

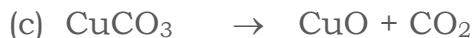
QUIZ: REACTIVITY AND EXTRACTION OF METALS

1. Given below are the following reactions of different metals with their salt solutions:



Arrange the metals, Cu, Fe, Ag and Zn in increasing order of their reactivity.

- (a) $\text{Ag} < \text{Cu} < \text{Fe} < \text{Zn}$
(b) $\text{Ag} < \text{Zn} < \text{Fe} < \text{Cu}$
(c) $\text{Zn} < \text{Fe} < \text{Ag} < \text{Cu}$
(d) $\text{Cu} < \text{Ag} < \text{Fe} < \text{Zn}$
2. A molecule is formed by the combination of two hypothetical atoms, X and Y. The atoms X & Y are bound together by electrovalent bonds. The atomic numbers of X and Y are 11 and 8 respectively. The molecular formula of the molecule is
- (a) XY_2
(b) X_2Y
(c) X_2Y_3
(d) X_3Y_2
3. Which one of the following metals is extracted by converting its ore to the oxide followed by reducing it with a reducing agent to the metal?
- (a) Copper
(b) Silver
(c) Sodium
(d) Zinc
4. Which of the following chemical reactions represents the process of roasting?
- (a) $2\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$
(b) $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$



5. In electrolytic refining of copper, which of the following is/are correct?

- (i) Pure copper is deposited on anode
- (ii) Pure copper is deposited on cathode
- (iii) The impurities settle down at the bottom of anode
- (iv) The impurities settle down on the bottom of cathode.

- (a) (i) only
- (b) (ii) only
- (c) (ii) and (iii) only
- (d) (ii) and (iv) only

6. Electrolytic refining is used to purify impure copper. A sample of copper contains zinc, iron and silver as impurity. During electrolytic refining of copper, which of these metals would dissolve in the electrolyte and which metal/(s) would settle as anode mud?

Options	Anode mud	Dissolve in electrolyte
(a)	Silver only	Zinc and Iron
(b)	Zinc only	Iron & Silver
(c)	Silver & Zinc	Iron
(d)	Zinc & Iron	Silver

7. Which of the following is not correct about the prevention of corrosion of iron?

- (i) By coating iron surface with zinc
- (ii) By coating iron with lead
- (iii) By making its alloy i.e. steel
- (iv) By applying grease over its surface

- (a) (i)

- (b) (ii)
- (c) (iii)
- (d) (iv)

Answers:

1. (a)

Explanation: Silver can be displaced by copper, Cu by Fe and Fe by Zn. It indicates that Zn is more reactive than Fe, Fe is more reactive than Cu and Cu is more reactive than Ag. Thus, Ag is the least reactive and Zn, the most reactive. Among Cu & Fe, Fe is more reactive than Cu [Reaction (iii)]. Hence, the order of reactivity is as given in (a).

2. (b)

Explanation: (i) The electronic configuration of X is 2, 8, 1. It will form stable configuration by losing one electron.

(ii) The configuration of Y is 2, 6. It needs two additional electrons to form a stable electronic configuration.

(iii) One electron each from the two X atoms is transferred to an atom Y. Thus two atoms of X combine with one atom of Y to form a molecule. The molecular formula of the molecule is X_2Y .

Note for teacher: If need be, the question may be made simpler by giving

(i) The number of outermost electrons in each atom X and Y or

(ii) The valency of the two atoms, X & Y .

The learner may be asked to find out the molecular formula.

3. (d)

Explanation: Copper and silver are lower in activity series and their oxides can be converted to the metal directly by heating. Zinc is middle in activity series and its oxide requires a reducing agent for its conversion to metal.

Sodium is towards the top of activity series. It has very high affinity to oxygen. Therefore, its oxide cannot be reduced by any reducing agent.

4. (a)

Explanation: Roasting is the process of heating an ore in the presence of excess of air. In (b), (c) & (d), heating is done in absence of air.

5. (c)

Explanation: Since impure copper is made the anode, copper atoms move as copper ions from anode to cathode. The impurities from anode settle down the anode.

6. (a)

Explanation: Metal impurities (zinc & iron) are more active than copper and would dissolve in CuSO_4 electrolyte. Silver being less active than copper would settle down the anode as anode mud.

Note for the teacher: (i) You may consider only the metals which are more reactive than copper and let the learners comprehend that the metals more reactive than copper would dissolve in the electrolyte.

eg. $\text{Fe} + \text{CuSO}_4 \rightarrow \text{Cu} + \text{FeSO}_4$

(ii) Then consider metals less active than copper. All such metal impurities would settle down the anode as anode mud.

7. (b)

Explanation: Lead is less active than iron. Thus, iron will react preferentially to lead. A more active metal such as zinc would react first with the atmospheric gases (O_2 , H_2O) and would protect iron from corrosion.