

Metals and Non-metals MCQ Chemistry Questions with Solutions

Q1: Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?

- (i) Good thermal conductivity
- (ii) Good electrical conductivity
- (iii) Ductility
- (iv) High melting point

- (a) (i) and (ii)
- (b) (i) and (iii)
- (c) (ii) and (iii)
- (d) (i) and (iv)

Answer: (d) (i) and (iv)

Explanation: Aluminum is ductile and has a high electrical conductivity, which makes it unsuitable for utensil production. Aluminium has a high melting point and good heat conductivity. Copper, steel (an alloy of iron), and aluminium are the most popular metals used to make utensils. Due to their ability to conduct heat, copper and aluminium are the most used materials.

Q2: Which property of metals is used for making bells and strings of musical instruments like Sitar and Violin?

- (a) Malleability
- (b) Sonorousness
- (c) Ductility
- (d) Conductivity

Answer: (b) Sonorousness

Explanation: Metal's sonorousness refers to its ability to produce sound. As a result, it's used to make musical instruments like the Sitar and the Violin's bells and strings.

Q3: Due to their semiconductor properties the non-metals used in computers, T.V. etc. are

- (a) Carbon
- (b) Bromine
- (c) Silicon
- (d) Fluorine

Answer: (c) Silicon

Explanation: Semiconductors are materials that have neither the conductivity of a conductor nor the insulating properties of an insulator. They are formed of pure silicon crystal, which is effectively pure silicon. Silicon is ideal for this lattice structure because its four valence electrons enable it to form perfect bonds with four of its silicon neighbours.

As a result, C is the correct answer.

Q4: $\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightarrow \dots + \text{H}_2\text{O}$

- (a) $\text{Al}(\text{OH})_3$
- (b) Na_2O
- (c) NaAlO_2
- (d) AlNaO_2

Answer: (c) NaAlO_2

Explanation: Alumina, or dialuminum trioxide, is the chemical formula for Al_2O_3 . It's a Lewis acid, to be precise.

Sodium hydroxide is abbreviated as NaOH . It's a solid base. When a base reacts with an acid, the results are usually salt and water.

As a result, lewis acid alumina combines with the base sodium hydroxide to generate salt and water in this reaction.

Q5: Which of the following pairs will give displacement reactions?

- (a) FeSO_4 solution and Copper metal
- (b) AgNO_3 solution and Copper metal
- (c) CuSO_4 solution and Silver metal
- (d) NaCl solution and Copper metal

Answer: (b) AgNO_3 solution and Copper metal

Explanation: The displacement reaction occurs when copper metal and silver nitrate solution are combined, and the chemical equation is: $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$.

Q6: Non-metals form covalent chlorides because

- (a) they can give electrons to chlorine
- (b) they can share electrons with chlorine
- (c) they can give electrons to chlorine atoms to form chloride ions
- (d) they cannot share electrons with chlorine atoms

Answer: (b) they can share electrons with chlorine

Explanation: By sharing electrons, non-metals create covalent bonds with other non-metals. Metals, on the other hand, lose electrons while non-metals gain them through the formation of ionic bonds.

Q7: Which of the following are not ionic compounds?

- (i) KCl
- (ii) HCl
- (iii) CCl_4
- (iv) NaCl

- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (iii) and (iv)
- (d) (i) and (iii)

Answer: (b) (ii) and (iii)

Explanation: Because HCl and CCl_4 are covalent compounds, they are unable to be ionic. Non-ionic compounds contain covalent bonds. Hydrochloric acid (HCl) and carbon tetrachloride (CCl_4) form covalent bonds because two atoms share a pair of electrons.

Since they possess positive and negative ions, sodium chloride (NaCl) and potassium chloride (KCl) form ionic compounds.

Q8: An alloy reacted with dilute hydrochloric acid to produce a gas which 'pops' a lighted splint. The residue reacted with dilute nitric acid to form a blue solution. Which one of the following pairs of metals is present in the alloy?

- (a) Copper and lead
- (b) Lead and magnesium
- (c) Lead and zinc
- (d) Copper and magnesium

Answer: (d) Copper and magnesium

Explanation: When zinc combines with hydrochloric acid, hydrogen gas is produced, which causes a lighted splint to pop. When copper residue combines with dilute nitric acid, it forms a blue solution.

Q9: The process in which a carbonate ore is heated strongly in the absence of air to convert it into metal oxide is called

- (a) Roasting
- (b) Calcination
- (c) Reduction
- (d) Smelting

Answer: (b) Calcination

Explanation: Calcination is the process of converting a carbonate ore into metal oxide by exposing it to high temperatures in the absence of oxygen. Zinc oxide is produced by heating zinc carbonate in the absence of air.

Q10: Which one among the following is an acidic oxide?

- (a) Na_2O
- (b) CO
- (c) CO_2
- (d) Al_2O_3

Answer: (c) CO_2

Explanation: Carbon dioxide is an acidic gas that dissolves with water to produce carbonic acid. Because carbon dioxide does not contain hydrogen, it is not an acid. However, CO_2 dissolves in water to form an acidic solution, just like any other nonmetal oxide.

Q11: Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?

