Metals and Non-Metals: Exercise Questions

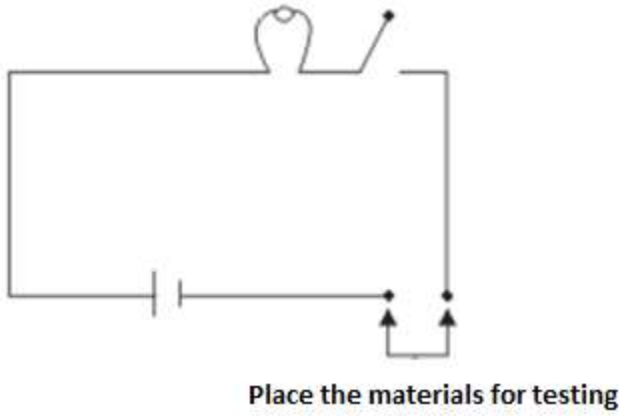
Q.1 Which of the following pairs will give displacement reactions?
(a)NaCl solution and copper metal
(b) $MgCl_2$ solution and aluminium metal
(c) $FeSO_4$ solution and silver metal
(d) $AgNO_3$ solution and copper metal.
Sol. (d) $AgNO_3$ solution and copper metal.

Q.2 Which of the following methods is suitable for preventing an iron frying pan from rusting?
(a) Applying grease
(b) Applying paint
(c) Applying a coating of zinc
(d) All of the above.
Sol. (c) Applying a coating of zinc.

Q.3 An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be
(a) calcium
(b) carbon
(c) silicon
(d) iron.
Sol. (a) Calcium

Q.4 Food cans are coated with tin and not with zinc because
(a) zinc is costlier than tin.
(b) zinc has a higher melting point than tin.
(c) zinc is more reactive than tin.
(d) zinc is less reactive than tin.
Sol. (c) zinc is more reactive than tin.

Q.5 You are given a hammer, a battery, a bulb, wires and a switch.
(a) How could you use them to distinguish between samples of metals and non-metals?
(b) Assess the usefulness of these tests in distinguishing between metals and non-metals.
Sol. (a) As we know that metal has malleable property. So we can convert any metal into the sheet by hitting it with a hammer. But nonmetal cannot be converted into sheets, they will break down by hitting with a hammer. We will make a circuit by using a battery, a bulb, wire and switch as shown in the figure:



If we test materials by placing in the circuit, then bulb glows on turning the switch on for only metals.
(b) The method is useful for testing any materials except for graphite which is a good conductor of electricity however it is a non-metal.

Q.6 What are amphoteric oxides? Give two examples of amphoteric oxides.
Sol.
The oxides which react with both acids and bases to form salt are called amphoteric oxide.
Example: aluminium oxide reacts in the following manner with acids and bases:

$Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$

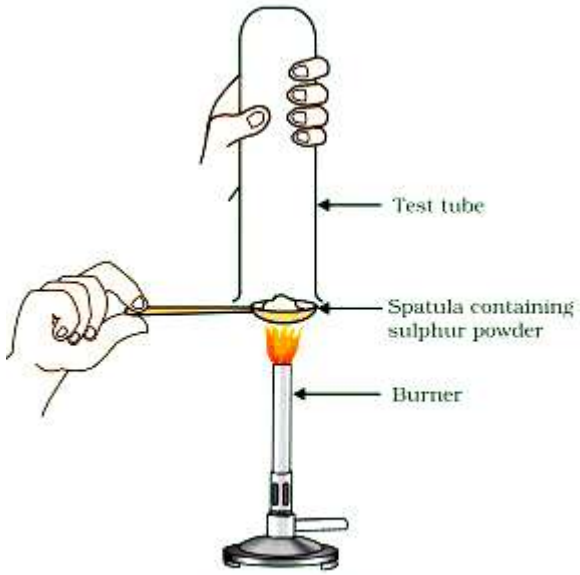
$Al_2O_3 + 2NaOH \rightarrow 2NaIO_2 + H_2O$

Other amphoteric oxides are, zinc oxide, lead oxide etc.

Q.7 Name two metals which will displace hydrogen from dilute acids, and two metals which will not.
Sol.
Metals that displace hydrogen: Sodium, zinc.
Metals that do not displace hydrogen: Silver, gold.

Q.8 In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte?
Sol. In the electrolytic refining of a metal M, the impure metal is made as an anode and a thin strip of pure metal is made as a cathode. A solution of the metal salt is used as an electrolyte.

Q.9 Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it as shown in the figure.



Collection of gas

(a) What will be the action of gas on?
(i) Dry litmus paper?
(ii) Moist litmus paper?
(b) Write a balanced chemical equation for the reaction taking place.
Sol.
(a) (i) It shows no effect on dry litmus paper.
(ii) It turns blue litmus into red in moist state.
(b) $S + O_2 \rightarrow SO_2$

Q.10 State two ways to prevent the rusting of iron.
Sol. (i) Iron is prevented from rusting by coating of zinc. This process is called Galvanization.
(ii) By the process of painting, a coating of paint is given on the iron articles to prevent the rusting of iron.

Q.11 What type of oxides are formed when non-metals combine with oxygen?
Sol. When non-metals combine with oxygen, Basic and amphoteric oxides are formed.

Q.12 Give reasons:
(a) Platinum, gold and silver are used to make jewellery.
(b) Sodium, potassium and lithium are stored under oil.
(c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
(d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.
Sol.
(a) Platinum, gold and silver, these are very less reactive and do not corrode. They have lustre and malleable properties. So, they are used in jewellery.

(b) Potassium, lithium and sodium react so vigorously and produce heat and fire, if it is kept in the air and water. Hence, to prevent accidental fires, they are kept under kerosene oil.

(c) Aluminium react with oxygen present in air and form aluminium oxide layer on its surface. This aluminium oxide layer does not corrode and prevents others compounds form reacting to aluminium. It is also a very good conductor of heat. That's why it is used to make utensils for cooking.

(d) It is easier to obtain a metal by reducing metal oxide, as compared to its sulphides and carbonates. Therefore, prior to reduction, the metal sulphides and carbonates must be converted into metal oxides.

Q.13 You must have seen tarnished copper vessels being cleaned with lemon or tamarind juice. Explain why these sour substances are effective in cleaning the vessels.

Sol. As we know that lemon or tamarind juice contain acid and copper oxide or turnish copper is a basic oxide. So, copper oxide reacts with acids but copper itself does not react. So, the copper can be cleaned by acidic substances like lemon or tamarind juice.

Q.14 Differentiate between metal and non-metal on the basis of their chemical properties.

***Sol.* Difference between metal and non-metal on the basis of their chemical properties:**

Metal	**Non-metal**
1. Metals from positive ions.	**1.** non-metals from negative ions
2. Metals react with oxygen and form basic oxide.	**2. Non-metals react with oxygen and form acidic oxide.**
3. Metals React with water and metal hydroxide and water.	**3. Non-metal do not react with water.**

Q.15 A man went door to door posing as a goldsmith. He promised to bring back the glitter of old and dull gold bangles to him which he dipped in a particular solution. The bangles to him which he dipped in a particular solution. The bangles sparkled like new but their weight was reduced drastically. The lady was upset but after a futile argument the man beat was upset but after a futile argument the man beat a hasty retreat. Can you play the detective to find out the nature of the solution he had used?

Sol. The used solution was aqua-regia.

Q.16 Give the reason why copper is used to make hot water tanks but steel (an alloy of iron) is not.

Sol. Since, hot ally of iron reacts with steam formed by boiling water. But, copper does not react with water. Copper is good conductor of heat than steel. It does not corrode easily.