

SAMPLE QUESTIONS

Metals and Non-metals



1.

Between copper and sodium, which metal is more reactive ? Explain with reasons.

Solution.

Sodium metal is more reactive than copper, because :

(i) Sodium reacts with oxygen easily to form sodium oxide but copper does not react with oxygen easily.

(ii) Sodium reacts vigorously with cold water to form sodium hydroxide and hydrogen but copper does not react even with steam.

2.

In a solution of silver nitrate, a copper plate was dipped. After some time, silver from the solution was deposited on the copper plate. Which metal is more reactive—copper or silver

Solution.

more reactive metal displaces a less reactive metal from its salt solution. Here, copper metal is displacing silver from silver nitrate solution (which then gets deposited on copper plate), therefore, copper metal is more reactive than silver metal.

3.

A solution of CuSO₄ was kept in an iron pot. After a few days, the iron pot was found to have a number of holes in it. Write the equation of the reaction that took place. Explain this reaction in terms of reactivity.

Solution.

iron metal is more reactive than copper metal. So, when a solution of copper sulphate (CuSO₄) was kept in an iron pot, then iron being more reactive displaced copper of copper sulphate solution to form copper metal and iron (II) sulphate solution



4.

What would you observe when zinc is added to a solution of iron (II) sulphate ? Write the chemical reaction that takes place.

Solution.

When zinc is added to a solution of iron (II) sulphate, then the greenish colour of iron (II) sulphate solution fades gradually due to the formation of colourless zinc sulphate solution, and iron metal is deposited on zinc :



5.

Which of the following pairs will give displacement reactions ?

- (a) NaCl solution and copper metal**
- (b) MgCl₂ solution and aluminium metal.**
- (c) FeSO₄ solution and silver metal.**
- (d) AgNO₃ solution and copper metal.**

Solution.

- (a) Copper metal is less reactive than sodium metal (Na), so no displacement reaction will occur between NaCl solution and copper metal.**
- (b) Aluminium metal is less reactive than magnesium metal (Mg), so no displacement reaction will take place between MgCl₂ solution and aluminium metal.**
- (c) Silver metal is less reactive than iron metal (Fe), so no displacement reaction will occur between FeSO₄ solution and silver metal.**
- (d) Copper metal is more reactive than silver metal (Ag), so a displacement reaction will take place between AgNO₃ solution and copper metal**

6.

From amongst the following, choose the metals and non-metals and state one of the properties on the basis of which you have made your choice.

(i) Graphite (ii) Sodium (iii) Phosphorus (iv) Helium.

Solution.

Out of graphite, sodium, phosphorus and helium, only sodium is a metal. All others are nonmetals. This choice has been made on the basis of the nature of their oxides. This is because metals form basic oxides whereas non-metals form acidic oxides or neutral oxides.

(i) Graphite is actually carbon element. Graphite or carbon usually forms an acidic oxide, carbon dioxide. So, graphite is a non-metal.

(ii) Sodium forms a basic oxide, sodium oxide. So, sodium is a metal.

(iii) Phosphorus forms an acidic oxide, phosphorus pentoxide. So, phosphorus is a non-metal.

(iv) Helium is a gas, so it is a non-metal. Being an inert gas, helium does not form an oxide

7.

An element reacts with oxygen to form an oxide which dissolves in dilute hydrochloric acid. The oxide formed also turns a solution of red litmus blue. Is the element a metal or a non-metal ? Explain your answer.

Solution.

Here the oxide of given element dissolves in an acid, therefore, the oxide must be basic in nature. Moreover, since the oxide turns red litmus solution to blue, this also confirms that the oxide is basic in nature. Now, basic oxides are formed by metals, so the element in this case is a metal.

8.

Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test-tube over the burning sulphur. (a) What will be the action of this gas on : (i) dry litmus paper ? (ii) moist litmus paper ? (b) Write a balanced chemical equation for the reaction taking place.

Solution.

(a) When sulphur is burnt in air then sulphur dioxide gas is formed. (i) Sulphur dioxide gas has no action on dry litmus paper. (ii) Sulphur dioxide gas turns moist blue litmus paper to red.



9.
Name one metal which has a low melting point.

10.
Name the metal which is the poorest conductor of heat

11.
Give the names and formulae of (a) two acidic oxides, and (b) two basic oxides.

12.
What name is given to those metal oxides which show basic as well as acidic behavior

13.
Name two metals which form amphoteric oxides

14.
(a) Explain why, metals usually do not liberate hydrogen gas with dilute nitric acid. (b)
Name two metals which can, however, liberate hydrogen gas from very dilute nitric acid

15.
(a) What happens when calcium reacts with chlorine ? Write an equation for the reaction which takes place. (b) What happens when magnesium reacts with very dilute nitric acid ? Write an equation for the reaction involved.

16.
(a) Why does aluminium not react with water under ordinary conditions ? (b) Name two metals which can displace hydrogen from dilute acids. (c) Name two metals which cannot displace hydrogen from dilute acids.

17.

(a) What is meant by the reactivity series of metals ? Arrange the following metals in an increasing order of

their reactivities towards water :Zinc, Iron, Magnesium, Sodium

(b) Hydrogen is not a metal but still it has been assigned a place in the reactivity series of metals. Why ?

(c) Name one metal more reactive and another less reactive than hydrogen.

(d) Name one metal which displaces copper from copper sulphate solution and one which does not.

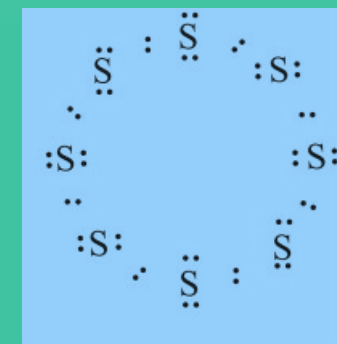
(e) Name one metal which displaces silver from silver nitrate solution and one which does not.

18.

What would be the electron-dot structure of a molecule of sulphur which is made up of eight atoms of sulphur ?

Solution

A sulphur atom has 6 outermost electrons. Eight sulphur atoms combine by sharing two electrons among themselves to form a ring type sulphur molecule, S₈



19.
What chemical process is used for obtaining a metal from its oxide ?

20.
State two ways to prevent the rusting of iron.

21.
What is meant by galvanization ? Why is it done ?

22.
Name the metal which is used for galvanizing iron.

23.
How is manganese extracted from manganese dioxide, MnO_2 ? Explain with the help of an equation.

24.
What is a thermite reaction ? Explain with the help of an equation. State one use of this reaction.

25.
Explain giving one example, how highly reactive metals are extracted.

26.
Describe with one example, how moderately reactive metals are extracted.

27.

How are the less reactive metals extracted ? Explain with the help of an example.

28.

(a) What is the difference between a mineral and an ore ?

(b) Which metal is extracted from cinnabar ore ?

(c) Name one ore of sodium. Name the sodium compound present in this ore and write its chemical formula.

(d) How is sodium metal extracted ? Explain with the help of equation of the reaction involved.

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