## Section A (40marks)

**Attempt all the questions from this section**

**Question 1.**

Choose the correct answers from the given options. (15)

(i) According to the modern periodic law the properties of elements are a periodic function of their____

(a) Atomic mass (c) Atomic volume

(b) Atomic number (d) Mass number

(ii) Which of the following has water of crystallization?

(a) Potassium chloride (c) Sodium nitrate

(b) Common Salt (d) Washing soda crystals

(iii) The three elements calcium, strontium and barium have the following similarities.

(a) All are metals (c) Each has an oxide that is alkaline in nature

(b) Each has valency 2 (d)All of the above

(iv) How many horizontal rows are there in the modern periodic table?

(a) 5 (c) 8

(b) 7 (d) 10

(v) The gas which is brown in colour and has irritating odour

(a) Sulphur dioxide (c) Hydrogen chloride

(b) Nitrogen dioxide. (d) Ammonia

(vi) On adding water to sodium the solution formed is __

(a) Neutral (c) Alkaline

(b) Acidic (d) Amphoteric

(vii) Which of the following is used for softening hard water

(a) Sodium bicarbonate. (c) Hydrochloric acid

(b) Washing soda. (d) Sodium hydroxide

(viii) Which element is in group 1 and period 2 of the periodic table?

(a) Hydrogen. (c) Lithium

(b) Sodium. (d) Potassium

(ix) Hydrogen reacts with oxygen to form water by.

(a) Direct combination reaction (c) decomposition reaction

(b) Neutralization reaction (d) Precipitation reaction

(x) The substance which leaves a black residue on heating is

(a) Zinc carbonate (c) Lead carbonate

(b) Copper nitrate (d) Ammonium dichromate

(xi) Which of the following reactions show that hydrogen act as a reducing agent

(a) $H_2 + Cl_2 \dashrightarrow 2HCl$ (c) $2H_2 + O_2 \dashrightarrow 2H_2O$

(b) $CuO + H_2 \dashrightarrow Cu + H_2O$ (d) $3H_2 + N_2 \dashrightarrow 2NH_3$

(xii) The gas formed when dilute sulphuric acid is added to sodium sulphite
(a) Hydrogen sulphide
(b) Sulphur trioxide
(c) Sulphur dioxide
(d) Sodium sulphate

(xiii) Water gas is a mixture of
(a) Carbon dioxide and oxygen
(b) Carbon monoxide and oxygen
(c) Carbon monoxide and hydrogen
(d) Carbon dioxide and hydrogen

(xiv) Which of the following is not an amphoteric oxide?
(a) Lead oxide
(b) Potassium oxide
(c) Aluminium oxide
(d) Zinc oxide

(xv) Which of the following is an example of redox reaction
a. $H_2 + Cl_2 \dashrightarrow 2HCl$
b. $NaCl \dashrightarrow Na+ + Cl-$
c. $H_20 \dashrightarrow H_2+ O_2$
d. $NH_3 + HCl \dashrightarrow NH_4Cl$

**Question 2.**

**A.** Answer the following according to the laboratory preparation of hydrogen. (5)
(a) Name the method of collection of gas and why is this method used?
(b) Why is Lead not used in the laboratory preparation of hydrogen?
(c) Name two metals which can produce hydrogen with very dilute nitric acid.
(d) How can the impurity hydrogen sulphide removed from hydrogen.
(e) How do you confirm that the above gas is hydrogen?

**B.** Name the following: (5)
(a) A gaseous oxidizing agent which does not contain oxygen.
(b) It catches fire and burns with a lilac coloured flame and produces hydrogen when reacted with water
(c) The gas liberated on heating sodium bicarbonate strongly.
(d) It acts as a dehydrating agent and remove water molecule from blue vitriol.
(e) The metal which reacts with hot water and displace hydrogen.

**C.** Write a relevant observation for each of the following. (5)
(a) Ferrous sulphate solution is treated with sodium hydroxide solution.
(b) Dilute hydrochloric acid is added to Zinc Sulphide.
(c) Calcium salts are heated in a flame.
(d) Magnesium burns in steam.
(e) Chlorine gas is treated with moist starch iodide paper.

**D.** Fill in the blanks: (5)
(a) Phenomenon when a compound absorbs moisture from the atmosphere when it is exposed to it,but not enough to form a solution is_____ ( hygroscopy /deliquescency)
(b) The element below sodium in the periodic table is _____ reactive than sodium. (more/less)
(c) When excess carbon dioxide is passed through lime water its milkiness disappear due to the formation of_____(Calcium carbonate/Calcium bicarbonat

(d) The gas formed when zinc reacts with concentrated sulphuric acid is _____ (Hydrogen/ Sulphur dioxide)

(e) Calcium sulphate present in hard water form _____ Lead sulphate. (Soluble/insoluble)

E. Match the following: (5)

| Column A | Column B |
|---|---|
| (i) Hydrogen | valancy 4 |
| (ii) Silicon | group 1 |
| (iii) Calcium | group 7 |
| (iv) Neon | 4th period |
| (v) Iodine | a gas |

## Section B (40marks)

Attempt any **four** from this section.

