Metals And Non-Metals

Improve your learning

Q. 1. Explain the physical properties of metals with suitable examples.

Answer : Following are the physical properties of the metal:-

a) **Sonority:** Most of the metals produce sounds when they are struck or dropped on the ground. This property of the metal is called sonority. E.g Bells in the temple is made up of metals so that they generate sound when they are struck.

b) **Malleability:** In general most of the metals can be drawn into fine sheets on applying pressure with the help of the hammer. This property is called Malleability. E.g Aluminum foil that we use in covering our food is made from aluminum by hammering it into the shape of thin sheets.

c) **Ductility:** Most of the metals can be hammered into the shape of thin wires. This property of metal is called ductility. E.g electrical wires are drawn from the metal by hammering into it.

d) **Conductivity:** Metals allow the heat and electricity to flow through them. This property of metal is called conductivity. E.g wires are made of copper so that electricity flows through them.

e) **Lustrous:** Generally metals have bright surface. Because of this reason, they are employed in making jewelry. E.g Gold, silver

f) **Density:** They have high density, as a result, they are hard in nature. For example, iron is very hard in nature and is used in making bridges etc so as to withstand the heavyweight.

Q. 2. You are given two samples. How do you distinguish which one is metal and which is non-metal?

Answer : Physical and Chemical Properties of the metals helps us to differentiate between metals and non-metals

PHYSICAL PROPERTIES

A) Metals are commonly hard while non-metals are soft so we can touch the given sample in order to know which one is metal and which one is not.

B) We will strike the given sample and if that produces high pitch sound then it is metal otherwise non-metal.

Chemical Properties

We know that metals are susceptible to rusting but non-metals are not for example when we place the given sample in the air in contact with moisture, if the sample gets rusted then it is metal.

Q. 3. Which metals are used in making jewelry? Why?

Answer : Gold, silver, and platinum are mostly used in making jewelry because

a) They are lustrous so look elegant.

b) They belong to the category of noble metals so do not react with any other substance as a result do not undergo rusting and maintain their shine look.

Q. 4. Which substance liberates hydrogen when reacts with metals?

Answer : Substances like acid, alkali, and water produces Hydrogen (H_2) when they react with metals. However, not all of the metals react with the all acids, bases and water. However, Zinc reacts with all of these three.

Acid reaction with Metals

$Zn+2HCl \rightarrow ZnCl_2 + H_2$

Alkali reaction with Metals

$Zn+2NaOH \rightarrow Na_2ZnO_2 + H_2$

Water reaction with Metals

$Zn+ H_2O \rightarrow ZnO + H_2$

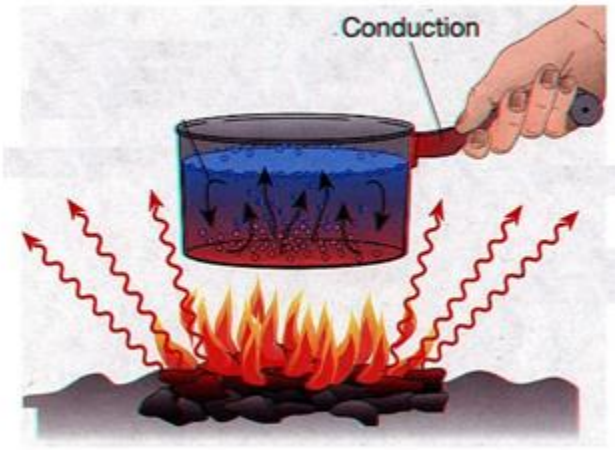
Q. 5. In a chemical reaction, iron is unable to displace zinc from zinc sulphate. Why?

Answer : Zinc is more reactive (Stronger) than iron (Weaker). When the Iron comes in contact with the Zinc Sulphate. Then both iron and zinc fight as both of them wants to get attached to Sulphate. But Zinc being stronger (reactive) than Iron wins the fight and hence Iron is unable to replace zinc from zinc sulphate.

Q. 6. Why don’t cooking pans have metal handles?

Answer : This is because of the fact that metals are a good conductor of heat so if the handle is made up of metal than heat will flow from the base of the cooking pan to the

handle which can burn our hands. For this reason, we have handles made up of plastic as it is an insulator.



As shown in the picture, if the handle is made of metal/conducting substance, then heat will get transferred into your body & our hand will be burnt.

Q. 7. Sulphur dioxide is _____

(a) basic oxide (b) acidic oxide (c) neutral oxide (d) amphoteric oxide

Answer : (b) Reason: SO_2 is acidic oxide since when it comes in contact with water it forms sulfurous acid.

$SO2 + H_2O \rightarrow H_2SO_3$

Q. 8. Match the following:

1) Making into thin sheets	(a) ductility
2) Shinning materials	(b) conductivity
3) Making into wires	(c) sonority
4) Transmission of heat	(d) lustrous
5) Making ringing sound	(e) malleability

Answer : 1) - e

Reason: Malleability means drawing metal into thin sheets.

