CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

GENERAL PRINCIPLES AND PROCESSES OF ISOLATION OF ELEMENTS

Exercise Part I Objective Questions Fill In The Blanks

1. Fill in the blanks choosing appropriate word/ words from those given in the brackets : (gravity separation, magnetic separation, absence, presence, $CuFeS_2$, Cu_2S, froth flotation, aluminium, iron, smelting, pure,

impure, mines, copper, silver, sulfide, zinc, chromium nickel, tin, blister copper, Cus, Fes, thermal, electrical, argentite or silver glance (Ag_2S), cuprous oxide, cuprous sulfide.)

Sulfide ores are concentrated by ..... process.

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Exercise Part I Objective Questions Complete The Following Statements By Selecting The Correct Alternative From The Choices Given

1. The process of removal of impurities from a crude metal is called :

A. concentration

B. calcination

C. refining

D. roasting

Answer: C

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2. The impurities present in the ore when mined are called :

A. flux

B. slag

C. gangue

D. None of these

Answer: C

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3. Calcination and roasting are :

A. different names of same operation

B. used for the purification of metals

C. usually carried in the reverberatory furnace

D. employed for the concentration of the ore.

Answer: C

Watch Video Solution

4. Froth floatation process involves the :

A. treatment of the ore with water and pine oil

B. warming of the ore with a stream of water

C. pouring of the ore over the belt rotating over magnetic rollers

D. heating the ore with aluminium

Answer: A

Watch Video Solution

5. Which one is true out of the following

A. All ores are minerals but all minerals are not ores

B. All minerals are ores but all ores are not minerals

C. Both the above statements are wrong.

D. None of these

Answer: A

Watch Video Solution

6. The sulfide ores are generally concentrated by

A. gravity separation

B. froth floatation process

C. magnetic separation

D. liquation

Answer: B

Watch Video Solution

7. Van Arkel method is used for refining

A. lead

B. zinc

C. copper

D. zirconium

Answer: D

Watch Video Solution

8. The metallurgical process in which a metal is obtained in a fused state is called

A. smelting

B. roasting

C. calcination

D. froth floatation

Answer: A

Watch Video Solution

9. Malachite is a mineral containing

A. magnesium

B. aluminium

C. copper

D. tin

Answer: C

Watch Video Solution

10. The extraction of metal from sulfide ore is done by

A. electrolysis

B. smelting process

C. metal displacement

D. none of these

Answer: B

Watch Video Solution

11. Which one of the following are prepared by electrolytic method ?

I. Mg II. S III. Sulfur IV. F_2

A. I and II

B. II and III

C. III and IV

D. I and IV

Answer: D

View Text Solution

12. Which one of the following fluxes is used to remove acidic impurities in metallurgical processes?

A. Silica

B. Sodium chloride

C. Limestone

D. Radium carbonate

Answer: C

Watch Video Solution

13. Refractory materials are used in furnace because they

A. possess great structural strength

B. can withstand high temperature

C. are chemically inser

D. do not require replacement

Answer: B

Watch Video Solution

14. The process of ore dressing is carried out to

A. add flux to the minerals

B. convert the ore to oxide

C. remove the silicous materials

D. remove the poisonous impurities

Answer: C

Watch Video Solution

