PRACTICE PAPER 03
CHAPTER 03 METALS AND NON-METALS

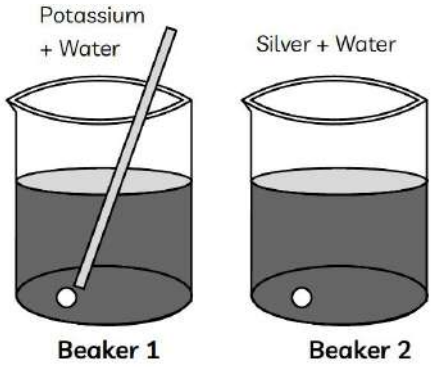
SUBJECT: SCIENCE **MAX. MARKS : 40**
CLASS : X **DURATION : 1½ hrs**

General Instructions:
(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A
Questions 1 to 10 carry 1 mark each.

1. A metal 'X' is used in thermite process. When is burnt in air it gives an amphoteric oxide 'Y'. 'X' and 'Y' are respectively:
(a) Fe and Fe_2O_3 (b) Al and Al_2O_3 (c) Fe and Fe_3O_4 (d) Al and Al_3O_4

2. A student drop pieces of potassium and silver in beakers containing water. The image shows the reaction.



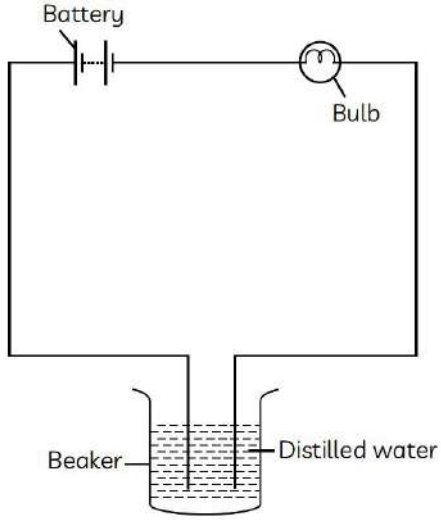
What are the products formed in each beaker?
(a) Beaker 1: K_2O and H_2O; Beaker 2: AgO and H_2O
(b) Beaker 1: KOH and H_2O; Beaker 2: Ag_2O and H_2O
(c) Beaker 1: K_2O and H_2O; Beaker 2: No reaction takes place
(d) Beaker 1: KOH and H_2; Beaker 2: No reaction takes place

3. On placing a copper coin in a test tube containing green ferrous sulphate solution, it will be observed that the ferrous sulphate solution:
(a) turns blue, and a grey substance is deposited on the copper coin.
(b) turns colourless and a grey substance is deposited on the copper coin.
(c) turns colourless and a reddish–brown substance is deposited on the copper coin.
(d) remains green with no change in the copper coin.

4. The metal X does not react with cold water but floats on hot water with formation of colourless bubbles. Which of the following represents metal X.
(a) Aluminium (b) Copper (c) Magnesium (d) Lead

5. Alloys are homogeneous mixtures of a metal with a metal or non-metal. Which among the following alloy contains non-metal as one of its constituents?
(a) Brass (b) Bronze (c) Amalgam (d) Steel

6. Raghav made an electric circuit using an LED, a battery, and connecting wires, as shown.



Raghav noticed that the LED does not glow. He replaced the distilled water with a salt solution of NaCl, $MgCl_2$, and CCL_4, one by one. He observed that the bulb glowed with salt solutions of NaCl and $MgCl_2$, but the LED bulb did not glow when the CCl_4 solution was taken. Which of the solutions used by Raghav contains only a covalent bond?

(a) NaCl (b) CCl_4 (c) Distilled water (d) Both (b) and (c)

7. On adding dilute sulphuric acid to a test tube containing a metal 'X', a colourless gas is produced when a burning matchstick is brought near it. Which of the following correctly represents metal 'X'?

