CHEMISTRY STUDY MATERIALS FOR CLASS 10
(NCERT Based notes of Chapter -03)

GANESH KUMAR DATE:- 12/06/2021

METALS AND NON-METALS

Question 10: State two ways to prevent the rusting of iron.

Answer : Two ways to prevent the rusting of iron are:

(i) Oiling, greasing, or painting: By applying oil, grease, or paint, the surface becomes water proof and the moisture and oxygen present in the air cannot come into direct contact with iron. Hence, rusting is prevented.

(ii) Galvanisation: An iron article is coated with a layer of zinc metal, which prevents the iron to come in contact with oxygen and moisture. Hence, rusting is prevented.

Q 11: What type of oxides is formed when non-metals combine with oxygen?

Answer : Non-metals combine with oxygen to form acidic oxides.

For example:

$$S_{(s)} + O_{2(g)} \rightarrow SO_{2(g)}$$

(Acidic in nature)

Question 12: Give reasons

(a) Platinum, gold and silver are used to make jewellery.

(b) Sodium, potassium and lithium are stored under oil.

(c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.

(d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.

Answer : (a) Platinum, gold, and silver are used to make jewellery because they are very lustrous. Also, they are very less reactive and do not corrode easily.

(b) Sodium, potassium, and lithium are very reactive metals and react very vigorously with air as well as water. Therefore, they are kept immersed in kerosene oil in order to prevent their contact with air and moisture.

(c) Though aluminium is a highly reactive metal, it is resistant to corrosion. This is because aluminium reacts with oxygen present in air to form a thin layer of aluminium oxide. This oxide layer is very stable and prevents further reaction of aluminium with oxygen. Also, it is light in weight and a good conductor of heat. Hence, it is used to make cooking utensils.

(d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction because metals can be easily extracted from their oxides rather than from their carbonates and sulphides.

Question 13: You must have seen tarnished copper vessels being cleaned with lemon or tamarind juice. Explain why these sour substances are effective in cleaning the vessels.

Answer : Copper reacts with moist carbon dioxide in air to form copper carbonate and as a result, copper vessel loses its shiny brown surface forming a green layer of copper carbonate. The citric acid present in the lemon or tamarind neutralises the basis copper carbonate and dissolves the layer. That is why, tarnished copper vessels are cleaned with lemon or tamarind juice to give the surface of the copper vessel its characteristic lustre.

Question 14: Differentiate between metal and non-metal on the basis of their chemical properties.

Answer :

Metals	Non-metals
Metals are electropositive.	Non-metals are electronegative.
They react with oxygen to form basic oxides.	They react with oxygen to form acidic or neutral oxides.
These have ionic bonds.	These have covalent bonds.
They react with water to form oxides and hydroxides. Some metals react with cold water, some with hot water, and some with steam.	They do not react with water.
They react with dilute acids to form a salt and evolve hydrogen gas. However, Cu, Ag, Au, Pt, Hg do not react.	They do not react with dilute acids. These are not capable of replacing hydrogen.
They react with the salt solution of metals. Depending on their reactivity, displacement reaction can occur.	These react with the salt solution of non- metals.
They act as reducing agents (as they can easily lose electrons).	These act as oxidising agents (as they can gain electrons).

Question 15: A man went door to door posing as a goldsmith. He promised to bring back the glitter of old and dull gold ornaments. An unsuspecting lady gave a set of gold bangles to him which he dipped in a particular solution. The bangles sparkled like new but their weight was reduced drastically. The lady was upset but after a futile argument the man beat a hasty retreat. Can you play the detective to find out the nature of the solution he had used?

Answer : He must have dipped the gold metal in the solution of aqua regia − a 3:1 mixture of conc. HCl and conc. HNO_3. Aqua regia is a fuming, highly corrosive liquid. It dissolves gold in it. After dipping the gold ornaments in aqua regia, the outer layer of gold gets dissolved and the inner shiny layer appears. That is why the weight of gold ornament reduced.

Question 16: Give reasons why copper is used to make hot water tanks and not steel (an alloy of iron).

Answer : Copper does not react with cold water, hot water, or steam. However, iron reacts with steam. If the hot water tanks are made of steel (an alloy of iron), then iron would react vigorously with the steam formed from hot water.

$$\underset{\text{Iron}}{3Fe} + \underset{\text{Steam}}{4H_2O} \longrightarrow \underset{\text{Iron (II, III) oxide}}{Fe_3O_4} + \underset{\text{Hydrogen}}{4H_2}$$

That is why copper is used to make hot water tanks, and not steel.

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