DELHI PUBLIC SCHOOL NEWTOWN
SESSION: 2023-24
FINAL EXAMINATION

CLASS: IX **FULL MARKS: 80**
SUBJECT: CHEMISTRY [SET A] **TIME: 2 HOURS**

General Instructions:

- **The paper consists of six printed pages.**
- **Section A is compulsory. Attempt *any four* questions from Section B.**
- **Answers should be to the point.**
- **Question numbers should be copied carefully while answering the questions.**

SECTION A
(Attempt all questions from this section)

Question 1

Choose one correct answer to the questions from the given options: (Do not copy the question, write the correct answers only.) **[15]**

(i) **The following chemical reaction is an example of a:**

$$H_2S + Cl_2 \rightarrow 2HCl + S$$

P. displacement reaction
Q. combination reaction
R. redox reaction
S. neutralisation reaction

(a) P and S
(b) Q and R
(c) P and R
(d) R and S

(ii) **In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is developed. While performing the test, lead nitrate is unavailable, which of the following can be used in place of lead nitrate?**

(a) Lead sulphate
(b) Lead acetate
(c) Ammonium nitrate
(d) Potassium sulphate

(iii) **Which of the following elements are metals?**

P. $_{12}X^{24}$
Q. $_{9}Y^{19}$
R. $_{15}Z^{31}$
S. $_{11}W^{23}$

(a) P and Q only
(b) Q and R only
(c) P and S only
(d) Q and S only

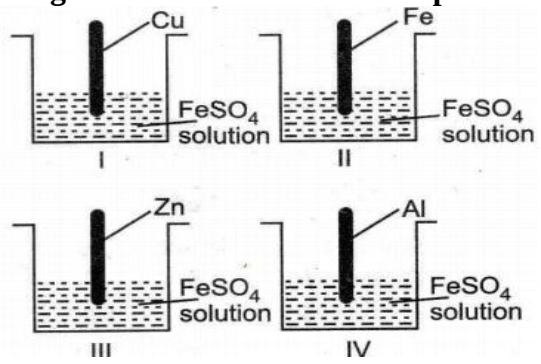
(iv) Which of the following represents the correct match?

Column I	Column II
(A) Electron	(i) Positive charge
(B) Proton	(ii) No charge
(C) Neutron	(iii) Negative charge

(a) (A)- (ii), (B)- (i). (C)- (ii)
(b) (A)- (i), (B) – (ii), (C)- (iii)
(c) (A) – (iii), (B)- (i), (C)- (ii)
(d) (A)-(ii), (B)-(i), (C)- (iii)

(v) The long form periodic table has:
(a) Seven horizontal rows and eighteen vertical columns
(b) Ten horizontal rows and eighteen vertical columns
(c) Ten horizontal rows and eight vertical columns
(d) Eight horizontal rows and ten vertical columns

(vi) ln which of the following beakers reaction will take place?



(a) I and III only
(b) I and lV only
(c) ll and lV only
(d) lll and lV

(vii) At constant temperature, if the pressure is doubled for a fixed mass of a gas then its volume will become:

(a) 2 times
(b) ½ times
(c) 4 times
(d) No change

(viii) $A \rightarrow A^{+3}$; $B \rightarrow B^{-1}$
Number of electrons present in the outermost shell of atoms A and B respectively is:

(a) 5, 1
(b) 3, 1
(c) 3, 7
(d) 5, 7

(ix) A _____solution is observed after placing Magnesium metal in a solution of Copper sulphate for half an hour.

(a) Blue
(b) Colourless
(c) Reddishbrown
(d) Dirty green

(x) The valency of nitrogen in nitrogen dioxide is:

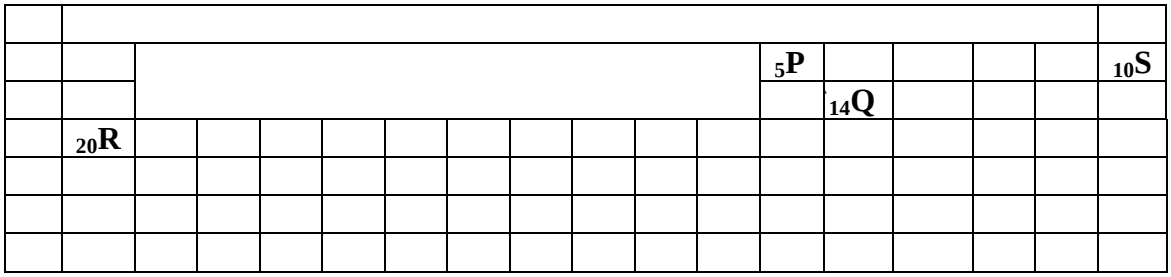
(a) 1
(b) 2
(c) 3
(d) 4

(xi) Which of the following is a deliquescent substance?