(a) Sodium (b) Sulphur (c) Copper (d) Silver

8. Lists the process which explains how pure metals are obtained from impure samples by electrolytic refining.

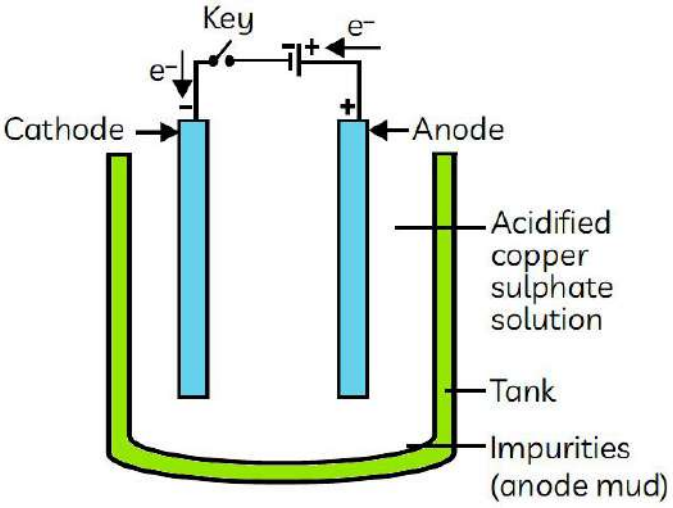
(I) Keep impure metal at anode and pure metal at cathode

(II) Pass current in the electrolytic solution

(III) Insoluble impurities settle in the bottom of the anode as anode mud

(IV) Pure metal from anode dissolves in the solution and pure metal from solution deposits on the cathode

You can also refer to the figure for arranging the steps.



Which option is correct for the arrangement of these steps in the appropriate order?

(a) (I), (III), (IV), (II) (b) (I), (II), (III), (IV)

(c) (I), (II), (IV), (III) (d) (I), (IV), (III), (II)

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

9. **Assertion (A):** Most of the salts when brought into the flame, impart characteristic colours to the flame.
Reason (R): Potassium salts impart violet colour and barium salts impart green colour to the flame.

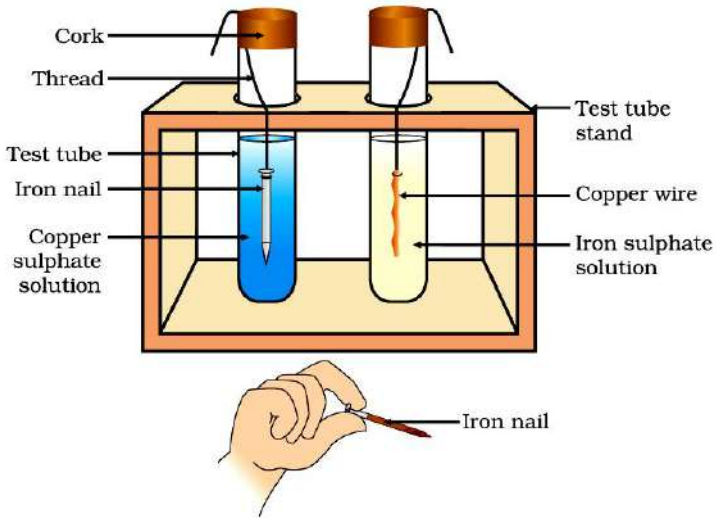
10. **Assertion (A):** Magnesium is less reactive than sodium.
Reason (R): Sodium reacts more vigorously with oxygen than magnesium.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. How do properties of iron change when: (a) a small quantity of carbon is mixed in it?
(b) nickel and chromium are mixed in it?

12. Observe the two test tubes A and B in the diagram given below and answer the following questions:



(a) In which test tube will the reaction take place ?
(b) Write a balanced equation for the reaction.
(c) Name the type of reaction.

13. Give reasons for the following observations:
(a) Ionic compounds in general have high melting and boiling points.
(b) Highly reactive metals cannot be obtained from their oxides by heating them with carbon.

14. (a) What are amphoteric oxides? Choose the amphoteric oxides from amongst the following oxides:
Na_2O, ZnO, Al_2O_3, CO_2, H_2O
(b) Why is that non-metals do not displace hydrogen from dilute acids?

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. (a) State the electron-dot structure for calcium and sulphur.
(b) Show the formation of CaS by the transfer of electrons.
(c) Name the ions present in this compound CaS. [Atomic number of Ca = 20, O = 16.]

16. State reasons for the following:
(a) Electric wires are covered with rubber like material.

(b) From dilute hydrochloric acid, zinc can liberate hydrogen gas but copper cannot.
(c) Sulphide ore of a metal is first converted to its oxide to extract the metal from it.

17. Explain the following:
(a) Sodium chloride is an ionic compound which does not conduct electricity in solid state where as it does conduct electricity in molten state as well as in aqueous solution.
(b) Reactivity of aluminium decreases if it is dipped in nitric acid.
(c) Metals like calcium and magnesium are never found in their free state in nature.

OR

A metal 'X' acquires a green colour coating on its surface on exposure to air.
(a) Identify the metal 'X' and name the process responsible for this change.
(b) Name and write chemical formula of the green coating formed on the metal.
(c) List two important methods to prevent the process.

SECTION – D

Questions 18 carry 5 marks.