15. Suggest a purification method for obtaining highly pure silicon used as semiconductor material from the following:

A. Zone refining method

B. Oxidation method

C. Electrochemical refining method

D. Reduction method

Answer: A

Watch Video Solution

16. Reverberatory furnace is employed in the metallurgical process mainly for

A. Reduction of oxide ore

B. smelting of sulfide ore

C. getting magnetic materials

D. conversion of chloride to sulfate

Answer: B

Watch Video Solution

17. The ore having two different metal atoms is

A. haematite

B. galena

C. magnetite

D. copper pyrites

Answer: D

Watch Video Solution

18. In the extraction of chlorine by electrolysis of brine

A. oxidation of Cl^- ion to chlorine gas occurs.

B. reduction of Cl^- ion to chlorine gas occurs.

C. for overall reaction ΔG has negative value.

D. a displacement reaction takes place.

Answer: A

Watch Video Solution

19. When copper ore is mixed with silica in a reverberatory furnace, copper matte is produced. The copper matte contains

A. sulfides of copper (II) and iron (II)

B. sulfides of copper (II) and iron (III)

C. sulfides of copper (I) and iron (II)

D. sulfides of copper (I) and iron (III)

Answer: C

 Watch Video Solution

20. Which of the following reactions is an example of autoreduction ?

A. $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

B. $Cu_2O + C \rightarrow 2Cu + CO$

C. $Cu^{2+}(aq) + Fe(s) \rightarrow Cu(s) + Fe^{2+}(aq)$

D. $Cu_2O + 1/2Cu_2S \rightarrow 3Cu + 1/2SO_2$

Answer: D

Watch Video Solution

21. A number of elements are available in earth's crust but most abundant elements are:

A. Al and Fe

B. Al and Cu

C. Fe and Cu

D. Cu and Ag

Answer: A

Watch Video Solution

22. Zone refining is based on the principle that

A. impurities of low boiling metals can be separated by distillation

B. impurities are more soluble in molten metal than in solid metal.

C. different components of a mixture are differently adsorbed on an adsorbent.

D. vapours of volatile compound can be decomposed to give pure metal.

Answer: B

Watch Video Solution

23. In the extraction of copper from its sulfide ore, the metal is formed by the reduction of Cu_2O with

A. FeS

B. CO

C. Cu_2S

D. SO_2

Answer: C

Watch Video Solution

24. Brine is electrolysed by using inert electrodes. The reaction at anode is

A. $Cl^-(aq) \rightarrow 1/2Cl_2(g) + e^-, E_{\text{cell}} = 1.36V$

B.

$$2H_2O(l) \rightarrow O_2(g) + 4H^+(aq)\,^+ 4e^-, E_{\text{cell}} = 1.23V$$

C. $Na^+(aq) + e^- \rightarrow Na(s), E_{\text{cell}} = 2.71V$

D. $H^+(aq) + e^- \rightarrow 1/2H_2(g), E_{\text{cell}} = 0.00V$

Answer: A

Watch Video Solution

25. In the metallurgy of aluminium

A. Al^{3+} is oxidised to Al(s).

B. graphite anode is oxidised to carbon monoxide and carbon dioxide.

C. oxidation state of oxygen changes in the reaction at anode.

D. oxidation state of oxygen changes in the overall reaction involved in the process.

Answer: B

Watch Video Solution

26. Electrolytic refining is used to purify which of the following metals?

A. Cu and Zn

B. Ge and Si

C. Zr and Ti

D. Zn and Hg

Answer: A

Watch Video Solution

27. Extraction of gold and silver involves leaching the metal with CN^- ion. The metal is recovered by:

A. displacement of metal by some other metal from the complex ion.

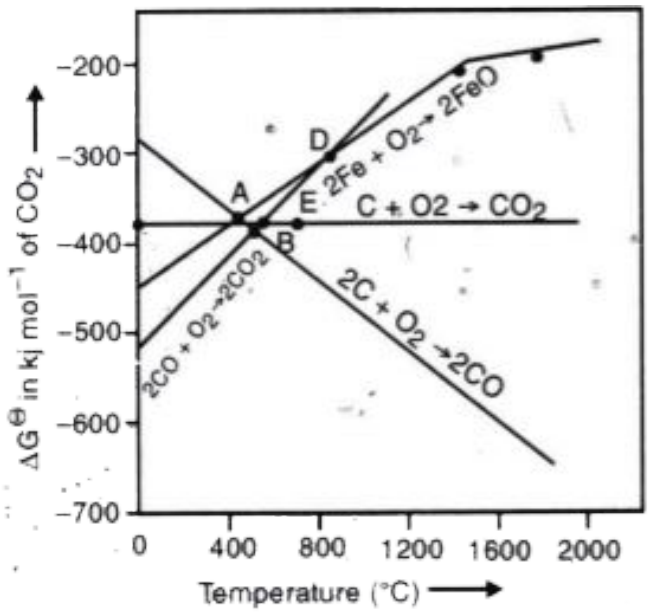
B. roasting of metal complex.

C. calcination followed by roasting.

D. thermal decomposition of metal complex.

Answer: A

 Watch Video Solution



28.

Choose the correct option of temperature at which carbon reduces FeO to iron and produces CO.

