



**DELHI PUBLIC SCHOOL NEWTOWN**  
**SESSION 2024-25**  
**FINAL EXAMINATION**

**CLASS: IX**  
**SUBJECT: CHEMISTRY (SET A)**

**FULL MARKS: 80**  
**TIME: 2 HOURS**

**General Instructions:**

- The paper consists of seven printed pages.
- Read the questions very carefully.
- Answers should be to the point.
- Question numbers should be copied carefully while answering the questions.

**SECTION A**

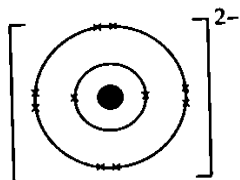
*(Attempt all questions from this section)*

**Question 1**

**[15]**

Choose the correct answers to the questions from the given options.  
(Do not copy the questions, write the correct answers only)

(i) The electronic configuration of  $Q^{2-}$  ion is shown below:



What is the electronic configuration of element Q?

- (A) 2,6      (B) 2,5      (C) 2,7      (D) 2,4

(ii) The table below shows the electronic configuration of four elements:

Element	Electronic configuration
W	2,4
X	2,8
Y	2,8,1
Z	2,8,7

Which pair of atoms will form a covalent compound?

- (A) 2 atoms of W      (B) An atom of W and 4 atoms of Z  
(C) 2 atoms of X      (D) An atom of Y and an atom of Z

(iii) Nandita mixed two solutions X and Y. She recorded the the following:

**Observation:** A yellow precipitate is formed.

**Conclusion:** It is a precipitation reaction (double displacement reaction)

The solutions X and Y respectively are:

- (A)  $FeCl_3$  and  $NH_4OH$       (B)  $Na_2SO_4$  and  $BaCl_2$   
(C)  $Pb(NO_3)_2$  and  $KI$       (D)  $AgNO_3$  and  $NaCl$

(iv) Raunak took 2 beakers P and Q containing ferrous sulphate solution and performed the following experiments:

Beaker	Metal strip added in beaker	Observation
P	Zinc strip	The colour of the solution in beaker changed from green to colourless.
Q	Copper strip	No change is observed

From the above observation Raunak concluded about the reactivity of the three metals is that:

- (A) Copper > Zinc > Iron                      (B) Iron > Copper > Zinc  
(C) Zinc > Copper > Iron                    (D) Zinc > Iron > Copper

(v) Study the reaction given:  $a\text{FeS}_2 + b\text{O}_2 \rightarrow c\text{Fe}_2\text{O}_3 + d\text{SO}_2$

The values of a, b, c, and d are as follows:

- (A) a = 4, b = 11, c = 2, d = 8              (B) a = 2, b = 5, c = 4, d = 6  
(B) a = 2, b = 13, c = 2, d = 5            (D) a = 4, b = 15, c = 2, d = 4

(vi) The percentage of nitrogen in hydrazine  $\text{N}_2\text{H}_4$  is [N = 14, H = 1]:

- (A) 78.5              (B) 87.5              (C) 28              (D) 32

(vii) Assertion (A): Gases exert pressure on the walls of the container they are kept in.

Reason (R): Due to the low kinetic energy of the gas molecules, they strike the walls of the container with a certain force.

- (A) Both A and R are true, and R is the correct explanation of A.  
(B) Both A and R are true, but R is not the correct explanation of A.  
(C) A is true but R is false.  
(D) A is false but R is true.

(viii) The graph PV versus P for a gas is:

- (A) Parabolic  
(B) Hyperbolic  
(C) A straight line passing through the origin  
(D) A straight line parallel to X – axis

(ix) Which of the following is NOT a triad?

- (A) Carbon (12), Nitrogen (14), Oxygen (16)  
(B) Lithium (7), Sodium (23), Potassium (39)  
(C) Chlorine (35), Bromine (80), Iodine (127)  
(D) Calcium (40), Strontium (87.5), Barium (137)

(x) In Mendeleev's periodic table, Eka aluminium is:

- (A) Strontium  
(B) Gallium  
(C) Barium  
(D) Magnesium

(xi) Which of the following statement about a dehydrating agent is NOT true:

- (A) They remove chemically combined elements of water in the ratio 2:1 from a compound.  
(B) They are used to prepare substances like carbon monoxide and sugar charcoal.  
(C) They remove chemically combined elements of water in the ratio 1:8 from a compound.  
(D) They represent chemical change as new substances are formed.