18. (a) In the formation of compound between two atoms A and B, A loses two electrons and B gains one electron.
(i) What is the nature of bond between A and B ?
(ii) Suggest the formula of the compound formed between A and B.
(b) On similar lines explain the formation of $MgCl_2$ molecule.
(c) Common salt conducts electricity only in the molten state. Why ?
(d) Why is melting point of NaCl high ?

OR

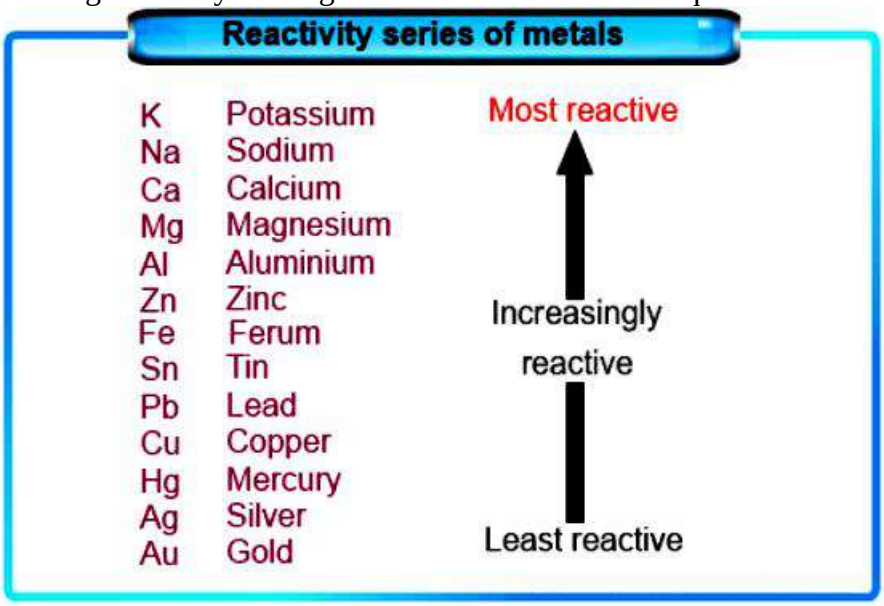
Explain the following:
(a) Carbon cannot reduce the oxides of Na or Mg.
(b) Iron articles are galvanized.
(c) Metals like Na, K, Ca and Mg are never found in their free state in nature.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Read the given passage and answer the questions based on passage and related studied concepts.

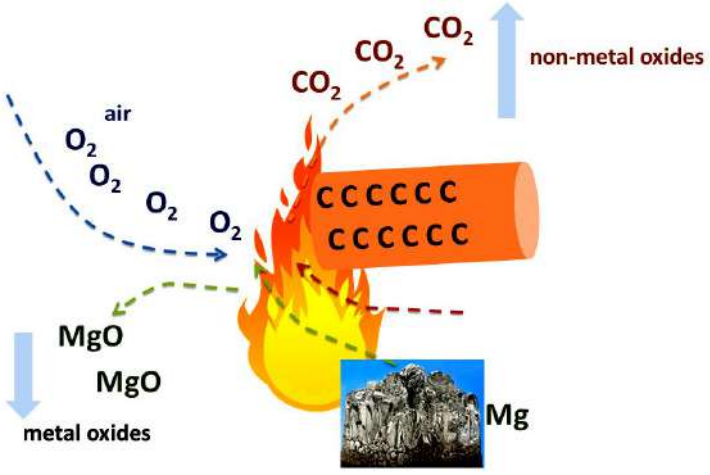
Analyse the following reactivity series given below and answer the questions that follow:



(a) What will happen if a strip of zinc is immersed in a solution of copper sulphate?
(b) If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. Which compound forms this green coating?

(c) Which one of the metals (Mg, Ag, Zn and Cu) would be displaced from the solution of its salts by other three metals?

20. Almost all metals combine with oxygen to form metal oxides. Metal oxides are generally basic in nature. But some metal oxides show both basic as well as acidic behaviour. Different metals show different reactivities towards oxygen. Some react vigorously while some do not react at all.



Burning of metals and non-metals in air

(a) What happens when copper is heated in air? (Give the equation of the reaction involved).
(b) Why are some metal oxides categorized as amphoteric? Give one example.
(c) Complete the following equations:

(i) $Na_2O(s) + H^2O(l) \rightarrow$
(ii) $Al_2O_3 + 2NaOH \rightarrow$

OR

(c) On burning Sulphur in oxygen a colourless gas is produced.
(i) Write chemical equation for the reaction.
(ii) Name the gas formed.
(iii) State the nature of the gas.
(iv) What will be the action of this on a dry litmus paper?

