METALS AND NON-METALS

C. 1. Difference between the physical state of metals and non-metals: Metals are solid at room temperature except mercury which is liquid whereas non-metals are found in solid, liquid and gaseous state at room temperature like carbon, phosphorus, etc., are solids; bromine is a liquid while hydrogen, nitrogen, etc., are gases.

2. The reaction of metals with oxygen, water and acids shows that metals have different reactivities. Potassium and sodium are the most reactive whereas silver and gold are the least reactive. An arrangement of metals in decreasing order of reactivity is called the reactivity series of metals.

3. Tin is electroplated on iron to make food containers. However, if the tin layer gets scratched, the iron starts rusting at that place. The tin can is then no longer suitable for storing food. Whereas galvanized iron does not rust even if there is a scratch on the zinc layer. This is the advantage of galvanized iron over tin-plated iron.

4. An alloy is a homogeneous mixture of two or more metals or one or more metals and a non-metal (usually carbon). An alloy is usually made by mixing together metals in their molten form. They are also sometimes made by mixing metal powders together.

5. The metals which do not react with water, acids and alkalis, occur in the free state in nature are known as noble metals. Examples: gold, silver, platinum. As they are unreactive, they are used to make ornaments. They do not lose their shine easily.

6. No, a wire cannot be drawn out of wood because wood is not a metal, thus it does not have ductility property.

7. Yes. Solder, an alloy of lead and tin has a melting point much lower than that of lead and tin. 8. It is done by passing an electric current through sulphuric acid using aluminium as anode. Oxygen is evolved at the anode which reacts with aluminium to form a uniform protective layer of aluminium oxide.

D. 1. The property of metals by which they can be beaten into thin sheets is known as malleability, e.g. copper, aluminium. The property of metals by which they can be drawn into thin wires is known as ductility, e.g. gold, silver. Metals are malleable and ductile in nature whereas non-metals are neither malleable nor ductile; they are brittle.

2. Metals react with water to form oxides or hydroxides and hydrogen. Different metals have different reactivities with water. (i) Sodium reacts vigorously with water, giving off a lot of heat. 2Na + 2H2O 2NaOH + H2Z Sodium Water Sodium Hydrogen hydroxide (ii) Magnesium reacts with hot water or steam. Mg + H2O MgO + H2 Magnesium Hot Magnesium Hydrogen water oxide (iii) Zinc reacts only with steam. Zn + H2O ZnO + H2 Zinc Steam Zinc oxide Hydrogen

3. Important uses of copper are: (a) It is widely used to make electric wires and cables. Copper coils are used in several electrical appliances. (b) It is also used to make heating utensils, car radiators and calorimeters. (c) It forms useful alloys.

4. Aluminium protects itself against corrosion upon exposure to air by forming a layer of aluminium oxide. If this layer is made more uniform, it protects the aluminium underneath more effectively. Thus, this is done by a process called anodizing to make it corrosion resistant.

5. Three important uses of hydrogen are: (i) to manufacture ammonia gas, which is used to manufacture fertilizers such as urea and ammonium sulphate. (ii) to extract metals such as copper, lead and tin. (iii) to use in oxy-hydrogen flame, obtained by burning hydrogen in oxygen is used for cutting and welding metals.

 6. The uses of silicon are: (i) in the electronic and computer industries to make devices like transistors, microchips and solar cells. (ii) to manufacture silicones, which are used for making waterproof clothes, greases and polishes. (iii) to make insulating material for electrical appliances.