

- Q1.** Iqbal treated a lustrous, divalent element M with sodium hydroxide. He observed the formation of bubbles in reaction mixture. He made the same observations when this element was treated with hydrochloric acid. Suggest how can he identify the produced gas. Write chemical equations for both the reactions.
- Q2.** During extraction of metals, electrolytic refining is used to obtain pure metals. (a) Which material will be used as anode and cathode for refining of silver metal by this process? (b) Suggest a suitable electrolyte also. (c) In this electrolytic cell, where do we get pure silver after passing electric current?
- Q3.** Why should the metal sulphides and carbonates be converted to metal oxides in the process of extraction of metal from them?
- Q4.** Generally, when metals are treated with mineral acids, hydrogen gas is liberated but when metals (except Mn and Mg), treated with HNO_3 , hydrogen is not liberated, why?
- Q5.** Compound X and aluminium are used to join railway tracks: (a) Identify the compound X (b) Name the reaction (c) Write down its reaction.
- Q6.** When a metal X is treated with cold water, it gives a basic salt Y with molecular formula XOH (Molecular mass = 40) and liberates a gas Z which easily catches fire. Identify X, Y and Z and also write the reaction involved.
- Q7.** A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y and Z.
- Q8.** The following reaction takes place when aluminium powder is heated with MnO_2
- $$3\text{MnO}_2(\text{s}) + 4\text{Al}(\text{s}) \longrightarrow 3\text{Mn}(\text{l}) + 2\text{Al}_2\text{O}_3(\text{l}) + \text{Heat}$$
- (a) Is aluminium getting reduced? (b) Is MnO_2 getting oxidised?
- Q9.** What are the constituents of solder alloy? Which property of solder makes it suitable for welding electrical wires?
- Q10.** A metal A, which is used in thermite process, when heated with oxygen gives an oxide B, which is amphoteric in nature. Write down the reactions of oxide B with HCl and NaOH .
- Q11.** A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal and its ore and give the reaction involved.
- Q12.** Give the formulae of the stable binary compounds that would be formed by the combination of following pairs of elements.
- (a) Mg and N_2 (b) Li and O_2 (c) Al and Cl_2 (d) K and O_2
- Q13.** What happens when (a) ZnCO_3 is heated in the absence of oxygen? (b) a mixture of Cu_2O and Cu_2S is heated?
- Q14.** A non-metal A is an important constituent of our food and forms two oxides B and C. Oxide B is toxic whereas C causes global warming
- (a) Identify A, B and C.
(b) To which group of Periodic Table does A belong?
- Q15.** Give two examples each of the metals that are good conductors and poor conductors of heat respectively.