PRACTICE PAPER 03
CHAPTER 03 METALS AND NON-METALS
(ANSWERS)

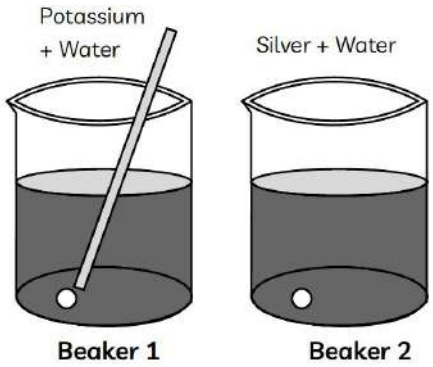
SUBJECT: SCIENCE **MAX. MARKS : 40**
CLASS : X **DURATION : 1½ hrs**

General Instructions:
(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.
(iv). There is no overall choice.
(v). Use of Calculators is not permitted

SECTION – A
Questions 1 to 10 carry 1 mark each.

1. A metal 'X' is used in thermite process. When is burnt in air it gives an amphoteric oxide 'Y'. 'X' and 'Y' are respectively:
(a) Fe and Fe_2O_3 (b) Al and Al_2O_3 (c) Fe and Fe_3O_4 (d) Al and Al_3O_4
Ans. (b) Al and Al_2O_3
The metal X is Aluminium because it produces Aluminium oxide, an amphoteric oxide (oxide that exhibits both acidic and basic behaviour) when it combines with oxygen.
$4Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s)$

2. A student drop pieces of potassium and silver in beakers containing water. The image shows the reaction.



What are the products formed in each beaker?
(a) Beaker 1: K_2O and H_2O; Beaker 2: AgO and H_2O
(b) Beaker 1: KOH and H_2O; Beaker 2: Ag_2O and H_2O
(c) Beaker 1: K_2O and H_2O; Beaker 2: No reaction takes place
(d) Beaker 1: KOH and H_2; Beaker 2: No reaction takes place
Ans. (d) Beaker 1: KOH and H2 : Beaker 2: No reaction takes place
All the metals do not react in the water. The intensity of reaction of a metal with water depends on its chemical reactivity. When a metal reacts with cold or hot water, then the products formed are metal hydroxide and hydrogen gas.
For example: 2K(s) + 2H2O(l) → 2KOH(aq) + H2(g) + Heat energy
The reaction is so violent and exothermic that the evolved hydrogen gas catches fire. Silver is very less reactive metal so it does not react with water at all.
When a metal reacts with steam then the products formed are metal oxide and hydrogen gas.

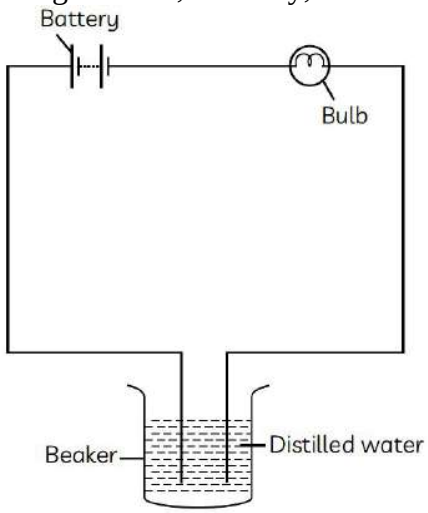
3. On placing a copper coin in a test tube containing green ferrous sulphate solution, it will be observed that the ferrous sulphate solution:

(a) turns blue, and a grey substance is deposited on the copper coin.
(b) turns colourless and a grey substance is deposited on the copper coin.
(c) turns colourless and a reddish–brown substance is deposited on the copper coin.
(d) remains green with no change in the copper coin.
Ans. (d) remains green with no change in the copper coin.
Since Cu is less reactive than Fe, it cannot replace Fe from its respective solution, so there won't be any reaction. Due to the lack of a reaction, the given solution will continue to be yellowish-green in colour, whose chemical reaction can be described as
$Cu(s) + FeSO_4(aq) \rightarrow$ No reaction

4. The metal X does not react with cold water but floats on hot water with formation of colourless bubbles. Which of the following represents metal X.
(a) Aluminium (b) Copper (c) Magnesium (d) Lead
Ans. (c) Magnesium
The metal X that does not react with cold water but floats on hot water with the formation of colorless bubbles is likely to be magnesium. Magnesium reacts with steam (hot water) to produce magnesium oxide and hydrogen gas. The reaction is as follows:
$Mg(s) + H_2O(g) \rightarrow MgO(s) + H_2(g)$
The hydrogen gas produced during the reaction is what causes the colorless bubbles.

