CBSE Test Paper 05

Chapter 03 Metal and Non Metals

1. Heating pyrites to remove sulphur is called**: (1)**

    a. Roasting
    b. Calcination
    c. Liquation
    d. Smelting

2. A process employed for the concentration of sulphide ore is**: (1)**

    a. Froth floatation
    b. Bessemerisation
    c. Electrolysis
    d. Roasting

3. Metal which is liquid at room temperature is**: (1)**

    a. Sodium
    b. Lead
    c. Mercury
    d. Silver

4. Metals are alloyed to**: (1)**

    A. Decrease hardness.
    B. Lower melting point.
    C. Decrease resistance towards corrosion.
    D. Increase tensile strength.

    a. A and C
    b. All of these
    c. B and D
    d. A and D

5. Before keeping any eatables in the jar, Riya always keeps anhydrous $CaCl_2$ in the bottle to**: (1)**

    a. All of these
    b. To absorb moisture.
    c. Kill germs
    d. To clean the bottle.

6. Name the major metal used for making of aircraft. **(1)**

7. What chemical process is used for obtaining a metal from its oxide? **(1)**

8. What is rust? Write its chemical formula. **(1)**

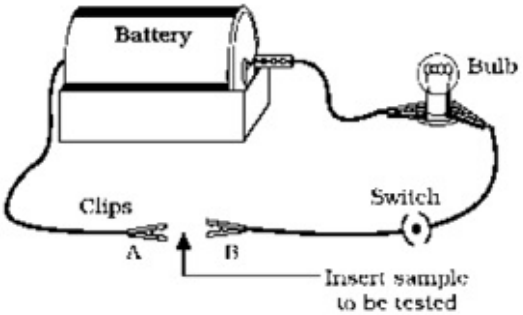
9. Which oxide of iron can be obtained on prolonged reaction of iron with steam? **(1)**

    a. FeO
    b. Fe_2O_3
    c. Fe_3O_4
    d. $Fe_2O_3 \& Fe_3O_4$

10. An ore on heating in air produces sulphur dioxide. Which process would you suggest for its concentration? Describe briefly any two steps involved in the conversion of this concentrated ore into related metal. **(3)**

11. Name an ore of zinc other than zinc oxide. By what process this ore be converted into zinc oxide? **(3)**

12. A student set up an electric circuit as shown in Fig. He placed the metal to be tested in the circuit between terminals A and B as shown. **(3)**



i. Does the bulb glow? What does this indicate?
ii. Why are electric wires coated with rubber like materials?

13. Solid sodium chloride does not conduct electricity whereas molten sodium chloride conducts electricity. Explain. **(3)**

14. How is copper obtained from its ore (Cu_2S)? Write only the chemical equations. How is copper thus obtained refined? Name and explain the process alongwith a labelled diagram. **(5)**

15. i. Name the metal which does not stick to glass?
ii. Name the non-metal which is a good conductor of electricity?
iii. Name the metal which is commonly used in thermit welding?
iv. What gets deposited at the cathode, a pure or impure metal?
v. hat is the nature of Zinc oxide? **(5)**

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Answers

1. a. Roasting

   Explanation: Calcination involves heating to remove volatile matter from an ore such as dolomite. In roasting, pyrites ($CuFeS_2$) is heated in a regular supply of air in a furnace at a temperature below the melting point of the metal. $2Cu_2S + 3O_2$ à $2Cu_2O + SO_2$

2. a. Froth floatation

   Explanation: Froth floatation method is used for removing **gangue** from **sulphide ores**. Collectors and froth stabilisers are added to a suspension of powdered ore in water. Light froth carrying mineral particles are skimmed off and then dried to recover ore particles.

3. c. Mercury

   Explanation: Mercury is a liquid at room temperature. Lead, sodium and silver are solids.

4. c. B and D

   Explanation: Metals are alloyed to improve the properties of metals. An alloy is a homogeneous mixture of two or more metals. They are stronger, harder and more resistant to corrosion. They have a lower melting point and lower thermal conductivity than that of the constituent metals.