- (i) Au
 - (ii) Cu
 - (iii) Na
 - (iv) K
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- (a) (i) and (ii)
 - (b) (i) and (iii)
 - (c) (ii) and (iii)
 - (d) (iii) and (iv)

Answer: (a) (i) and (ii)

Explanation: Different reduction procedures yield metals that aren't extremely pure. They contain impurities that must be eliminated before pure metals can be obtained. Electrolytic refining is the most common method for purifying impure metals. Electrolytic refining recovers impurities such as gold, silver, platinum group metals, arsenic, selenium, and tellurium.

Q12: Which one of the following four metals would be displaced from the solution of its salts by the other three metals?

- (a) Mg
- (b) Zn
- (c) Ag
- (d) Cu

Answer: (c) Ag

Explanation: Silver is a non-reactive metal that can be easily displaced.

- Ag would be displaced from its salt solution by metals such as Mg, Zn, or Cu.
- The standard reduction potential for the half-reaction Ag is the maximum among the metals. As a result, the Ag^+ ion is the most strong oxidising agent among the metals (ions).
- Other metals lose an electron while the Ag^+ ion gains one.

Q13: An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open. It reacts vigorously with water. Identify the element from the following:

- (a) Na
- (b) Mg
- (c) P
- (d) Ca

Answer: (a) Na

Explanation: Sodium is a soft alkali metal that can be easily cut with a knife.

Soft metals are malleable metals that can be dented, worked, or cut without shattering. The softness of sodium metal allows it to be cut with a knife.

Q14: Galvanisation is a method of protecting iron from rusting by coating it with a thin layer of

- (a) Galium
- (b) Aluminium
- (c) Zinc
- (d) Silver

Answer: (c) Zinc

Explanation: When exposed to air and moisture, iron rusts quickly, and rusting can be prevented by applying a thin layer of zinc to the surface. Galvanisation is the process of applying a zinc coating to iron and steel.

Q15: The electronic configurations of three elements X, Y and Z are X — 2, 8; Y — 2, 8, 7 and Z — 2, 8, 2. Which of the following is correct?

- (a) X is a metal
- (b) Y is a metal
- (c) Z is a non-metal
- (d) Y is a non-metal and Z is a metal

Answer: (d) Y is a non-metal and Z is a metal

Explanation: $X = 1s^2 2s^2 2p^6 = 2, 8 = 10$

It is the electronic configuration of neon.

$Y = 1s^2 2s^2 2p^6 3s^2 3p^5 = 2, 8, 7 = 17$

It is the configuration of the halogen family of chlorine atoms which is non-metal.

$Z = 1s^2 2s^2 2p^6 3s^2 = 2, 8, 2 = 12$

It is the configuration of alkaline earth metals of magnesium atom which is metal.

X is a noble gas

Y is a non-metal

Z is a metal

Practise Questions on Metals and Non-metals MCQ

Q1: Alloys are homogeneous mixtures of a metal with a metal or non-metal. Which among the following alloys contain non-metal as one of its constituents?

- (a) Brass
- (b) Bronze
- (c) Amalgam
- (d) Steel

Answer: (d) Steel

Explanation: Iron is soft and rusts in its pure form. As a result, to change its properties, it is alloyed with another metal. Stainless steel is made up of iron, chromium, and nickel. Steel is an iron-carbon alloy with high carbon content.

Q2: Amalgam is an alloy of

- (a) Mercury
- (b) Copper and Tin
- (c) Lead and Tin
- (d) Copper and Zinc

Answer: (a) Mercury

Explanation: An amalgam is an alloy of mercury with another metal.

Q3: Copper objects lose their shine and form a green coating of

- (a) Copper oxide

- (b) Copper hydroxide and Copper oxide
- (c) Basic Copper carbonate
- (d) Copper carbonate

Answer: (c) Basic Copper carbonate

Explanation: The formation of a copper oxide layer on copper objects causes them to lose their shine over time. When damp air, CO_2 , and water react with a copper object. On the object's surface, it develops a green coating of basic copper carbonate.

Q4: The most abundant metal in the earth's crust is

- (a) Aluminium
- (b) Iron
- (c) Calcium
- (d) Sodium

Answer: (a) Aluminium

Explanation: The percentage abundance of some elements in the earth's crust is as follows:

Oxygen – 46.6%
Aluminium – 8.1%
Calcium – 3.63%
Gold – 0.0011%

However, oxygen is a non-metallic element, whereas aluminium, calcium, and gold are metals. As a result, the most abundant metal in the earth's crust is aluminium.

Q5: What happens when calcium is treated with water?

- (i) It does not react with water.
- (ii) It reacts violently with water.
- (iii) It reacts less violently with water.
- (iv) Bubbles of hydrogen gas formed stick to the surface of calcium.

- (a) (i) and (iv)
- (b) (ii) and (iii)
- (c) (i) and (ii)
- (d) (iii) and (iv)

Answer: (d) (iii) and (iv)

Explanation: The reaction with water is less violent in the case of calcium, and hydrogen begins to float on the surface of the water, generating hydrogen gas bubbles.

The chemical equation for calcium's reaction with water is as follows:

Metal hydroxide and hydrogen gas are the byproducts of a metal's interaction with water.

Metal + steam \rightarrow Metal hydroxide + Hydrogen

Calcium hydroxide and hydrogen gas are formed when calcium combines with cold water.

