

ಎಸ್‌ಎಸ್‌ಎಲ್‌ಸಿ-ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

SCIENCE

METALS AND NON-METALS

Answer the following questions

7. The way metals like sodium, magnesium and iron react with air and water is an indication of their relative positions in the 'reactivity series'. Is the statement true? Justify your answer with examples.

Ans:- (.....Contd)

Magnesium reacts with oxygen and water at high temperature. Whereas iron reacts with oxygen on prolonged heating. It reacts with only steam.

8. Give the nature of solubility of some different metals with water.

Ans:-

Sl. No.	Metal	Solubility in water in water
1.	Copper (Cu)	Insoluble
2.	Iron (Fe)	Insoluble
3.	Sodium (Na)	Soluble
4.	Magnesium(Mg)	Soluble in hot water Partially soluble
5.	Calcium (Ca)	Insoluble
6.	Zinc (Zn)	Insoluble
7.	Aluminium (Al)	

9. Why do calcium float in water?

Ans:- When calcium is poured into water, calcium oxide is formed with liberation of hydrogen. The bubbles of hydrogen get stuck to the surface of metal and it floats over water. Magnesium reacts similarly.

10. When a metal X is treated with cold water, it gives a basic salt Y with molecular formula XOH(Molecular mass = 40) and liberates a gas Z which easily catches fire. Identify X, Y, Z.

Ans:- The formula, XOH shows that metals is univalent. Na liberates H₂ gas with cold water. H₂ catches fire easily.

∴ X = Na, Y = NaOH, Z = H₂.

11. Name metal which reacts with a very dilute HNO₃ to evolve hydrogen gas.

Ans:- Magnesium.

12. "Hydrogen gas is not evolved when most metals react with nitric acid" State reasons to justify this statement.

Ans:- Hydrogen gas is not evolved when most metals react with nitric acid because HNO₃ is a strong oxidizing agent. It oxidizes the H₂ produced to water and itself gets oxidized to any of the nitrogen oxides [N₂O, NO, NO₂].

13. Write a short note on the reactivity series of metals.

Ans:- Some metals are very reactive while others less reactive or do not react at all. Eg:- sodium and potassium react very vigorously even with cold water, so they can be said to be very reactive metals.

Zinc and iron do not react with even hot water but react with steam, so these are less reactive metals.

Copper and silver do not react even with steam, so they are quite unreactive metals. Similarly, metals react with acids with different vigour and rate of evolution of H₂ is different in different cases.

As all the metals do not react with oxygen, water or acid and so their comparative reactivities cannot be ascertained. But displacement reactions give better evidence about the comparative reactivity of one metal

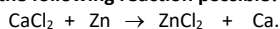
with respect to another. Eg:- if metal A displaces metal B from its solution, it is more reactive than B and so on.

The arrangement of metals in a vertical column in order of decreasing reactivities is called the activity series of metals

Reactivity or Activity series of Metals

	Element	Symbol
These metals are more reactive than hydrogen and displaces H ₂ gas from dilute acids.	Potassium	K→Most reactive
	Sodium	Na
	Barium	Ba
	Calcium	Ca
	Magnesium	Mg
	Aluminium	Al
	Zinc	Zn
	Iron	Fe
	Nickel	Ni
	Tin	Sn
	Lead	Pb
	Hydrogen	H
These metals are less reactive than hydrogen	Copper	Cu
	Mercury	Hg
	Silver	Ag
	Gold	Au
	Platinum	Pt→Least reactive

14. Is the following reaction possible?



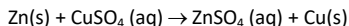
Ans:- This reaction will not take place because Zn is less reactive than Ca and this cannot displace Ca from its salts.

15. A zinc plate was put into a solution of copper sulphate kept in a glass container. It was found that blue colour of the solution gets fader and fader with the passage of time. After few days when zinc plate was taken out of the solution, a number of holes were observed on it.

i] State the reason for changes observed on the zinc plate.

ii] Write the chemical equation for the reaction involved.

Ans:- zinc plate got a number of holes because it reacted with the solution of copper sulphate as the following equation.



16. Give reasons for the following:

Hydrogen is not a metal but it has been assigned a place in the activity series of metals.

Ans:- The reactivity of metals depends on the ease with which they can lose electrons. Hydrogen also loses one electron more easily than some other metals and forms positive ions. Therefore, it also finds a place in the activity series of metals.

17. What happens when:

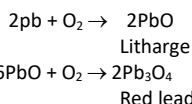
i] Lead is heated to 400-500°C in air.

ii] Steam is passed over heated iron.

iii] Copper oxide is heated with magnesium.

iv] Aluminium wire is dipped in heating water.

Ans:- i] Lead forms litharge and red lead when heated in air.



ii] Red hot iron displaces hydrogen from steam.