5. b. To absorb moisture.

   Explanation: Anhydrous calcium chloride is used to absorb moisture or as a packaging aid to ensure dryness.

6. Duralumin is major metal used for making of aircraft.

7. A metal is obtained from its oxide by the process of reduction.

8. Rust is mainly hydrated iron (III) oxide. Its chemical formula is $Fe_2O_3 . xH_2O$.

9. (c) Fe_3O_4
   $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$

10. The ore on heating produces sulphur dioxide gas so it is a sulphide ore. The method used for its concentration is "froth floatation process". After concentration of the ore following two steps would be followed to convert it into metal.
    (i) Roasting: The sulphide ore is converted into its oxide by heating it in the presence of air.
    $MS + O_2 \rightarrow MO + SO_2 \uparrow$
    (ii) Reduction of metal oxide to metal: The oxide formed by roasting is then reduced to metal by using a suitable reducing agent like carbon (coke).
    $MO + \underset{(Coke)}{C} \rightarrow M + CO$

11. Another ore of zinc is zinc blend (ZnS). Zinc blend is converted into zinc oxide by the process of roasting in air.
    Another ore of zinc is Calamite ($ZnCO_3$). It can be converted into zinc oxide by the process of calcination.

12. i. Yes the bulb glows, this indicates that metal is a good conductor of electricity.
    ii. Rubber like substance is a bad conductor of electricity and prevents from electric shock.

13. The electrical conductivity of sodium chloride is due to the movement of Na+ and Cl ions. In the solid state, the ions cannot move. Therefore, sodium chloride does not conduct electricity in the solid state. In the molten state, the ions are free to move. Therefore, sodium chloride conducts electricity in the molten state.

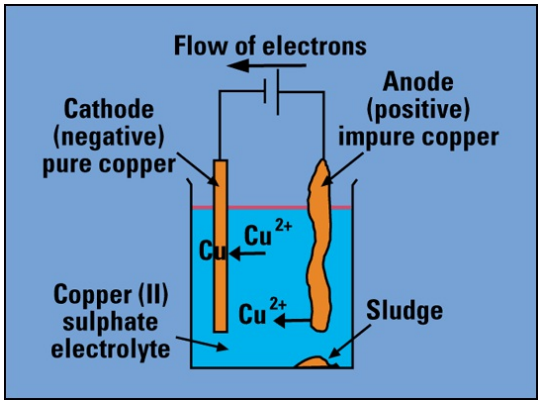
14. Copper is obtained from its ore Copper glance (Cu_2S) in two steps:
    $2Cu_2S\ (s) + 3O_2\ (g) \xrightarrow{Heat} 2Cu_2O\ (s) + 2SO_2\ (g)$
    $2Cu_2O(s) + Cu_2S(s) \xrightarrow{Heat} 6Cu\ (s) + SO_2(g)$
    The Copper thus obtained is refined by the process called "Electrolytic Refining". In this, the impure copper is made anode by connecting to the positive terminal of the battery and a thin plate of pure copper is made cathode by connecting to the negative terminal of the battery. The copper sulphate(acidified) solution is taken in the tank

which acts as an electrolyte. When an electric current is passed through the solution, the pure copper from the anode passes into the solution and an equivalent amount of Cu^{+} ions from the solution are deposited on the cathode as pure copper. Impure copper usually contains the impurities (Fe, Ag, Au) which collects below the anode as "Anode mud".

At cathode : $Cu^{2+}(aq) + 2e^{-} \rightarrow Cu(s)$

At anode : $Cu(s) \rightarrow Cu^{2+}(aq) + 2e^{-}$

The diagram shown below is of electrolytic refining of copper



15. i. Mercury
    ii. Graphite
    iii. Aluminum
    iv. A pure metal is always deposited at the cathode
    v. Zinc oxide (ZnO) is an amphoteric oxide.