2) - d

Reason: Lustrous means the materials having shining surface.

3) - a

Reason: Ductility means drawing metals into wires.

4) - b

Reason: Metals are good conductors of heat.

5) - c

Reason: Sonority means the material which produces a ringing sound.

Q. 9. Which gas makes a ‘pop’ sound if exposed to lighted matchstick?

Answer : Hydrogen gas makes a pop sound when exposed to lighted matchstick

Reason: When hydrogen reacts with oxygen to produce water vapor then a lot of heat is produced during the reaction. We know that things expand when they are heated so the heat released during reaction increases the size of air molecules and during that process, some of them get burst as a result, the pop sound is produced.

Q. 10. Why are bells made up of metals instead of wood?

Answer : The bells made up of wood do not produce sound when they are ringed because wood being non-metal is not sonorous.

Metals exhibit the property of the sonority so when they are struck they produce a loud sound. Since the bell purpose is to produce loud sound and that purpose is not served by the wood, therefore, the bells are made up of metal.

Q. 11. Imagine the human life without metals, write briefly about the consequences

Answer : It is very hard to imagine the life without the metals. Life will come to standstill as

a) The cables that we use to transport electricity make use of copper since it is a good conductor of electricity. It is hard to imagine life without electricity

b) Instead of keeping the food in the utensils made from steel we would be using plastic which is not durable.

c) We make use of iron pan since it provides some iron to our body, deficiency of which can lead to anemia.

d) Metals like gold and silver are used in making jewelry we can't imagine our life without ornaments.

Q. 12. After completion of metals and nonmetals chapter, Raheem understood that metals are hard and nonmetals are soft. During the discussion with his brother he came to know that Diamond is the hardest material and it is a nonmetal. Similarly, mercury is a soft material and it is a metal. These findings from the discussion raised some questions in Raheem's mind. Can you guess those questions? Write them.

Answer : Questions that came to mind of Raheem's are as follows

a) Metals are generally hard how can a diamond be the hardest in spite of being non-metal?

b) Mercury belongs to the category of metal and still, it is soft instead of being hard, how?

c) Why diamond being non-metal has luster?

Q. 13. Discuss the acidic and basic nature of the metals and non-metals with suitable experiments.

Answer : Basic Nature of Metals

Procedure to follow to check the acidic nature of metals:

a) Take the small piece of magnesium in a test tube and burn it.

b) Add some distilled water to the remaining of magnesium left in the test tube.

c) Add red litmus paper to it. Note that color of it changes to blue.

Reaction: $Mg + O_2 \rightarrow MgO$

From this, we conclude that metals form basic oxides.

Acidic Nature of Non-metals

Steps to check the Acidic Nature of non-metals

a) Take a Deflagrating spoon (You can make it by wrapping a thin wire around bottle cap.

b) Take a glass jar that has a lid on it.

c) Put some powdered sulphur in the spoon and heat it.

d) As soon as sulphur catches fire, insert the spoon into the glass jar and cover it with the lid.

e) Slowly remove the lid and pour some water into it.

f) Shake the glass jar and add blue litmus paper to it.

g) blue litmus paper changes to red which signifies the acidic nature of non-metals.

Reaction:

$S + O_2 \rightarrow SO_2$

Q. 14. How do you appreciate wide range utility of aluminum right from utensils to space craft?

Answer : Aluminum finds its use from utensils to spacecraft since

a) It is the third most abundant element on the earth so it is cheap and is available.

b) It is highly malleable and ductile so can be drawn into any desired shape without many efforts so the best choice for utensils.

c) It is light weight which makes it the best choice for the spacecraft.

d) Good conductor of electricity so used in electrical wires.

Q. 15. How is malleability of metals used in our daily life?

Answer : Malleability of the metals is very helpful to us in our daily life as:

a) The containers used in the kitchen are made up of metal that is drawn into the required shape as metals are malleable.

b) Metals used in making ornaments such as gold and silver are first drawn into the shape of the necklace, rings etc this is only possible since metals are malleable.

c) Aluminum is drawn into thin foils that are used for covering food and packaging material. This is only possible as aluminum is malleable and can be beaten into the shape of aluminum foil.

Q. 16. Dumping of waste material made up of metals and non-metals leads to environment pollution. Do you support the statement? Give your justification with suitable examples.

Answer : I totally agree with the statement. Following points support my argument :

a) Metals such as Iron, copper are not bio-degradable and takes thousands of year to get decomposed that leads to soil pollution,

b) Metals such as Lead and Mercury should not be thrown away directly as they are poisonous and leads to air and water pollution.

c) Oxides of Carbon and sulphur (non-metals) contribute to acid rain and thus lead to water pollution.

d) Excess of Nitrates (non-metal) in the soil helps in the growth of disease-causing germs which ultimately leads to water pollution.

e) An excess amount of calcium (non-metals) decreases the alkalinity of water which increases the growth of certain microbes and thus leads to water pollution.