5. Alloys are homogeneous mixtures of a metal with a metal or non-metal. Which among the following alloy contains non-metal as one of its constituents?
(a) Brass (b) Bronze (c) Amalgam (d) Steel
Ans. (d) Steel
Steel contains non-metal as one of its constituents. Steel is an alloy made by combining iron and other elements, mainly carbon (cabout 0.05%). Carbon gives strength to iron. It is used to make buildings, ships, automobiles, machines, and appliances.

6. Raghav made an electric circuit using an LED, a battery, and connecting wires, as shown.

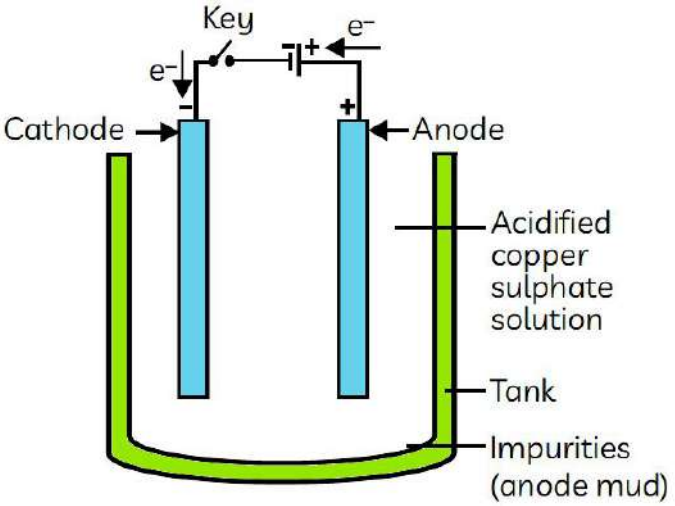


Raghav noticed that the LED does not glow. He replaced the distilled water with a salt solution of NaCl, $MgCl_2$, and CCL_4, one by one. He observed that the bulb glowed with salt solutions of NaCl and $MgCl_2$, but the LED bulb did not glow when the CCl_4 solution was taken. Which of the solutions used by Raghav contains only a covalent bond?
(a) NaCl (b) CCl_4 (c) Distilled water (d) Both (b) and (c)
Ans. (d) Both (b) and (c)
NaCl is an ionic compound and in their molten state or solution, electricity is conducted and the LED bulb glows but distilled water and CCl4 solution do not conduct electricity as they form covalent compounds.

7. On adding dilute sulphuric acid to a test tube containing a metal ‘X’, a colourless gas is produced when a burning matchstick is brought near it. Which of the following correctly represents metal ‘X’?
(a) Sodium (b) Sulphur (c) Copper (d) Silver

Ans. (a) Sodium
The metal 'X' is Sodium. Hydrogen gas (H2) is one product of the reaction between sodium and dilute sulphuric acid. Hydrogen gas is colourless and highly flammable. When a burning matchstick is brought close to hydrogen gas, it will ignite with a "pop" sound, indicating the presence of hydrogen gas.

8. Lists the process which explains how pure metals are obtained from impure samples by electrolytic refining.
(I) Keep impure metal at anode and pure metal at cathode
(II) Pass current in the electrolytic solution
(III) Insoluble impurities settle in the bottom of the anode as anode mud
(IV) Pure metal from anode dissolves in the solution and pure metal from solution deposits on the cathode
You can also refer to the figure for arranging the steps.



Which option is correct for the arrangement of these steps in the appropriate order?
(a) (I), (III), (IV), (II) (b) (I), (II), (III), (IV)
(c) (I), (II), (IV), (III) (d) (I), (IV), (III), (II)
Ans. (c) (I), (II), (IV), (III)
During the electrolytic refining of copper metal, a thick block of impure copper metal is made anode, a thin strip of pure copper metal is made cathode and an acidified copper sulphate is taken as electrolyte. On passing electric current, impure copper from anode dissolves and goes into copper sulphate solution and pure copper from the solution deposit on cathode. The soluble impurities go into the solution whereas, insoluble impurities collect below the anode as anode mud.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

9. **Assertion (A):** Most of the salts when brought into the flame, impart characteristic colours to the flame.
Reason (R): Potassium salts impart violet colour and barium salts impart green colour to the flame.
Ans. (b) Both (A) and (R) are true, and (R) is not the correct explanation of (A).
Ionic compounds on burning produce characteristic colours to the flame of bunsen burner. These compounds don't melt on heating but are soluble in water, not in organic solvents.

