ಎಸ್ಎಸ್ಎಲ್ಸಿ–ಇಂಗ್ಲಿಷ್ ಮಾಧ್ಯಮ

SCIENCE

METALS AND NON-METALS

Answer the following questions

11. Explain, how can we find out whether a given substance isa metal if we know its electronic configuration.

Ans. If we have the electronic configuration of a substance, we can say whether it is a metal or not. Metals have 1 to 3 electrons in the outermost shell of their atoms.

Sodium, magnesium and aluminum are metals, as these contain 1, 2, 3 electrons respectively in their outermost shells. Their atomic numbers and electronic configurations are as given below:

Metal	Atomic Number	Electronic configuration		
		K	L	M
Sodium	11	2	8	1
Magnesium	12	2	8	2
Aluminium	13	2	8	3

12. Demonstrate why some metals are used for making cooking useless?

Ans:- Some metals are used for making cooking vessels because these - i] are good conductors of heat. ii] have high melting points. iii] are non-corrosive. iv] are easily available.

13. Aluminium or copper wire required for electric circuits are coated with a rubber like material. Why?

Ans:- Aluminium or copper wires are good conductors of electricity. They are coated with rubber like material in order to prevent shock when current is flowing through the wire when circuit is on.

14. Why is it not possible to group metals and non-metals on the basis of their physical properties? Explain.

Ans:- We cannot group metals and non-metals on the basis of their physical properties only because there are many exceptions both in metals and non-metals.

Eg:- i] All metals except mercury are solids.

ii] Metals have generally high melting points but gallium and caesium have very low melting points.

iii] Metals are hard but alkali metals like lithium, sodium and potassium are so soft that they can be cut with a knife.

iv] Non- metals are dull but iodine is lustrous.

v] Non-metals are bad conductor of electricity but carbon in the form of graphite is a conductor of electricity.

vi] Most solid non-metals are soft but carbon in the form of diamond is the hardest natural substance.

15. A non-metal X exists in two different forms Y and Z. Y is the hardest natural substances, whereas Z is a good conductor of electricity. Identify Y and Z.

Ans:- Y is diamond and Z is graphite.

16. Name the metal which has very low melting point and can melt with heat of the palm.

Ans:- Gallium.

17. Why do we use copper and aluminum wire for transmission of electric current?

Ans:- Copper and aluminium are good conductors of electricity and are easily available.

18. State two physical properties of gold which are of extreme use to jewellers.

Ans:- i] Malleability, ii] Ductility.

19. What are non-metals?

Ans:- Non- metals are the elements which form negative ions by gaining electrons, e.g., oxygen is a non-metal which forms oxide ions , O^{-2}, by gaining electrons. These are poor conductors of heat, electricity, do not reflect light and have no luster. Hydrogen, carbon, silicon etc., are some of the non-metallic elements.

20. How many non-metals are there? How many of them are solids, liquids and gases?

Ans:- There are 22 non-metals out of which ten non-metals are solids, eleven non-metals are gases and one non-metal is a liquid.

Solid non-metals are -Boron (B), Carbon (C), Silicon (Si), Phosphorous (P), Arsenic (As), Sulphur (S), Iodine (I).

Gaseous non-metals are - Hydrogen (H), Nitrogen (N), Oxygen (O), Fluorine (F), Neon (Ne), Chlorine (Cl), Helium (He), Argon (Ar), Krypton (Kr), Xenon (Xe), Radon (Rn).

Liquid non-metal is - Bromine (Br).

21. Name some metalloids? Why are they so-called?

Ans:- Arsenic and antimony are metalloids. They are called metalloids because they exhibit characteristics of both metals and non-metals.

22. State the important physical properties of non-metals.

Ans:- The important physical properties of non-metals are

i**] Non-metals are brittle**, i.e, they cannot be beaten into sheets. When hammered, they break into pieces. Eg:- sulphur and phosphorous are brittle non-metals**.**

ii] Non-metals are non-ductile, i.e., they cannot be drawn into thin wire on stretching.

iii] **Non- metals are bad conductors of heat and electricity**: except carbon (in the form of graphite) non-metals do not conduct heat and electricity because unlike metals they have no free electrons.

iv] **Non- metals are dull:** Except iodine and graphite, non-metals have no luster [shine].

v] Non-metals have comparatively low melting points and boiling points.

vi] Non-metals have low densities.

vii] Non-metals may be solid, liquid or gas at room temperature. Carbon, sulphur and phosphorous are solid non—metals, bromine is a liquid non-metal; hydrogen, oxygen and nitrogen are gaseous non-metals.

viii] Most-solid non-metals are soft: Only carbon [in the form of diamond] is very hard.

ix] Non-metals are not strong; i.e., these have low tensile strength.

23. Give some important chemical properties of metals.

Ans:- i] **Reaction with oxygen**: Most of the metals react with oxygen of air and form their oxides. Most metal oxides are insoluble in water but some of these dissolve in water to form alkalies.

Some metals react with oxygen even at room temperature, some react on heating, whereas still others react only on prolonged heating.

a] Sodium reacts with oxygen at room temperature to form sodium oxide [Na_2O]. This is a basic oxide and dissolves in water to form sodium hydroxide, an alkali.

$4Na + O_2 \rightarrow 2Na_2O$

$Na_2O + H_2O \rightarrow 2NaOH$

Sodium hydroxide

b] Magnesium burns in air with a dazzling white flame heated to a temperature called its ignition temperature. It does not react with air at room temperature.

$2Mg + O_2 \rightarrow 2MgO$

Magnesium oxide

c] Copper and iron metals are less reactive and react with oxygen only on prolonged heating.

$2Cu + O_2 \rightarrow 2CuO$ (Cupric oxide)

$4Fe + 3O_2 \rightarrow 2Fe_2O_3$ (Ferric oxide)

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