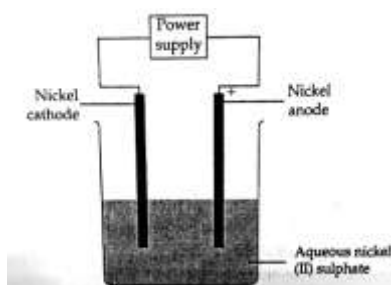
$$[H=1, O=16, Na=23, S=32, Cu=64]$$

- (b) What is the colour of the precipitate formed?

**(iii) What do you observe when: 3**

- (a) Acetylene is shaken with an ammoniacal solution of cuprous chloride?

- (b) Ethane and ethene are shaken with bromine solution in carbon tetrachloride?
- (c) Ethanoic acid is added to an aqueous solution of sodium hydrogen carbonate?
- (iv) The action of heat on the blue crystalline solid L gives a reddish brown gas M, which has relights a glowing splint and leaves a black residue. When gas N, which has a rotten egg smell, is passed through a solution of L a black precipitate is formed.  
 (a) Identify LM and N (Name the formula).  
 (b) Write the equation for the action of heat on L.  
 (c) Write the equation for the reaction between L and the gas N.
- Q6.** (i) A hydrocarbon X contains 85.7% by weight of C  
 (a) Determine its empirical formula ( $C=12$ ,  $H=1$ ).  
 (b) If molecular mass of X is 28 find its molecular formula.
- (ii) A compound made up of two elements X and Y has an empirical formula  $X_2Y$ .  
 If the atomic weight of X is 10 and that of Y is 5 and the compound has a vapour density 25, find its molecular formula.
- (iii) Give & balanced chemical equation for each of the following:  
 (a) Action of conc. nitric acid on sulphur.  
 (b) Catalytic oxidation of ammonia.  
 (c) Laboratory preparation of nitric acid.
- (iv) The following questions are pertaining to the laboratory preparation of hydrogen chloride gas:  
 (a) Write the equation for its preparation mentioning the condition required.  
 (b) Name the drying agent used and justify your choice.  
 (c) State a safety precaution you would take during the preparation of hydrochloric Acid.
- Q7.** (i) An organic compound with vapour density = 94 contains  
 $C=12.67\%$ ,  $H=2.13\%$ , and  $Br=85.11\%$ . Find the molecular formula.  
 [Atomic mass:  $C=12$ ,  $H=1$ ,  $Br=80$ ]
- (ii) What is the special feature of the structure of:  
 (a)  $C_2H_4$  (b)  $C_2H_2$
- (iii) An aqueous solution of nickel (II) sulphate was electrolyzed using nickel electrodes.  
 Observe the diagram and answer the questions that follow:



- (a) What do you observe at the cathode and anode respectively?
- (b) Name the cation that remains as a spectator ion in the solution.
- (c) Which equation for the reaction at the anode is correct?
- (1)  $Ni \rightarrow Ni^{2+} + 2e^-$  (2)  $Ni + 2e^- \rightarrow Ni^{2+}$   
 (3)  $Ni^{2+} \rightarrow Ni + 2e^-$  (4)  $Ni^{2+} + 2e^- \rightarrow Ni$
- (iv) Choose the most appropriate answer from the following list of oxides which fit the description each answer may be used only once: [ $SO_2$ ,  $SiO_2$ ,  $Al_2O_3$ ,  $MgO$ ,  $CO$ ,  $Na_2O$ ]  
 (a) A basic oxide.  
 (b) An oxide which dissolves in water forming an acid.  
 (c) An amphoteric oxide.
- Q 8.** (i) (a) In the formation of compound XY, atom X gives one electron to each Y atom.  
 What is the nature of bond to XY,? Give four properties of XY,

(b) How is a coordinate bond formed?

(ii) (a) What is the pH of:

2

1. Pure water                      2. Milk                      3. Human blood

(b) The pH value of three solutions is given below. Which one of them is acidic, neutral and alkaline nature?

1. pH=7                      2. pH=10                      3. pH=3

(iii) Identify the following reactions as either oxidation or reduction:

3

- (a)  $O + 2e^- \rightarrow O^{2-}$                       (b)  $K - e^- \rightarrow K^+$                       (c)  $Fe^{3+} + e^- \rightarrow Fe^{2+}$

(iv) A group of elements in the periodic table are given below (Boron is first member of the group and Thallium is the last). Boron, Aluminium, Gallium, Indium, Thallium  
Answer the following questions in relation to the above group of elements:

3

- (a) Which element has the most metallic character?  
(b) Which element would be expected to have the highest electronegativity ?  
(c) If the electronic configuration of aluminium is 2, 8, 3, how many electrons are there in the outer shell of thallium?

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