10. **Assertion (A):** Magnesium is less reactive than sodium.

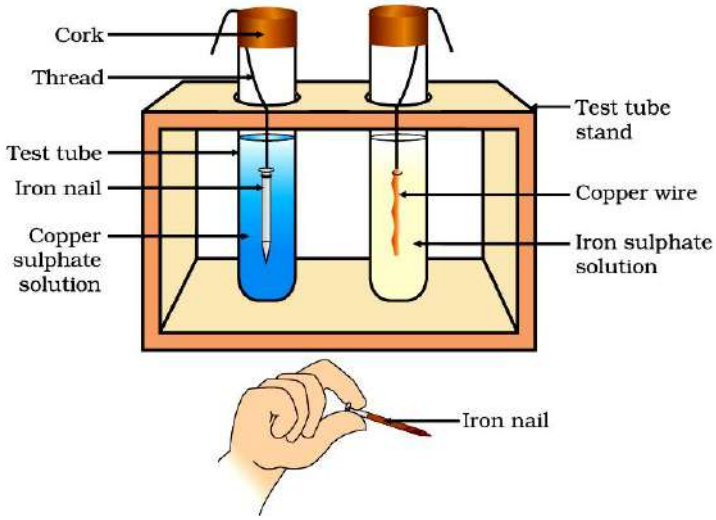
Reason (R): Sodium reacts more vigorously with oxygen than magnesium.
Ans. (a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
The reaction of sodium with oxygen is highly exothermic. Moreover, as the reaction of magnesium with oxygen is less vigorous than sodium, magnesium is less reactive than sodium.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. How do properties of iron change when:
(a) a small quantity of carbon is mixed in it?
(b) nickel and chromium are mixed in it?
Ans. (a) Pure iron is very soft and stretches easily when heated. It is mixed with about 0.05 % of carbon to increase its strength and hardness.
(b) Iron is mixed with nickel and chromium to increase its hardness and make it rust proof.

12. Observe the two test tubes A and B in the diagram given below and answer the following questions:



(a) In which test tube will the reaction take place ?
(b) Write a balanced equation for the reaction.
(c) Name the type of reaction.
Ans. (a) In first test tube reaction will take place.
(b) $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$
(c) Displacement reaction

13. Give reasons for the following observations:
(a) Ionic compounds in general have high melting and boiling points.
(b) Highly reactive metals cannot be obtained from their oxides by heating them with carbon.
Ans.
(a) Ionic compounds have high melting and boiling points due to strong force of attraction between oppositely charged ions.
(b) It is because these metals, themselves are strong reducing agents. Therefore, cannot be reduced by reducing agent like carbon.

14. (a) What are amphoteric oxides? Choose the amphoteric oxides from amongst the following oxides:
Na_2O, ZnO, Al_2O_3, CO_2, H_2O
(b) Why is that non-metals do not displace hydrogen from dilute acids?
Ans. (a) Those oxides which are both acidic as well as basic are called amphoteric oxides, e.g. Al_2O_3, ZnO.
(b) It is because non-metals do not supply electrons to change H^+ ions into hydrogen gas.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. (a) State the electron-dot structure for calcium and sulphur.
(b) Show the formation of CaS by the transfer of electrons.
(c) Name the ions present in this compound CaS. [Atomic number of Ca = 20, O = 16.]
Ans.

(*a*) Ca $\quad\quad$:S:
(2, 8, 8, 2) $\quad\quad$ (2, 8, 6)

(*b*) $Ca \longrightarrow Ca^{2+} + e^-$

$S + 2e^- \longrightarrow S^{2-}$

$Ca \overset{\times}{\underset{\times}{\longrightarrow}} :\ddot{S}:$ or (Ca^{2+}) $(:\ddot{S}:^{2-})$

(*c*) Ca^{2+} and S^{2-} ions are present in CaS.

16. State reasons for the following:
(a) Electric wires are covered with rubber like material.
(b) From dilute hydrochloric acid, zinc can liberate hydrogen gas but copper cannot.
(c) Sulphide ore of a metal is first converted to its oxide to extract the metal from it.
Ans. (a) It is because rubber is an insulator and does not allow current to flow through it.
(b) Zinc is more reactive than hydrogen. Therefore, it can displace hydrogen from dilute HCl whereas copper cannot, because, it is less reactive than hydrogen.
(c) It is because it is easier to reduce oxide ore as compared to sulphide ore.

