Metals and Non-metals

Assertion & Reason Type Questions

Directions: Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

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

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

c. Assertion (A) is true but Reason (R) is false.

d. Assertion (A) is false but Reason (R) is true.

Q1. Assertion (A): Metals are good conductors of heat.

Reason (R): Silver and copper are poor conductors of heat.

Answer : (c) Reason (R) is false because silver and copper are best conductors of heat.

Q2. Assertion (A): Aluminium oxide is an amphoteric oxide.

Reason (R): Anodising is a process of forming a thick oxide layer of aluminium.

Answer : (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

Q3. Assertion (A): Calcium floats in water.

Reason (R): Calcium reacts with water to form hydrogen gas and bubbles of H_2 gas stick to the calcium metal surface.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

Q4. Assertion (A): Zinc fails to evolve hydrogen gas on reacting with dil. nitric acid.

Reason (R): Dil.HNO_3 is an oxidising agent and zinc gives no when reacts with it.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

Q5. 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.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

Q6. 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.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

Q7. Assertion (A): Metals low in the reactivity series are very unreactive. The oxides of these metals can be reduced to metals by heating alone.

Reason (R): Cinnabar when heated in air first gets converted into mercuric oxide which is then reduced to mercury on further heating.

Answer : (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A).

Q8. Assertion (A): The reaction of Fe_2O_3 with Al is known as thermite reaction. This is used to join railway tracks or cracked machine parts.

Reason (R): The reaction is highly exothermic.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

Q9. Assertion (A): Sodium, calcium and magnesium are obtained by the electrolysis of their molten oxides.

Reason (R): These metals have more affinity for oxygen than carbon.

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Answer : (d) Assertion (A) is false because sodium, magnesium and calcium are obtained by the electrolysis of their molten chlorides.

Q10. Assertion (A): Pure gold, known as 24 carat gold, is not suitable for making jewellery.

Reason (R): Pure gold is very soft.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A).

Q11. Assertion (A) : Hydrogen gas is not evolved when a metal reacts with nitric acid.

Reason (R) : Nitric acid is a strong oxidising agent.

Answer : (a)

Q12. Assertion (A) : Highly reactive metals are obtained by electrolytic reduction.

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

Answer : (b)

Q13. Assertion (A): Bronze is an alloy of copper and tin.

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

Answer : (c)

Q14. Assertion (A) : Zinc oxide is amphoteric in nature.

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

Answer : (a)

Q15. Assertion (A) : Magnesium chloride is an ionic compound.

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

Answer : (a)

Q16. 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.

Answer : (c)

Q17. 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.

Answer : (d)

Q18. Assertion (A): Zinc becomes dull in moist air.

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

Answer : (a)

Q19. Assertion (A) : MgCl, is a covalent compound.

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

Answer : (d)

Q20. 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.

Answer : (c)

Q21. 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.

Answer : (a)

Q22. 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.

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

Q23. Assertion (A) : Copper displaces silver from silver nitrate solution.

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

Answer : (a)

Q24. **Assertion (A) :**Aluminum oxide and zinc oxide are acidic in nature.

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

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

Q25. 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.

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

Q26. 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.

Answer : (a)

Q27. Assertion (A) : Gold occurs in native state.

Reason (R) : Gold is a reactive metal.

Answer : (c) Gold is a noble metal.

Q28. Assertion (A) : The property of beating a metal into sheets is called ductility.

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

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

Q29. Assertion (A) : Silver and gold do not react with oxygen even at high temperatures.

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

Answer : (a)

Q30. Assertion (A) : The oxides of sulphur and phosphorus are acidic in nature.

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

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

Q31. Assertion (A) : MgO exists in liquid state.

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

Answer : (d) MgO exists in solid state.

Q32. Assertion (A) : On reacting with water, calcium starts floating over water.

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

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

Q33. 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.

Answer : (a)

Q34. 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.

Answer : (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.

Q35. Assertion (A) : Non-metals are electronegative in nature.

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

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

Q36. 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.

Answer : (a)

Q37. 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.

Answer : (a)

Q38. Assertion (A) : Metals generally act as reducing agents.

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

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

Q39. Assertion (A) : Magnesium reacts with oxygen upon heating and burns brightly to form magnesium oxide.

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

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

Q40. Assertion (A) : Bromine cannot displace chlorine from its salt solution.

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

Answer : (a)