**Question 3.**

(a) (2)

(i) Write the process of removal of hardness of water by Clark's process.

(ii) Under what conditions can hydrogen be made to combine with chlorine. Name the products formed and write the equation for the reaction. (2)

(b) Give reason:

(i) Covalent compounds exist as gases, liquids or soft solids.

(ii) Alkali metals are good reducing agents.

(c) Two neutral gases A and B undergo a reversible synthesis reaction to form a pungent odour gas C. (3)

(i) Identify A,B and C

(ii) Give the balance chemical equation along with the conditions.

(iii) What do you observe when gas C comes in contact with concentrated hydrochloric acid? (3)

d) State which of the following reactions are oxidized or reduced?

(i) $S^{2-}$ ----------→ S

(ii) $Mn^{5+}$ -------→ $Mn^{7+}$

(iii) $Cl^-$ ---------→ Cl

**Question 4.** (2)

(a) Write the balanced equation for the following reaction.

(i) Lead reacts with caustic potash solution

(ii) Aluminium reacts with hydrochloric acid. (2)

(b) Write one difference between the following:

(i) Efflorescence and Deliquescence

(ii) Temporary hard water and Permanent hard water.

(c) Draw the orbital structure of the following and also state the type of bonding in it.
(i) Sodium chloride
(ii) Ammonia

(d) An element has 7 electrons in its M shell. (3)
(i) State its position in the periodic table.
(ii) What is the valency of the element?
(iii) State the name assigned to this group.

**Question 5.**

(a) (i) Salt A on reacts with dilute hydrochloric acid gives a colourless gas B having rotten egg smell. The salt A imparts golden yellow colour to the flame.
(ii) Identify anion and cation in salt A
(iii) Give confirmatory test of gas B.

(b) (i) What is the advantage of a detergent over soap. (2)
(ii) Write the molecular formula of white vitriol.

(c) State whether the following statements are true or false. Justify your answer. (3)
(i) In an electrovalent compound, the cation attains the electronic configuration of the noble gas that comes after it in the periodic table.
(ii) In the formation of a compound PQ2, the atom P gives one electron to each atom of Q. The compound PQ2 is a good conductor of electricity.
(iii) Hard water is suitable for producing steam.

(d) Identify the following substances: (3)
(i) An alkaline gas which produces dense white fumes when reacted with hydrochloric acid
(ii) The most reactive non-metal.
(iii) An element X has atomic number 12. Write the formula of the compound found between X and the second member of the halogen group.

**Question 6.**

(a) Define: (2)
(i) Thermal dissociation
(ii) Electrochemical reaction

(b) What happens to the solubility of the following substances with increase in temperature (2)
(i) Sodium chloride
(ii) Glauber's salt.

(c) Elements X, Y and Z have atomic numbers 6, 9 and 12 respectively. (3)
(i) Which one forms an anion and cation?
(ii) State the type of bond formed between Y and Z.
(iii) Write the formula of the compound formed between Y and Z.

(d) Divide the following redox reactions into oxidation and reduction half reactions. (3)

(i) $Zn + Pb^{2+} \dashrightarrow Zn^{2+} + Pb$

(ii) $Cl_2 + 2Br^- \dashrightarrow Br_2 + 2Cl^-$

**Question 7**

(a) Write one observation and the balanced equation in the case of the following substances being heated. (2)

(i) Copper nitrate

(ii) Ammonium dichromate

(b) Hydrogen is manufactured by Bosch process. (2)

(i) Give the equations with conditions.

(ii) How can you obtain hydrogen from a mixture of hydrogen and carbon dioxide?

(c) (i)A metal M forms an oxide having the formula $M_2O_3$.It belongs to third period write the atomic number and the valency of the metal. (2)

(ii) Name one desiccating agent. (1)

(d) Match the atomic numbers of A = 10, B = 16, C = 19 with each of the following: (3)

(i) A solid non metal of valency 2

(ii) An inert gas

(iii) A metal of valency 1

**Question 8**

(a) Complete and balance the following equations: (3)

(i) $\_\_\_\_\_ + H_2SO_4 \dashrightarrow Na_2SO_4 + H_2O$

(ii) $N_2 + O_2 \xrightarrow{3000^oc} \_\_\_\_\_$

(iii) $Ag_2CO_3 \longrightarrow \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_$ (3)

(b) (i) State Mendeleev's Periodic Law.

(ii) What is the cause of periodicity?

(iii) Give two pairs of bridge elements.

(c)A small piece of calcium metal is put it into a small trough containing water. There is effervescence and white turbidity is formed. (3)

(i) Name the gas formed in the reaction. How would you test the gas?

(ii) What do you observe when a few drops of litmus solution are added to the turbid solution? (2)

(d) Differentiate between the following:

(i) Hydrogen sulphide and Sulphur dioxide (using acidified potassium dichromate solution)

(ii) Oxygen and Ammonia (Nessler's reagent)

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