17. Explain the following:
(a) Sodium chloride is an ionic compound which does not conduct electricity in solid state where as it does conduct electricity in molten state as well as in aqueous solution.
(b) Reactivity of aluminium decreases if it is dipped in nitric acid.
(c) Metals like calcium and magnesium are never found in their free state in nature.
Ans. (a) • Sodium chloride is an ionic compound because it is made up of Na+ and Cl– ions.
• It does not conduct electricity in solid state because ions are not free to move.
• It conducts electricity in molten state because ions are free to move.
(b) It is due to formation of oxide layer on its surface which makes it passive (less reactive) HNO3 is good oxidising agent.
(c) It is because Mg and Ca are highly reactive, react with other elements to form compounds, therefore, are not found in free state.

OR

A metal 'X' acquires a green colour coating on its surface on exposure to air.
(a) Identify the metal 'X' and name the process responsible for this change.
(b) Name and write chemical formula of the green coating formed on the metal.
(c) List two important methods to prevent the process.
Ans. (a) Metal is copper. The process is corrosion.
(b) Basic copper carbonate [$CuCO_3.Cu(OH)_2$]
(c) • It should be coated with tin.
• It should be mixed with other metals to form alloys.

SECTION – D

Questions 18 carry 5 marks.

18. (a) In the formation of compound between two atoms A and B, A loses two electrons and B gains one electron.
(i) What is the nature of bond between A and B ?
(ii) Suggest the formula of the compound formed between A and B.
(b) On similar lines explain the formation of $MgCl_2$ molecule.

(c) Common salt conducts electricity only in the molten state. Why ?
(d) Why is melting point of NaCl high ?
Ans.

(a) (i) Ionic bond

(ii) $(A^{2+})(:\ddot{B}:^{-})_2$, *i.e.* AB_2

(b) $Mg \longrightarrow Mg^{2+} + 2e^-$

$2Cl + 2e^- \longrightarrow 2Cl^-$

$(Mg^{2+})\ (:\ddot{Cl}:^{-})_2$

(c) Na^+ and Cl^- are free to move in molten state but not in solid state.
(d) It is due to strong force of attraction between Na^+ and Cl^-.

OR

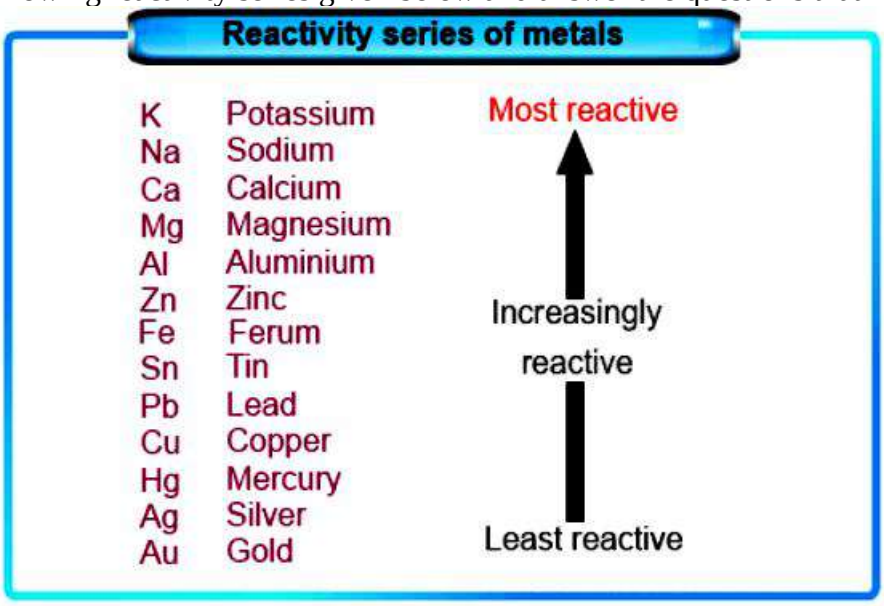
Explain the following:
(a) Carbon cannot reduce the oxides of Na or Mg.
(b) Iron articles are galvanized.
(c) Metals like Na, K, Ca and Mg are never found in their free state in nature.
Ans. (a) Sodium and magnesium have a tendency to react with oxygen rather than carbon because these are highly reactive metals. They have a greater affinity for oxygen than for carbon. Hence, their oxides are stable. The reduction of these metallic oxides with carbon requires very high temperature and at that temperature, metals react with carbon to form their corresponding carbides. Hence, carbon cannot reduce the oxides of Na or Mg.
(b) Galvanization is a process of applying a thin layer of zinc over the metal surface. It prevents further contact of metal surface with atmosphere and reduces the corrosion level. So, iron articles are galvanized with a thin layer of zinc over them. Since zinc is more reactive than iron, it undergoes oxidation more readily than iron. As a result, iron articles remain protected.
(c) Metals such as Na, K, Ca and Mg are highly reactive metals and hence, they are not found in their free state in nature. Na, K, Ca and Mg are alkali and alkaline Earth metals. They are the most reactive metals and readily react with atmospheric oxygen and other gases. Therefore, they are found in nature in the form of their respective compounds.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Read the given passage and answer the questions based on passage and related studied concepts.