A. Below temperature at point A.

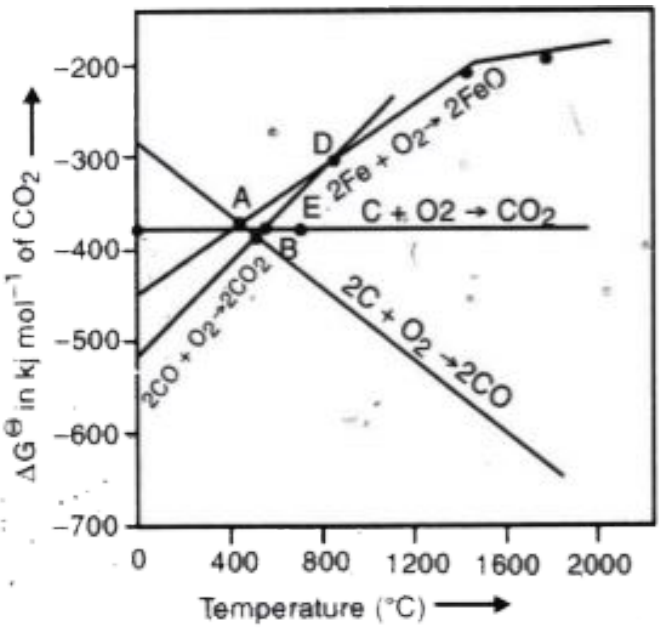
B. Approximately at the temperature corresponding to point A.

C. Above temperature at point A but below temperature at point D.

D. Above temperature at point A.

Answer: D

Watch Video Solution



29.

Below point 'A' FeO can

A. be reduced by carbon monoxide only.

B. be reduced by both carbon monoxide and carbon.

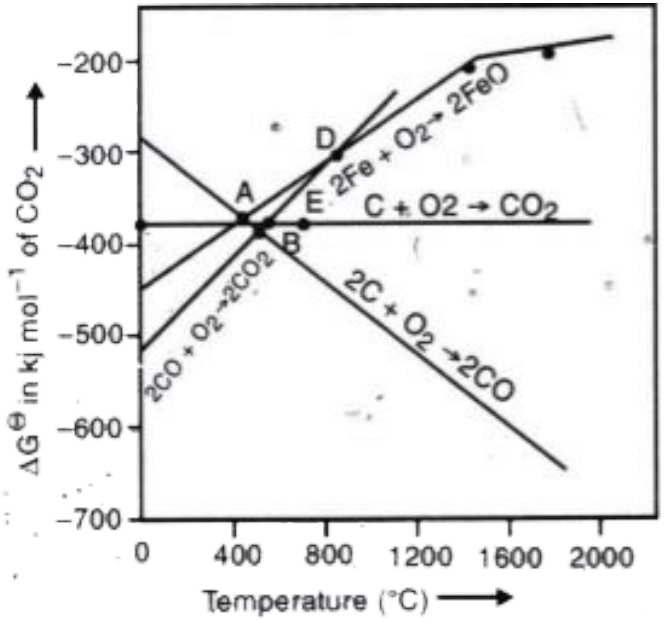
C. be reduced by carbon only.

D. not be reduced by both carbon and carbon monoxide.

Answer: A

Watch Video Solution

30.



For the reduction of FeO at the temperature

corresponding to point D, which of the following statements is correct ?

A. ΔG value for the overall reduction reaction with carbon monoxide is zero.

B. ΔG value for the overall reduction reaction with a mixture of 1 mol carbon and 1 mol oxygen is positive.

C. ΔG value for the overall reduction reaction with a mixture of 2 mol carbon and 1 mol oxygen will be positive.

D. ΔG value for the overall reduction reaction with carbon monoxide is negative.

Answer: D

Watch Video Solution

31. The process of removal of impurities from a crude metal is called :

A. concentration

B. calcination

C. refining

D. roasting

Answer: C

Watch Video Solution

32. The impurities present in the ore when mined are called :

A. flux

B. slag

C. gangue

D. None of these

Answer: C

Watch Video Solution

33. Calcination and roasting are :

A. different names of same operation

B. used for the purification of metals

C. usually carried in the reverberatory furnace

D. employed for the concentration of the ore.

Answer: C

Watch Video Solution

34. Froth floatation process involves the :

A. treatment of the ore with water and pine oil

B. warming of the ore with a stream of water

C. pouring of the ore over the belt rotating over magnetic rollers

D. heating the ore with aluminium

Answer: A

Watch Video Solution

35. Which one is true out of the following

A. All ores are minerals but all minerals are not ores

B. All minerals are ores but all ores are not minerals

C. Both the above statements are wrong.

D. None of these

Answer: A

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36. The sulfide ores are generally concentrated by

