CBSE Test Paper 04

Chapter 03 Metal and Non Metals

1. Copper sulphate $(CuSO_4)$ is: **(1)**
   a. Blue in colour.
   b. Green in colour.
   c. Red in colour.
   d. None of these
2. Food cans are coated with tin and not zinc because: **(1)**
   a. Zinc has a higher melting point.
   b. Zinc is less reactive than tin
   c. Zinc is more reactive than tin.
   d. Zinc is costlier than tin.
3. Galvanisation process involves elements zinc and iron. Which of the two metals is sacrificing its life to save the life of the other? **(1)**
   a. None of these
   b. Both sacrifice each other's life
   c. Zn
   d. Fe
4. Match the following with the correct response: **(1)**

(1) Enrichment of ore	(A) Froth floatation process
(2) Extraction of metals	(B) Reduction by carbon
(3) Conversion of oxide form to the metallic form	(C) Roasting
(4) Refining of metals	(D) Electrolysis

   a. 1-C, 2-B, 3-D, 4-A
   b. 1-B, 2-D, 3-A, 4-C
   c. 1-A, 2-C, 3-B, 4-D
   d. 1-D, 2-A, 3-C, 4-B
5. Which element is stored in water and which element is stored in kerosene? **(1)**
   a. Calcium and phosphorus respectively

b. Sodium and phosphorus respectively
c. Phosphorus and sodium respectively
d. Magnesium and sodium respectively

6. Name two elements that are alloyed with iron to make stainless steel. **(1)**
7. Which of the following metals will melt at body temperature? Gallium, Magnesium, Caesium, Aluminium. **(1)**
8. Aluminium occurs in combined state, whereas gold is found in free state in nature. Why? **(1)**
9. An element X on reacting with O_2 forms X Oxide dissolved in water and turns blue litmus paper red. Predict the nature of element whether it is a metal or a non metal. **(1)**
10. What is meant by electrolytic reduction? How is sodium obtained from its molten chloride? Explain. **(3)**
11. i. If vapour of dry ammonia gas are brought in contact with red litmus strip, what will happen to the colour of the litmus strip?
    ii. Name the metal whose foils are used for the packing of food materials. **(3)**
12. Write an equation for the reaction of : Iron with steam. **(3)**
13. A trivalent metal 'X' is manufactured by the process of electrolysis, it is the most abundant metal in Earth's crust. Identify the metal and give its two uses. **(3)**
14. i. An ore, on heating in air, give sulphur dioxide gas. Name the method in each metallurgical step, that will be required to extract this metal from its ore.
    ii. State which of the following reactions will take place or which will not, giving suitable reason for each? **(5)**
    a. $Zn(s) + CuSo_4\,(aq) \rightarrow ZnSO_4\,(aq) + Cu(s)$
    b. $Fe(s) + ZnSO_4(aq) \rightarrow FeSO_4(aq) + Zn(s)$
15. What are the various methods used for concentration of ore/ Ore dressing. **(5)**

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Answers

1. a. Blue in colour.

   Explanation: Hydrated copper sulphate ($CuSO_4$) is blue in colour. When water is then added to anhydrous copper sulphate, it turns into the pentahydrate form, acquiring a blue color, and is commonly known as **blue vitriol**.

2. c. Zinc is more reactive than tin.

   Explanation: Food cans are coated with tin and not zinc because zinc is more reactive than tin. If food cans are coated with zinc, zinc may react with food items and make them unfit for human consumption.

3. c. Zn

   Explanation: Galvanisation is the process of applying a protective coating of zinc to iron to prevent the rusting of iron. The most common method is hot dip galvanizing, in which steel sections are submerged in a bath of molten zinc.

4. c. 1-A, 2-C, 3-B, 4-D

   Explanation: Froth floatation process is a process employed for the concentration or enrichment of a sulphide ore. Roasting is used for the conversion of ore to metal oxide. Reduction by carbon is used for the conversion of oxide to the metallic form. Electrolysis is employed for the refining of metal like copper.

5. c. Phosphorus and sodium respectively

   Explanation: Phosphorus and sodium are highly reactive at room temperature. Phosphorus is stored under water. Sodium reacts with water, hence it is stored under kerosene.

6. Nickel and chromium are used with iron to form stainless steel.
7. Gallium and caesium will melt at 37°C (body temperature).
8. Gold is very less reactive whereas Aluminium is very reactive thus it occurs in combined state.
9. The oxide is acidic in nature as it has turned blue litmus to red. Hence X is a non

metal.

10. By electrolytic reduction metals are extracted by electrolysis of their salts. The metal oxides, hydroxide or chlorides are electrically reduced by this method.
Sodium is obtained by the electrolysis of its molten chloride (Sodium chloride). The sodium metal is deposited at the cathode (the negatively charged electrode), whereas chlorine is liberated at the anode (the positively charged electrode).