- Q16.** Name one metal and one non-metal that exist in liquid state at room temperature. Also name two metals having melting point less than 310 K (37°C).
- Q17.** An element A reacts with water to form a compound B which is used in white washing. The compound B on heating forms an oxide C which on treatment with water gives back B. Identify A, B and C and give the reactions involved.
- Q18.** An alkali metal A gives a compound B (molecular mass = 40) on reacting with water. The compound B gives a soluble compound C on treatment with aluminium oxide. Identify A, B and C and give the reaction involved.
- Q19.** Give the reaction involved during extraction of zinc from its ore by (a) roasting of zinc ore (b) calcination of zinc ore.
- Q20.** A metal M does not liberate hydrogen from acids but reacts with oxygen to give a black colour product. Identify M and black coloured product and also explain the reaction of M with oxygen.
- Q21.** An element forms an oxide A_2O_3 which is acidic in nature. Identify A as a metal or non-metal.
- Q22.** A solution of $CuSO_4$ was kept in an iron pot. After few days the iron pot was found to have a number of holes in it. Explain the reason in terms of reactivity. Write the equation of the reaction involved.
- Q23.** A non-metal A which is the largest constituent of air, when heated with H_2 in 1 : 3 ratio in the presence of catalyst (Fe) gives a gas B. On heating with O_2 it gives an oxide C. If this oxide is passed into water in the presence of air it gives an acid D which acts as a strong oxidising agent.
- (a) Identify A, B, C and D.
- (b) To which group of Periodic Table does this non-metal belong?
- Q24.** Give the steps involved in the extraction of metals of low and medium reactivity from their respective sulphide ores.
- Q25.** Explain the following:
- (a) Reactivity of Al decreases if it is dipped in HNO_3 .
- (b) Carbon cannot reduce the oxides of Na or Mg.
- (c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as well as in molten state.
- (d) Iron articles are galvanised.
- (e) Metals like Na, K, Ca and Mg are never found in their free state in nature.
- Q26.** (a) Given below are the steps for extraction of copper from its ore. Write the reaction involved.
- (i) Roasting of copper (I) sulphide.
- (ii) Reduction of copper (I) oxide with copper (I) sulphide.
- (iii) Electrolytic refining.
- (b) Draw a neat and well labelled diagram for electrolytic refining of copper.
- Q27.** Of the three metals X, Y and Z. X reacts with cold water, Y with hot water and Z with steam only. Identify X, Y and Z and also arrange them in order of increasing reactivity.
- Q28.** An element A burns with golden flame in air. It reacts with another element B, atomic number 17 to give a product C. An aqueous solution of product C on electrolysis gives a compound D and liberates hydrogen. Identify A, B, C and D. Also write down the equations for the reactions involved.
- Q29.** Two ores A and B were taken. On heating ore A gives CO_2 whereas, ore B gives SO_2 . What steps will you take to convert them into metals?

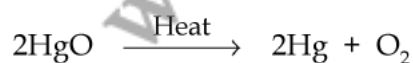
- S1.** The produced gas can be identified by bringing a burning match stick near the reaction vessel, a pop sound is produced



The element is a metal.

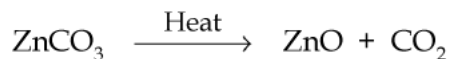
- S2.** (a) Anode : Impure silver
Cathode : Pure silver
(b) Electrolyte: Silver salt, such AgNO₂, AgCl etc.
(c) We get pure silver at cathode
- S3.** It is easier to obtain metal from its oxide, as compared from its sulphides and carbonates.
- S4.** It is because HNO₃ is a strong oxidising agent. It oxidises the H₂ produced to H₂O.
- S5.** (a) X — Fe₂O₃ (b) Thermite reaction.
(c) Fe₂O₃(s) + 2Al(s) —→ 2Fe(l) + Al₂O₃(s) + Heat.
- S6.** X — Na, Y — NaOH, Z — H₂
2Na + 2H₂O —→ 2NaOH + H₂ + Heat energy
- S7.** X — Carbon, Y — Diamond, Z — Graphite.
- S8.** (a) No, because oxygen is added to aluminium therefore, it is getting oxidised.
(b) No, since manganese has lost oxygen therefore, it is getting reduced.
- S9.** Solder is an alloy of lead and tin. Low melting point of solder makes it suitable for welding electrical wires.
- S10.** A — Al; B — Al₂O₃
Al₂O₃ + 6HCl —→ 2AlCl₃ + 3H₂O
Al₂O₃ + 2NaOH —→ 2NaAlO₂ + H₂O
- S11.** Metals low in activity series can be obtained by reducing their sulphides or oxides by heating. Mercury is the only metal that exists as liquid at room temperature. It can be obtained by heating cinnabar (HgS), the sulphide ore of mercury.

The reactions are as follows:



- S12.** (a) Mg₃N₂ (b) Li₂O (c) AlCl₃ (d) K₂O

S13. (a) It undergoes calcination. The chemical reaction can be given as



(b) It undergoes auto reduction forming copper and sulphur dioxide



S14. (a) A is carbon, B is carbon monoxide and C is carbon dioxide

(b) A belongs to Group – 14 of the Periodic Table.