A. gravity separation

B. froth floatation process

C. magnetic separation

D. liquation

Answer: B

Watch Video Solution

37. Van Arkel method is used for refining

A. lead

B. zinc

C. copper

D. zirconium

Answer: D

Watch Video Solution

38. The metallurgical process in which a metal is obtained in a fused state is called

A. smelting

B. roasting

C. calcination

D. froth floatation

Answer: A

Watch Video Solution

39. Malachite is a mineral containing

A. magnesium

B. aluminium

C. copper

D. tin

Answer: C

Watch Video Solution

40. The extraction of metal from sulfide ore is done by

A. electrolysis

B. smelting process

C. metal displacement

D. none of these

Answer: B

Watch Video Solution

41. Which one of the following are prepared by electrolytic method ?

I. Mg II. S III. Sulfur IV. F_2

A. I and II

B. II and III

C. III and IV

D. I and IV

Answer: D

Watch Video Solution

42. Which one of the following fluxes is used to remove acidic impurities in metallurgical processes?

A. Silica

B. Sodium chloride

C. Limestone

D. Radium carbonate

Answer: C

Watch Video Solution

43. Refractory materials are used in furnace because they

A. possess great structural strength

B. can withstand high temperature

C. are chemically inser

D. do not require replacement

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Watch Video Solution

44. The process of ore dressing is carried out to

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C. remove the silicous materials

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Watch Video Solution

45. Suggest a purification method for obtaining highly pure silicon used as semiconductor material from the

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C. Electrochemical refining method

D. Reduction method

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Watch Video Solution

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B. smelting of sulfide ore

C. getting magnetic materials

D. conversion of chloride to sulfate

Answer: B

Watch Video Solution

47. The ore having two different metal atoms is

A. haematite

B. galena

C. magnetite

D. copper pyrites

Answer: D

Watch Video Solution

48. In the extraction of chlorine by electrolysis of brine

A. oxidation of Cl^- ion to chlorine gas occurs.

B. reduction of Cl^- ion to chlorine gas occurs.

C. for overall reaction ΔG has negative value.

D. a displacement reaction takes place.

Answer: A

Watch Video Solution

49. When copper ore is mixed with silica in a reverberatory furnace, copper matte is produced. The copper matte contains

A. sulfides of copper (II) and iron (II)

B. sulfides of copper (II) and iron (III)

C. sulfides of copper (I) and iron (II)

D. sulfides of copper (I) and iron (III)

Answer: C

 Watch Video Solution

50. Which of the following reactions is an example of autoreduction ?

A. $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

B. $Cu_2O + C \rightarrow 2Cu + CO$

C. $Cu^{2+}(aq) + Fe(s) \rightarrow Cu(s) + Fe^{2+}(aq)$

D. $Cu_2O + 1/2Cu_2S \rightarrow 3Cu + 1/2SO_2$

Answer: D

Watch Video Solution

51. A number of elements are available in earth's crust but most abundant elements are:

A. Al and Fe

B. Al and Cu

C. Fe and Cu

D. Cu and Ag

Answer: A

 Watch Video Solution

52. Zone refining is based on the principle that _____ .

A. impurities of low boiling metals can be separated by distillation

B. impurities are more soluble in molten metal than in solid metal.

C. different components of a mixture are differently adsorbed on an adsorbent.

D. vapours of volatile compound can be decomposed to give pure metal.

Answer: B

Watch Video Solution

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D. SO_2

Answer: C

Watch Video Solution

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$2H_2O(l) \rightarrow O_2(g) + 4H^+(aq)^+ 4e^-, E_{\text{cell}} = 1.23V$

C. $Na^+(aq) + e^- \rightarrow Na(s), E_{\text{cell}} = 2.71V$

D. $H^+(aq) + e^- \rightarrow 1/2H_2(g), E_{\text{cell}} = 0.00V$

Answer: A

Watch Video Solution

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B. graphite anode is oxidised to carbon monoxide and carbon dioxide.

C. oxidation state of oxygen changes in the reaction at anode.

D. oxidation state of oxygen changes in the overall reaction involved in the process.

Answer: B

Watch Video Solution

56. Electrolytic refining is used to purify which of the following metals?

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B. Ge and Si

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D. Zn and Hg

Answer: A

Watch Video Solution

57. Extraction of gold and silber involves leaching the metal with CN^- ion. The metal is recovered by _____ .

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B. roasting of metal complex.

