Chapter - 3

Metals and Non metals

(Assertion and Reasoning Questions)

Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

Q.1. Assertion (A) : Hydrogen gas is not evolved when a metal reacts with nitric acid.
Reason (R) : Nitric acid is a strong oxidising agent.

Q.2. Assertion (A) : Highly reactive metals are obtained by electrolytic reduction.

Reason (R) : In the electrolytic reduction, metal is deposited at the cathode.

Q.3. Assertion (A): Bronze is an alloy of copper and tin.

Reason (R) : Alloys are heterogeneous mixture of metals with other metals and non-metals.

Q.4. Assertion (A) : Zinc oxide is amphoteric in nature.

Reason (R): Zinc oxide reacts with both acids and bases.

Q.5. Assertion (A) : Magnesium chloride is an ionic compound.

Reason (R) : Metals and non-metals react by mutual transfer of electrons.

Q.6. Assertion (A): Zinc can easily displace copper on reacting with a solution of copper sulphate.

Reason (R) : Copper is more reactive metal as compared to Zinc.

Q.7. Assertion (A) : Zinc carbonate is heated strongly in presence of air to form zinc oxide and carbon dioxide.

Reason (R) : Calcination is the process in which a carbonate ore is heated strongly in the absence of air to convert into metal oxide.

Q.8. Assertion (A): Zinc becomes dull in moist air.

Reason (R) : Zinc is coated by a thin film of its basic carbonate in moist air.

Q.9. Assertion (A) : MgCl, is a covalent compound.

Reason (R) : MgCl, is a good conductor of electricity in molten state.

Q.10. Assertion (A) : Anodising is a method to prevent metal from corrosion.

Reason (R) : Anodising is a process of coating iron with a layer of zinc.

Q.11. Assertion (A) : The reaction of calcium with water is less violent in comparison to that of sodium.

Reason (R) : The heat evolved is not sufficient for the hydrogen to catch fire.

Q.12. Assertion (A) :C and N do not react with dil. HCl and dil. H_2SO_4.

Reason (R) : Metals do not react with dil. HCl and dil. H_2SO_4.

Q.13. Assertion (A) : Copper displaces silver from silver nitrate solution.

Reason (R) : Copper is more reactive than silver.

Q.14. Assertion (A) : Aluminum oxide and zinc oxide are acidic in nature.

Reason (R) : Amphoteric nature means that substance have both acidic and basic character

Q.15. Assertion (A) : Different metals have different reactivities with water and dilute acids.

Reason (R) : Reactivity of a metal depends on its position in the reactivity series.

Q.16. Assertion (A) : Iron is the most widely used metal. But it is never used in its pure state.

Reason (R) : Pure iron is very soft and stretches easily when hot.

Q.17. Assertion (A) : Gold occurs in native state.

Reason (R) : Gold is a reactive metal.

Q.18. Assertion (A) : The property of beating a metal into sheets is called ductility.

Reason (R) : Gold and silver are most malleable metals.

Q.19. Assertion (A) : Silver and gold do not react with oxygen even at high temperatures.

Reason (R) : Silver and gold are less active metals.

Q.20. Assertion (A) : The oxides of sulphur and phosphorus are acidic in nature.

Reason (R) : Metal oxides are basic in nature.

Q.21. Assertion (A) : MgO exists in liquid state.

Reason (R) : The electrostatic forces of attraction between Mg2+ and 02- ions constitute ionic bond.

Q.22. Assertion (A) : On reacting with water, calcium starts floating over water.

Reason (R) : Calcium reacts with cold water at room temperature.

Q.23. Assertion (A) : Electrovalency of Na is +1.

Reason (R) : The number of electrons which an atom either loses or gains in the formation of an ionic bond is known as its valency.

Q.24. Assertion (A) : The arrangement of metals in order of decreasing reactivities is called reactivity series.

Reason (R) : Metals at the top of series are very reactive and metals at the bottom are least reactive.

Q.25. Assertion (A) : Non-metals are electronegative in nature.

Reason (R) : They have tendency to lose electrons.

Q.26. Assertion (A) : Ionic compounds have high melting and boiling points.

Reason (R) : A large amount of energy is required to break the strong inter-ionic attraction in ionic compounds.

Q.27. **Assertion (A) :**Metals in general have very high melting and boiling points.

Reason (R) : Metals have the strongest chemical bonds which are metallic in nature.

Q.28. Assertion (A) : Metals generally act as reducing agents.

Reason (R) : The reducing character is expressed in terms of electron releasing tendency.

Q.29. Assertion (A) : Magnesium reacts with oxygen upon heating and burns brightly to form magnesium oxide.

Reason (R) : Magnesium oxide is basic in nature.

Q.30. Assertion (A) : Bromine cannot displace chlorine from its salt solution.

Reason (R) : Chlorine is more reactive than bromine.

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ANSWER KEY

Q.1 : (a) **Q.2** : (b) **Q.3** : (c) **Q.4** : (a)

Q.5 : (a) **Q.6** : (c) **Q.7** : (d) **Q.8** : (a)

Q.9 : (d) **Q.10** : (c) **Q.11** : (a)

Q.12 : (c) Metals react with dilute HCl and dil. H_2SO_4. Non-metals do not react with dilute acids.

Q.13 : (a)

Q.14 : (d) Aluminium and zinc oxides are amphoteric in nature.

Q.15 : (a) The metals placed at the top of the series are most reactive.

Q.16 : (a)

Q.17 : (c) Gold is a noble metal.

Q.18 : (d) The property of beating a metal into sheets is called malleability.

Q.19 : (a)

Q.20 : (b) Sulphur and phosphorous are non-metals. Non-metals form either acidic or neutral oxides.

Q.21 : (d) MgO exists in solid state.

Q.22 : (b) calcium floats over water because the bubbles of hydrogen gas formed get stick to the surface of the water.

Q.23 : (a)

Q.24 : (b) Metals at the top of the series are very reactive and therefore, they do not occur free in nature. The metals at the bottom of the series are least reactive and therefore, they normally occur free in nature.

Q.25 : (c) Non-metals have a tendency to gain electrons.

Q.26 : (a) **Q.27** : (a)

Q.28 : (b) Metals have a strong tendency to lose electrons and hence they behave AS REDUCING AGENTS.

Q.29 : (b) Metals react with oxygen to form metal oxides which are basic in nature.

Q.30 : (a)