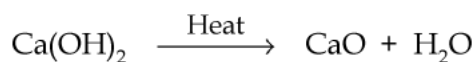
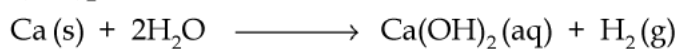
S15. (a) Good conductor : Ag and Cu

(b) Poor conductor : Pb and Hg

S16. Metal – Mercury (Hg); Non-metal – Bromine (Br)

Two metals with melting points less than 310 K are Cesium (Cs) and Gallium (Ga).

S17. A – Ca; B – Ca(OH)₂; C – CaO



S18. A – Na; B – NaOH; C – NaAlO₂



S19. (a) $2\text{ZnS (s)} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{ZnO (s)} + 2\text{SO}_2(\text{g})$

(b) $\text{ZnCO}_3(\text{s}) \xrightarrow{\text{Heat}} \text{ZnO (s)} + \text{CO}_2(\text{g})$

S20. M = Cu; Black product – CuO



S21. Since an oxide of element is acidic in nature, therefore, A will be a non-metal.

S22. Fe is more reactive as compared to Cu. Therefore, Fe displaces Cu from CuSO₄ and forms FeSO₄.



S23. (a) A – N₂; B – NH₃; C – NO; D – HBO₃

(b) Element A belongs to Group – 15 of the Periodic Table.

S24. Sulphide ore of low reactivity metal

↓ Roasting

Metal

↓ Refining

Pure metal

Sulphide ore of medium reactivity metal

↓ Roasting

Oxide

↓ Reduction

Metal

↓ Refining

Pure metal

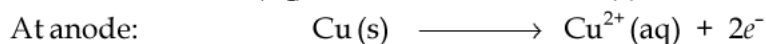
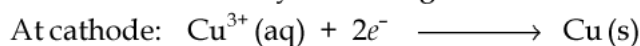
- S25. Hint:** (a) Due to the formation of layer of oxide *i.e.*, Al_2O_3 .
 (b) Na or Mg are more reactive metals as compared to carbon.
 (c) In solid NaCl, the movement of ions is not possible due to its rigid structure but in aqueous solution or molten state, the ions can move freely.
 (d) To protect from corrosion.
 (e) They are highly reactive.

S26. (a) (i) Roasting of sulphide ore

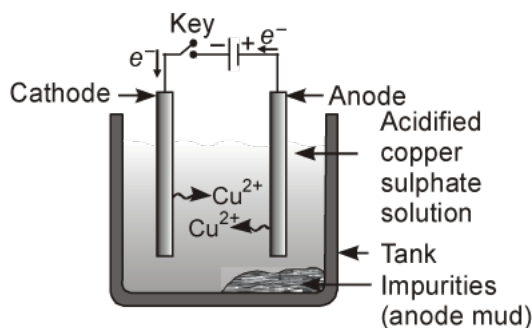


This reaction is known as auto-reduction

(iii) Reaction for electrolytic refining



(b) Diagram for electrolytic refining of copper



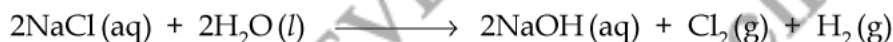
S27. X is alkali metal, Na or K

Y is alkaline earth metal, Mg or Ca

Z is Fe

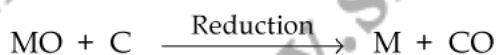
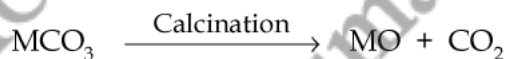
Increasing reactivity series : Na > Mg > Fe.

S28. A = Na; B = Cl₂; C = NaCl; D = NaOH



S29. Since ore A gives CO₂ and ore B gives SO₂. Therefore, ores are MCO₃ and MS.

A can be obtained



B can be obtained