(a) Glauber's salt
(b) Washing soda
(c) Calcium chloride
(d) Gypsum

(xii) Shweta was given four squares P, Q, R and S with atomic numbers written on them. She gave the following four statements:

(P) Element before Q is a metal.
(Q) R represents an alkaline earth metal.
(R) Element in P is a metalloid.
(S) Element just before S is a non metal



The true statements given by her are:

(a) (P), (Q) and (R) only
(b) (P), (Q) and (S) only
(c) (Q) and (R) only
(d) (P), (Q), (R) and (S)

(xiii) Which of the following is not the "Greenhouse gas"?

(a) Chlorofluorocarbon
(b) Ammonia
(c) Carbon dioxide
(d) Methane

(xiv) Total number of electrons that take part in forming bonds in O_2 is:

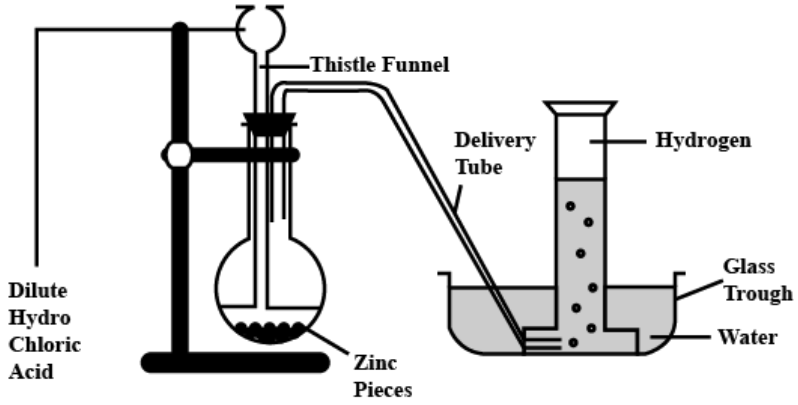
(a) Two
(b) Four
(c) Six
(d) Eight

(xv) An element belongs to third period and sixteenth group. It will have ____ electrons in its valence shell.

(a) 2
(b) 5
(c) 6
(d) 3

Question 2

(i) The following schematic diagram shows the preparation of hydrogen gas. **[5]**



(a) What would happen if the following changes are made?
- **(I) In place of zinc granules, same amount of zinc dust is taken in the test tube.**
- **(II) In place of zinc, copper turnings are taken.**
- **(III) Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated.**

(b) Write a balanced chemical reaction for (III).

(c) Name the drying agent used to dry the gas.

(ii) Match the following Column A with Column B. **[5]**

Column A	Column B
(a) Ice point in absolute temperature	**1. 373K**
(b) The volume of a gas at O Kelvin	**2. 273K**
(c) The absolute temperature of a gas at $10^{O}C$	**3. $-273^{O}C$**
(d) The boiling point of water	**4. 283K**
(e) Zero Kelvin	**5. Zero**

(iii) Complete the following by choosing the correct answers from the bracket: **[5]**

(a) A_____[reddish brown / dirty green] coloured precipitate is formed when ammonium hydroxide is added to a solution of ferric chloride.

(b) The absolute temperature value corresponding to $30^{O}C$ is _____[303K/ 173K]

(c) A natural phenomenon that becomes harmful due to pollution is_____ [desertification / greenhouse effect]

(d) _____ gas is evolved on heating sodium nitrate. [nitrogen dioxide/ oxygen]

(e) In sodium chloride sodium is the ____ radical [acidic/ basic]

(iv) Identify the following: **[5]**

(a) The symbolic representation of a molecule of a compound.

(b) A compound which on heating liberates a reddish brown gas and gives a residue which is yellow when hot and white when cold.

(c) A compound which changes from blue to pink on adding water.

(d) The fundamental particle not present in a hydrogen atom.

(e) Nature of oxides formed by the elements on the right hand side of the periodic table.