(xii) Efflorescence occurs when the vapour pressure in the hydrated crystals is:

- (A) Less than atmospheric vapour pressure.  
(B) Equal to atmospheric vapour pressure.  
(C) Equal to vapour pressure of the moisture.  
(D) More than atmospheric vapour pressure.

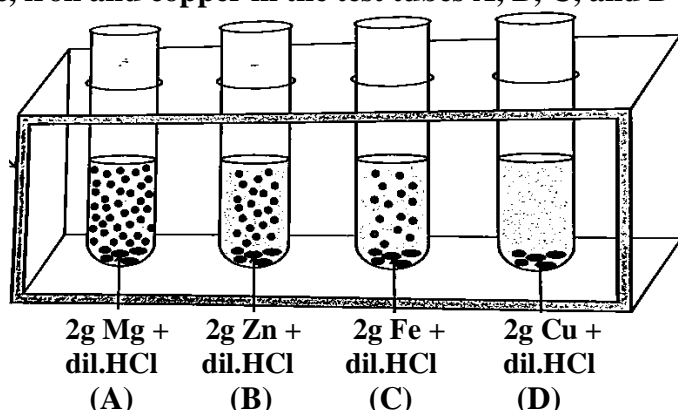
(xiii) The compound whose solution is used to remove phosphine from hydrogen is:

- (A) Silver nitrate.  
(B) Lead nitrate  
(C) Caustic potash.  
(D) Anhydrous calcium chloride.

- (xiv) Pure and dry hydrogen gas is collected by:
- Downward displacement of water.
  - Downward displacement of mercury.
  - Upward displacement of air.
  - Downward displacement of liquor ammonia.
- (xv) Taj Mahal and other monuments are facing serious problem due to:
- Global warming
  - Ozone depletion
  - Acid rain
  - Smog

## Question 2

- (i) Yuvraj took four test tubes and labeled them as A, B, C, and D. He added 2 g of magnesium, zinc, iron and copper in the test tubes A, B, C, and D respectively. [5]



- In which test tube a green solution will be obtained?
  - In which test tube the reaction will be fastest?
  - Write balanced chemical equation for the reaction taking place in test tube B.
  - In which test tube no reaction will take place? Give reason.
- (ii) Name the following: [5]
- A compound which decomposes in presence of sound.
  - The compound which retards the rate of decomposition of hydrogen peroxide.
  - An ion which has no electrons.
  - The metalloid in the third period.
  - A neutral gaseous oxide which is reducing agent.
- (iii) Complete the following by choosing the correct the correct answers from the bracket: [5]
- The element placed at the extreme \_\_\_\_\_ ( *left/ right* ) in a period is non-reactive.
  - A \_\_\_\_\_ ( *dirty green/ reddish* ) coloured precipitate is obtained when sodium hydroxide is added to an aqueous solution of ferrous sulphate.
  - Mendeleev's periodic table had \_\_\_\_\_ ( *63/55* ) elements.
  - \_\_\_\_\_ ( *Washing soda/ Glauber's salt* ) shows abnormal solubility.
  - Manganese reacts with \_\_\_\_\_ ( *cold very dilute/ hot concentrated* ) nitric acid to produce hydrogen.
- (iv) Match the following Column A with Column B. [5]

Column A	Column B
(a) Absolute zero	1. Non polar covalent compound
(b) Lead	2. Triple covalent bond
(c) Methane	3. 0 Kelvin
(d) Zinc oxide	4. Produces hydrogen on reacting with NaOH.
(e) Nitrogen	5. Yellow when hot, white when cold

- (v) Draw the electron dot diagram of the following: [5]
- A covalent compound having two lone pairs
  - Ammonia molecule
  - A molecule having a double covalent bond
  - Formation of calcium oxide
  - Hydrogen chloride