C. calcination followed by roasting.

D. thermal decomposition of metal complex.

Answer: A

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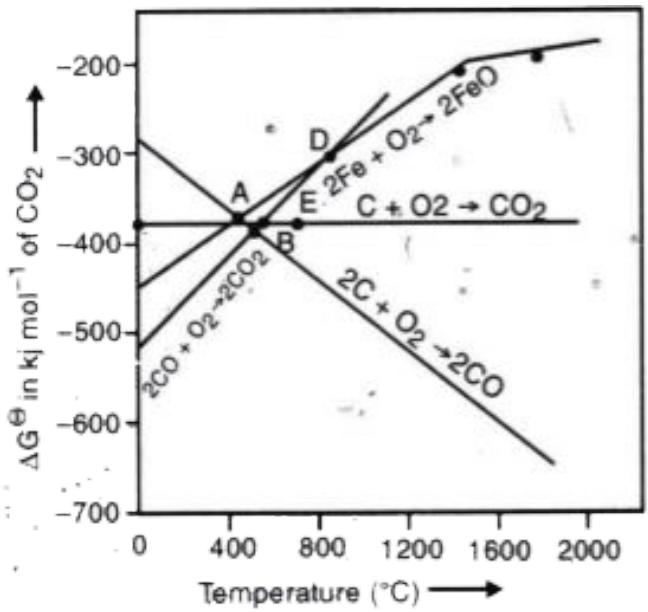
58. 

Choose the correct option of temperature at which carbon reduces FeO to iron and produces CO.

A. Below temperature at point A.

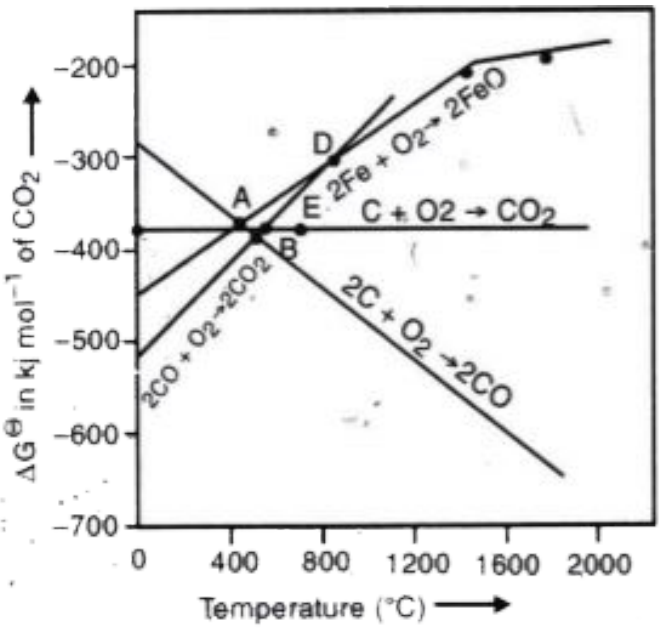
B. Approximately at the temperature corresponding to point A.

C. Above temperature at point A but below temperature at point D.

D. Above temperature at point A.

Answer: D

Watch Video Solution



59.

Below point 'A' FeO can

A. be reduced by carbon monoxide only.

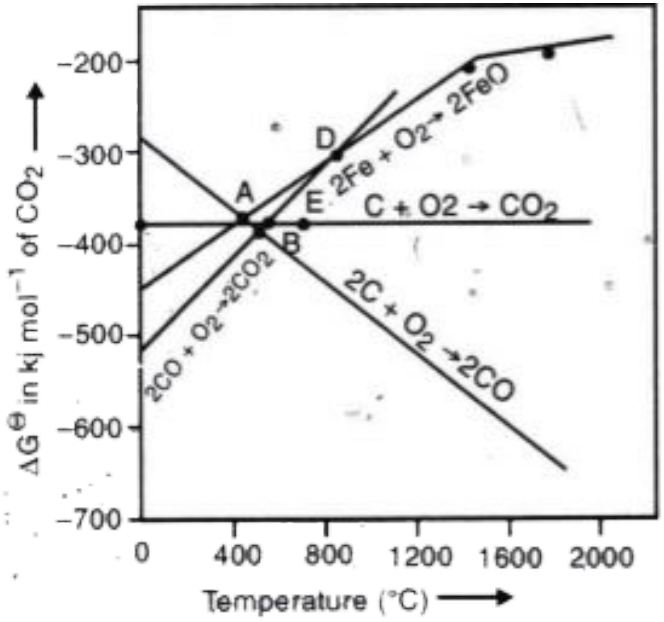
B. be reduced by both carbon monoxide and carbon.