Analyse the following reactivity series given below and answer the questions that follow:



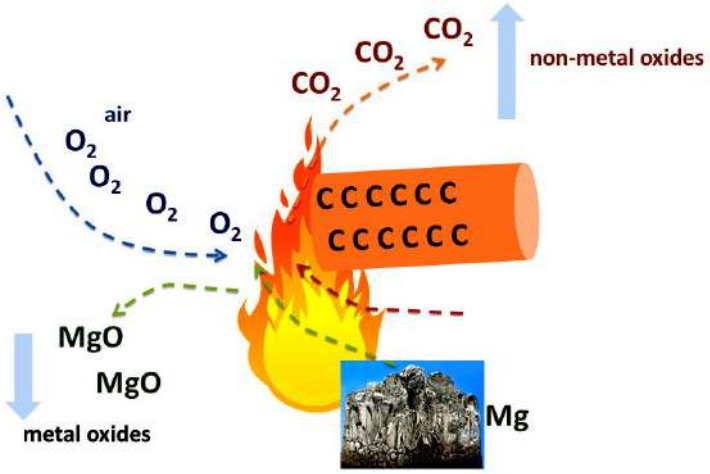
(a) What will happen if a strip of zinc is immersed in a solution of copper sulphate?

(b) If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. Which compound forms this green coating?
(c) Which one of the metals (Mg, Ag, Zn and Cu) would be displaced from the solution of its salts by other three metals?
Ans. (a) When a strip of zinc metal is put in copper sulphate solution, then the blue colour of copper sulphate solution fades gradually and red brown coating of copper is deposited on zinc strip.

$$Zn(s) + CuSO^4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$$

Zinc Copper sulphate Zinc sulphate Copper
This is an example of displacement reaction.
(b) Copper reacts with moist carbon dioxide in the air and forms green coloured basic copper carbonate.
(c) Least reactive metal can be displaced from its solution by other three metals. Since silver (Ag) is the least reactive metal out of given four metals so, it will be displaced from its solution by the other three metals.

20. Almost all metals combine with oxygen to form metal oxides. Metal oxides are generally basic in nature. But some metal oxides show both basic as well as acidic behaviour. Different metals show different reactivities towards oxygen. Some react vigorously while some do not react at all.



Burning of metals and non-metals in air

(a) What happens when copper is heated in air? (Give the equation of the reaction involved).
(b) Why are some metal oxides categorized as amphoteric? Give one example.
(c) Complete the following equations:
(i) $Na_2O(s) + H^2O(l) \rightarrow$
(ii) $Al_2O_3 + 2NaOH \rightarrow$

OR

(c) On burning Sulphur in oxygen a colourless gas is produced.
(i) Write chemical equation for the reaction.
(ii) Name the gas formed.
(iii) State the nature of the gas.
(iv) What will be the action of this on a dry litmus paper?
Ans. (a) Copper is a reactive element. When it is heated in the air, it forms black copper oxide (CuO).

$$2Cu(s) + O_2(g) \rightarrow 2CuO(s)$$

(Copper) (Oxygen) (Copper oxide)
(b) Metal oxides are categorized as amphoteric oxides that react with both acids as well as bases to create salts and water. Amphoteric oxides, among many others, include lead oxide and zinc oxide. These oxides are oxygen compounds that show both acidic and basic characteristics. These undergo a neutralisation reaction to form water and salt.
Example:

$$ZnO(s) + 2NaOH(aq) \rightarrow Na_2ZnO_2(aq) + H_2O(l)$$

(c) (i) Na2O + H2O → 2NaOH

(ii) Al_2O_3 + 2NaOH → 2 $NaAlO_2$ + H_2O

(Aluminium oxide) (Sodium hydroxide) (Sodium aluminate) (Water)

OR

(c) (i) S + O_2 → SO_2

(ii) The gas formed is sulphur dioxide which is colourless and poisonous.

(iii) The nature of the gas is acidic.

(iv) SO_2 gas has no effect on dry litmus paper because it shows acidic behavior only in the presence of water.