At cathode $Na^+ + e^- \longrightarrow Na$

At anode $2Cl^- \rightarrow Cl_2 + 2e^-$

Reaction $NaCl \rightarrow Na^+ + Cl^-$

11. i. NH_3 is basic in nature, but litmus paper needs ions to change its color. As it is seen that NH_3 doesn't have any ion, so it is unable to change the color of litmus.
ii. Aluminium foils are used for the packing of food material

12. When red hot iron reacts with steam to form iron(II,III) oxide and hydrogen.
$Fe\,(s) + 4H_2O\,(g) \rightarrow Fe_3O_4\,(s) + 4H_2\,(g) \uparrow Iron\ Steam$

13. The metal should be aluminium because Aluminium is the most abundant metal in the earth crust and the third most abundant element in nature. Aluminium is trivalent (Al^{3+}) and is prepared by electrolytic refining.
Atomic No. = 13,

Uses.

i. Its alloy, duralumin, is used in making aircrafts.
ii. It is used for making utensils.
iii. Preparing electricity conducting wires

14. i. The ore is Cinnabar (Hg_2S)

Cinnabar is the ore of mercury (Hg) which has low reactivity and can be reduced to mercury by heating alone. So to obtain mercury from cinnabar the only step required is heating strongly in the presence of oxygen called "Roasting". In the first step, cinnabar gets converted to mercuric oxide which on further heating is reduced to mercury.

$2HgS\,(s) + 3\,O_{2\,(g)} + Heat \rightarrow 2\,HgO(s) + 2\,SO_2\,(g)$

$2\ HgO + Heat \rightarrow 2\ Hg\ (l) + O_2\ (g)$

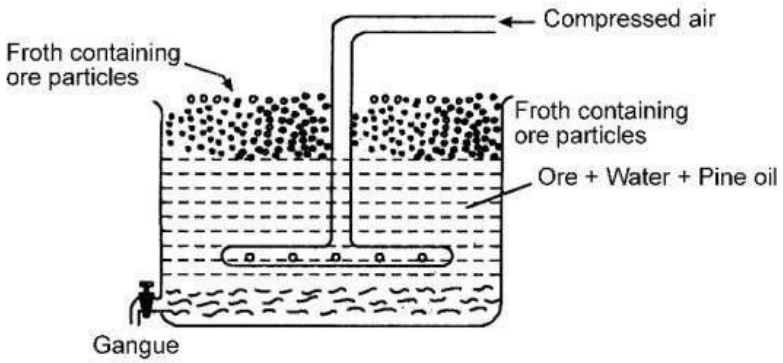
ii. a. This reaction will take place as Zn is more reactive than Cu, so Zn will displace Cu from its salt $CuSO_4$ and will form colourless $ZnSO_4$ solution and reddish brown particles Cu.

b. This reaction will not occur as Fe is less reactive than Zn, so it will not be able to displace Zn from $ZnSO_4$.

15. Concentration of Ore: The process of removal of unwanted impurities like sand, rocky material, earthy particles etc. from the ore is called ore concentration or ore dressing. The finely ground ore is concentrated by any of the following processes:

i. Hydraulic washing: This method depends upon the difference in the densities of the ore particles and the impurities (gangue). The crushed and powdered ore is taken in large wooden tables with small obstacles. A stream of water is passed over the shaking table. The lighter impurities are washed away with the running stream of water while the heavier ore particles are left behind. This method of concentration is usually applicable to oxide ores.

ii. Froth floatation process: This method is used for the extraction of those metals in which the ore particles are preferentially wetted by oil and gangue by water. In this method, the powdered ore is mixed with water containing small quantities of oil (pine oil m eucalyptus oil) in a large tank (Fig.), The water is agitated by blowing air violently when a froth (or foam) is formed. The froth carries the lighter ore particles along with it to the surface. The heavier impurities are left behind in water and these settle to the bottom. Since the ore particles float with the froth at the surface, this process is called froth floatation process. The froth at the surface is transferred into another tank. The froth is broken by adding some acid and ore particles are separated by filtration and dried. For example, the froth floatation process is commonly used for the sulphide ores of copper, zinc, lead et



iii. Magnetic separation: The ores which are attracted by a magnet can be separated from the non-magnetic impurities with the help of magnetic separation method. For example, this method is used for the concentration of haematite, an ore of iron. It consists of a leather belt moving over two rollers, one of which is magnetic in nature. This is shown in the figure. The powdered ore is dropped over the moving belt at one end. At the other end, the magnetic portion of the ore is attracted by the magnetic roller and falls nearer to the roller while the non-magnetic impurities fall farther off.