(v) Identify the reducing agent in the following reactions. [5]

(a) $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$

(b) $H_2O + F_2 \rightarrow HF + HOF$

(c) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

(d) $4Na + O_2 \rightarrow 2Na_2O$

(e) $CuO + H_2 \rightarrow Cu + H_2O$

SECTION B

(Attempt any four questions.)

Question 3

(i) XOH is the formula of hydroxide of metal X. What is the formula of its chloride and sulphate? [2]

(ii) Name the substances that give water permanent hardness. How will you remove it? (Write a balanced chemical equation) [2]

(iii) Give balanced equations to show the formation of acid rain due to oxides of nitrogen. [3]

(iv) Distinguish between the following pairs of compounds:

(a) Sodium sulphite and sodium carbonate (using dilute sulphuric acid)

(b) Sodium chloride and potassium chloride (flame test)

(c) Zinc carbonate and lead carbonate (dry heating) [3]

Question 4

(i) Name the products formed when steam is heated with water gas at $1000^{O}C$ in the presence of a catalyst. Write a balanced chemical equation for it. [2]

(ii) An element A has 2 electrons in its fourth shell. State:

(a) Its position in the periodic table

(b) Is it a metal or non metal? [2]

(iii) A sample of diborane gas, a substance that bursts into flame when exposed to air, has a pressure of 350mm of Hg at a temperature of $-13^{O}C$ and a volume of 3.50L. If conditions are changed so that the temperature is $35^{O}C$ and pressure is 475mm of Hg, what will be the volume of the sample? [3]

(iv) What do you observe when?

(a) Iodine crystals are heated in a test tube?

(b) Ferric chloride crystals are exposed to atmosphere for sometime?

(c) Blue vitriol is heated strongly in a test tube? [3]

Question 5

(i) Identify the following substance:

(a) An alkaline gas A which produces dense white fumes with hydrogen chloride.

(b) A dilute acid B which does not normally give hydrogen gas when reacted with metals but does gives a gas when reacts with manganese. [2]

(ii) State two ways by which global warming can be reduced. [2]

(iii) What type of bonding is present in methane? Draw the orbit diagram to represent it. [3]

(iv) An element X has 12 neutrons and 11 protons.

(a) State its position in the periodic table.

(b) What type of compound will it form with element Y having atomic number 17?

(c) Write the formula of the compound formed by X and Y? [3]

Question 6

(i) A gas is contained in a vessel of capacity 5 litres and subjected to a pressure of 15atm. Calculate the pressure of the gas on connecting the container to another empty container of similar capacity at constant temperature. [2]

(ii) Explain the following:

(a) Table salt becomes sticky on exposure during the rainy season.

(b) Hard water is unfit for laundries and industrial uses. [2]

(iii) Complete the following reactions and state whether it is oxidation or reduction reaction.

(a) $Sn^{2+} \rightarrow Sn^{4+}$

(b) $Fe^{3+} \rightarrow Fe$

(c) $Br \rightarrow Br^{1-}$ [3]

(iv) State the formula of green vitriol. Find the percentage of water of crystallization in it. (Fe=56, S=32, O=16) [3]

Question 7

(i) Can the following groups of elements be classified as Dobereiner's triad? Explain giving reasons.

(a) Na, Si, Cl

(b) Be, Mg, Ca (Be=9, Na=23, Si=28, Cl=35, Ca=40) [2]

(ii) Define solubility. Name the compound having highest solubility at $100^{O}C$. [2]

(iii) How would you carry out the following conversions? Give equations and conditions.

(a) Hydrogen to a basic gas

(b) Aluminum to hydrogen.

(c) Carbon to hydrogen [3]

(iv) 100mL of a gas is cooled from $15^{O}C$ to $-15^{O}C$ at constant pressure. What will be its volume? State the gas law it obeys. [3]

Question 8

(i) State two factors how acid rain affects soil chemistry. [2]

(ii) Write balanced chemical equations for the following reactions.

(a) Ammonium chloride + sodium nitrite → sodium chloride + nitrogen + water.

(b) Lead dioxide + hydrochloric acid → lead chloride + water + chlorine. [2]

(iii) What happens when?

(a) Sodium sulphate solution is added to barium chloride solution.

(b) Silver metal is added to copper sulphate solution.

(c) Hydrogen peroxide bottle is kept in transparent bottles. [3]

(iv) An element P is present in period 2 group 15.

(a) Name the element.

(b) What type of bonding will it form with itself?

(c) Draw the electron dot diagram to show the structural formula of the molecule it will form with itself. [3]