**SECTION B (40 Marks)**  
(Attempt any four questions)

**Question 3**

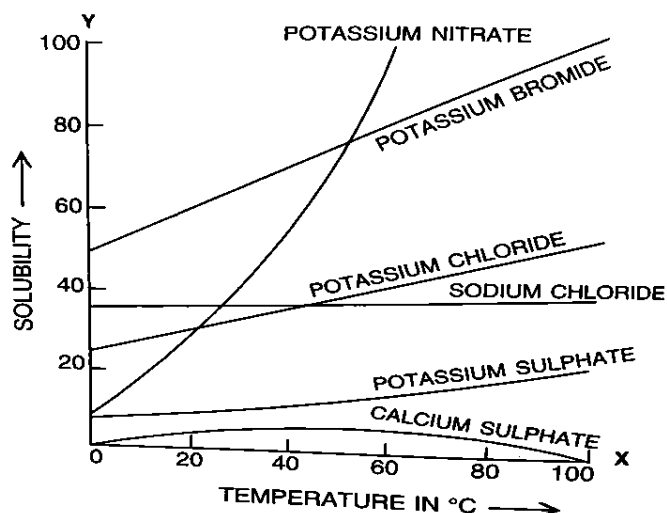
- (i) Identify the anion present in the following compounds: [2]
- When dilute sulphuric acid is added to compound P a colourless gas with a rotten egg smell is produced which turns moist lead acetate paper silvery black.
  - When dilute sulphuric acid is added to compound Q a colourless, odourless gas is released with brisk effervescence which turns lime water milky but has no effect on acidified potassium permanganate solution.
- (ii) State the property of the substance underlined in the following equations: [2]
- $\underline{\text{Zn}} + 2\text{KOH} \rightarrow \text{K}_2\text{ZnO}_2 + \text{H}_2$
  - $\text{H}_2\text{S} + \underline{\text{Cl}_2} \rightarrow 2\text{HCl} + \text{S}$
- (iii) Complete the table given below ( given that the value of Z for B is 10) [3]

Element	Atomic number	Number of valence electrons
A	Z-1	
B	Z	
C	Z+4	

- (iv) Write balanced chemical equations for the following reaction: [3]
- A reaction in which two gases react to form a solid.
  - A reaction in which two solids react to form a liquid,
  - A reaction which is carried out under very high pressure.

**Question 4**

- (i) The following questions refers to the industrial preparation of hydrogen gas by Bosch Process [2]
- Write equation for the endothermic reaction.
  - How is hydrogen gas separated from unused carbon monoxide?
- (ii) Blue vitriol is a crystalline solid chemically known as Copper (II) sulphate pentahydrate and has the formula  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ . Calculate the percentage of water of crystallization in this molecule. [Cu = 64, S = 32, O = 16, H = 1] [2]
- (iii) Pratik while performing an experiment to determine the effect of temperature on the solubility, he presented his result graphically. Answer the following question based on his graph given below: [3]



- Identify the salt whose solubility rises rapidly with rise in temperature.
- Identify the salt whose solubility decreases with rise in temperature
- Identify the salt whose solubility remains almost unaffected with rise in temperature.

(iv) Complete the following ionic equations, and classify them into oxidation or reduction reactions:

[2]

- $\text{Cu}^{2+} \rightarrow \text{Cu}$
- $\text{Cl} \rightarrow \text{Cl}^-$
- $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+}$

#### Question 5

(i) Ranjana wants to prove hydrogen is a reducing agent. To demonstrate this she passes hydrogen gas over heated copper oxide.

[2]

- What will she observe?
- Write balanced equation for the above reaction.

(ii) Name the following:

[2]

- A metallic carbonate which does not decompose on heating.
- A nitrate which on heating produces oxygen as the only gaseous product.

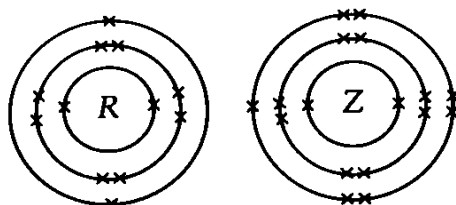
(iii) Abhi was given a salt 'X' which was orange in colour for analysis. On strong heating it produced a green residue, a colourless gas and also a colourless liquid oxide.

