

### CBSE Test Paper-01

#### Class - 12 Chemistry (General Principles and Processes of Isolation of Elements)

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1. Which solution is used as electrolyte in the extraction of aluminium metal?
  - a.  $\text{Na}_3\text{AlF}_6$
  - b.  $\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$
  - c.  $\text{Al}_2\text{O}_3$  and  $\text{Na}_3\text{AlF}_6$
  - d.  $\text{Al}_2\text{O}_3$
2. The most abundant metal on earth is
  - a. Zinc
  - b. Aluminium
  - c. Copper
  - d. Gold
3. The distillation process is used for the purification of
  - a. Pb
  - b. Hg
  - c. Cs
  - d. Sn
4. Impurities associated with bauxite ore is/are
  - a.  $\text{TiO}_2$
  - b.  $\text{SiO}_2$
  - c. All of these
  - d.  $\text{Fe}_2\text{O}_3$
5. An ore has impurities which are lighter than the ore. The process used for the concentration of ore is
  - a. Froth floatation
  - b. Hydraulic washing
  - c. Magnetic separation
  - d. Leaching
6. The extraction of Au by leaching with NaCN involves both oxidation and reduction.

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Show reactions.

7. Name the depressant which is used to separate ZnS and PbS ores in froth floatation process.
8. An ore sample of galena (PbS) is contaminated with zinc blende (ZnS). Name ore chemical which can be used to concentrate galena selectively by froth flotation method.
9. Name halide ores of:
  - i. Ag
  - ii. K
  - iii. Mg
  - iv. Ca
10. Write chemical reactions taking place in the extraction of zinc from zinc blende.
11. What is the role of depressant in froth floatation process?
12. Name the ores which are concentrated by froth floatation process. What is meant by the term depressant?
13. Which of the ores can be concentrated by magnetic separation method?
14. What is the principle behind chromatography? Name some types of chromatographic techniques.
15. Why extraction the of copper from pyrites is more difficult than that from its oxide ore through reduction?

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## CBSE Test Paper-01

### Class - 12 Chemistry (General Principles and Processes of Isolation of Elements) Solutions

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1. c.  $\text{Al}_2\text{O}_3$  and  $\text{Na}_3\text{AlF}_6$

**Explanation:**  $\text{Al}_2\text{O}_3$  and  $\text{Na}_3\text{AlF}_6$  (molten solution). Aluminium oxide has a very high melting point (over  $2,000^\circ\text{C}$ ), so it would be expensive to melt it. Instead, it is dissolved in molten cryolite, an aluminium compound with a lower melting point than aluminium oxide. The use of cryolite reduces some of the energy costs involved in extracting aluminium.

2. b. Aluminium

**Explanation:** By mass, **aluminium** makes up about 8% of the Earth's crust; it is the third most abundant element after oxygen and silicon and the **most abundant metal** in the crust.

3. b. Hg

**Explanation:** Hg is purified by distillation, which is obtained from cinnabar.

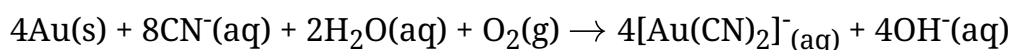
4. c. All of these

**Explanation:** Bauxite ore has silica,  $\text{TiO}_2$  and  $\text{Fe}_2\text{O}_3$  as impurities.

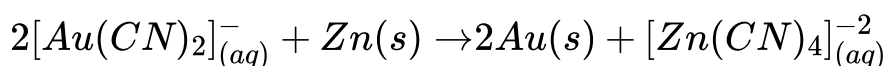
5. b. Hydraulic washing

**Explanation:** This is hydraulic washing or gravity separation. Here when stream of water is passed it takes away all the lighter impurities with it and the heavier ore particles are left behind.

6. In the first reaction Au charges into  $\text{Au}^+$  i.e. its oxidation takes place.



In second reaction,  $\text{Au}^+ + e^- \rightarrow \text{Au}^0$  i.e. reduction takes place.



7. NaCN (Sodium cyanide) is used as depressant to separate ZnS and PbS ores in froth floatation process.

8. NaCN (sodium cyanide) used as a depressant.

9. i. AgCl (Horn silver)

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- ii. KCl (Sylvine)
  - iii.  $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$  (Carnalite)
  - iv.  $\text{CaCl}_2$
10. Zinc blende is  $\text{ZnS}$ . It is roasted in air to give  $\text{ZnO}$  which further reacts with remaining  $\text{ZnS}$  to give  $\text{Zn}$ .
- $$2\text{ZnS(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{ZnO(s)} + 2\text{SO}_2\text{(g)}$$
- $$2\text{ZnO} + \text{ZnS} \rightarrow 3\text{Zn} + \text{SO}_2$$
11. It prevents certain sulphides like  $\text{ZnS}$  to enter the froth in presence of  $\text{PbS}$  therefore, helps in their separation. Sodium Cyanide is used as depressant in separation of  $\text{ZnS}$  from  $\text{PbS}$ .
12. Froth floatation method is used for concentration of sulphide ores. For example,
- $\text{ZnS}$  (Zinc blende)
  - $\text{CuFeS}_2$  (Copper pyrites)
  - $\text{PbS}$  (Galena)
- Depressants are used to prevent certain type of particles from forming the froth. For example,  $\text{NaCN}$  acts as a depressant to separate  $\text{ZnS}$  from  $\text{PbS}$ . It selectively prevents  $\text{ZnS}$  from coming to the froth but allows  $\text{PbS}$  to come with the froth.
13. Ores which are magnetic in nature can be separated from the non-magnetic gangue particles by magnetic separation. For example, ores of iron such as haematite ( $\text{Fe}_2\text{O}_3$ ), magnetite ( $\text{Fe}_3\text{O}_4$ ), siderite ( $\text{FeCO}_3$ ) and iron pyrites ( $\text{FeS}_2$ ) being magnetic can be separated from non magnetic silica and other impurities by magnetic separation method.
14. The principle behind chromatography is that different components of a mixture are differently adsorbed on an adsorbent. Some chromatographic techniques are paper chromatography, column chromatography, gas chromatography etc.
15. The Gibbs free energy of formation of pyrites is less than that of  $\text{H}_2\text{S}$  and  $\text{CS}_2$ . Therefore,  $\text{H}_2$  and  $\text{C}$  cannot reduce  $\text{Cu}_2\text{S}$  to  $\text{Cu}$ . On the other hand, the Gibbs free energy of formation of  $\text{Cu}_2\text{O}$  is greater than that of  $\text{CO}$ . Hence,  $\text{C}$  can reduce  $\text{Cu}_2\text{O}$  to  $\text{Cu}$ .
- $$\text{C}_{(\text{s})} + \text{Cu}_2\text{O}_{(\text{s})} \rightarrow 2\text{Cu}_{(\text{s})} + \text{CO}_{(\text{g})}$$
- Hence, the extraction of copper from its pyrite ore is difficult than from its oxide ore through reduction.
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