[3]

- Name the colourless gas evolved when Abhi heated salt X.
- Which cation is present in salt X?
- Identify the salt given to Abhi for analysis.

(iv) The diagram below shows the atomic structure of two elements R and Z

[3]



- Write the formula of the compound formed between R and Z.
- What type of bond is expected to form between R and Z?
- Between R and Z which element has a tendency to undergo reduction?

#### Question 6

(i) Element 'X' forms an oxide with the formula  $\text{X}_2\text{O}_3$  which is a solid with high melting point. 'X' would most likely to be placed in the group of the Periodic Table as:

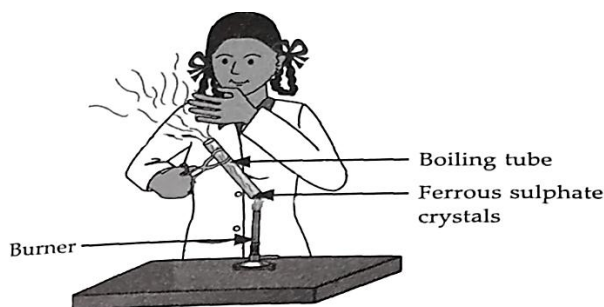
[2]

1. (a) Na (b) Mg (c) Al (d) Si

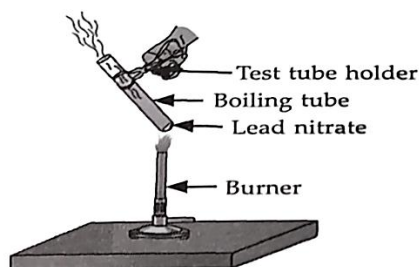
2. Justify your answer in the above question.

- (ii) A student was asked to perform two experiments in the laboratory based on the instructions given. Observe the picture given below and state one observation for each of the experiments 1 and 2. [2]

Experiment 1



Experiment 2



- (iii) A scientist designed a table which is given below. In the table H does not represent hydrogen. Some elements are given in their own symbol and position in the periodic table while others are shown with a letter. [3]

IA	IIA	IIIA	IVA	VA	VIA	VIIA	0
1	2	13	14	15	16	17	18
Li		D			O	J	Ne
A	Q	E	Si		H	K	
B	Ca		F	G			L

(a) Which element has 5 valence electrons?

(b) Write the formula of the compound formed between B and O.

(c) Which element in the fourth period will not form an oxide?

- (iv) X [2,8,7] and Y [2,8,2] are two elements. Using this information complete the following: [3]

(a) \_\_\_\_\_ is a metallic element.

(b) Metal atoms tend to have a maximum of \_\_\_\_\_ electrons.

(c) \_\_\_\_\_ is a reducing agent.

#### Question 7

- (i) A vessel of capacity 600 cc contains nitrogen gas at a pressure of 330 cm of Hg. What will be the pressure of nitrogen gas, when the vessel is connected to another vessel of 300 cc capacity? Also state the law used for the above calculation. [3]
- (ii) Write the formula of the following: [3]
- Ammonium phosphate
  - Sodium plumbite
  - Potassium chlorate
- (iii) It is found that on heating a gas, its volume increase by 50% and pressure decreases to 60% of its original value. If the initial temperature was  $-15^{\circ}\text{C}$ , calculate the temperature to which it was heated. [4]

**Question 8**

- (i) Give reasons for the following: [2]  
(a) Carbon tetrachloride does not conduct electricity.  
(b) Calcium oxide is used for drying ammonia gas.
- (ii) State one harmful effect of the following: [2]  
(a) Chlorofluoro carbon  
(b) Nitrogen dioxide.
- (iii) What would you observe when: [3]  
(a) Ammonia gas is bubbled through Nessler's reagent.  
(b) A filter paper dipped in acidified potassium dichromate solution is introduced in a jar of sulphur dioxide.  
(c) A piece of calcium is added to cold water.
- (iv) Give an example of the following: [3]  
(a) An anhydrous crystalline salt.  
(b) A liquid compound which acts as a drying as well dehydrating agent.  
(c) A compound which causes permanent hardness of water.