C. be reduced by carbon only.

D. not be reduced by both carbon and carbon monoxide.

Answer: A

Watch Video Solution



60.

For the reduction of FeO at the temperature

corresponding to point D, which of the following statements is correct ?

A. ΔG value for the overall reduction reaction with carbon monoxide is zero.

B. ΔG value for the overall reduction reaction with a mixture of 1 mol carbon and 1 mol oxygen is positive.

C. ΔG value for the overall reduction reaction with a mixture of 2 mol carbon and 1 mol oxygen will be positive.

D. ΔG value for the overall reduction reaction with carbon monoxide is negative.

Answer: D

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61. The process of removal of impurities from a crude metal is called :

A. concentration

B. calcination

C. refining

D. roasting

Answer: C

Watch Video Solution

62. The impurities present in the ore when mined are called :

A. flux

B. slag

C. gangue

D. None of these

Answer: C

 Watch Video Solution

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D. heating the ore with aluminium

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Watch Video Solution

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Watch Video Solution

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Watch Video Solution

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D. zirconium

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Watch Video Solution

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Watch Video Solution

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D. tin

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Watch Video Solution

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C. metal displacement

D. none of these

Answer: B

Watch Video Solution

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B. II and III

C. III and IV

D. I and IV

Answer: D

Watch Video Solution

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C. Limestone

D. Radium carbonate

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Watch Video Solution

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Watch Video Solution

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Watch Video Solution

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B. galena

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D. copper pyrites

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Watch Video Solution

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C. for overall reaction ΔG has negative value.

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Answer: A

Watch Video Solution

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B. sulfides of copper (II) and iron (III)

C. sulfides of copper (I) and iron (II)

D. sulfides of copper (I) and iron (III)

Answer: C

 Watch Video Solution

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A. $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

B. $Cu_2O + C \rightarrow 2Cu + CO$

C. $Cu^{2+}(aq) + Fe(s) \rightarrow Cu(s) + Fe^{2+}(aq)$

D. $Cu_2O + 1/2Cu_2S \rightarrow 3Cu + 1/2SO_2$

Answer: D

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81. A number of elements are available in earth's crust but most abundant elements are:

A. Al and Fe

B. Al and Cu

C. Fe and Cu

D. Cu and Ag

Answer: A

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82. Zone refining is based on the principle that _____ .

A. impurities of low boiling metals can be separated by distillation

B. impurities are more soluble in molten metal than in solid metal.

C. different components of a mixture are differently adsorbed on an adsorbent.

D. vapours of volatile compound can be decomposed to give pure metal.

Answer: B

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B. CO

C. Cu_2S

D. SO_2

Answer: C

Watch Video Solution

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A. $Cl^-(aq) \rightarrow 1/2Cl_2(g) + e^-, E_{\text{cell}} = 1.36V$

B.

$2H_2O(l) \rightarrow O_2(g) + 4H^+(aq)\ ^+4e^-, E_{\text{cell}} = 1.23V$

C. $Na^+(aq) + e^- \rightarrow Na(s), E_{\text{cell}} = 2.71V$

D. $H^+(aq) + e^- \rightarrow 1/2H_2(g), E_{\text{cell}} = 0.00V$

Answer: A

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A. Al^{3+} is oxidised to Al(s).

B. graphite anode is oxidised to carbon monoxide and carbon dioxide.

C. oxidation state of oxygen changes in the reaction at anode.

D. oxidation state of oxygen changes in the overall reaction involved in the process.

Answer: B

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86. Electrolytic refining is used to purify which of the following metals?

A. Cu and Zn

B. Ge and Si

C. Zr and Ti

D. Zn and Hg

Answer: A

Watch Video Solution

87. Extraction of gold and silber involves leaching the metal with CN^- ion. The metal is recovered by _____ .

A. displacement of metal by some other metal from the complex ion.

B. roasting of metal complex.

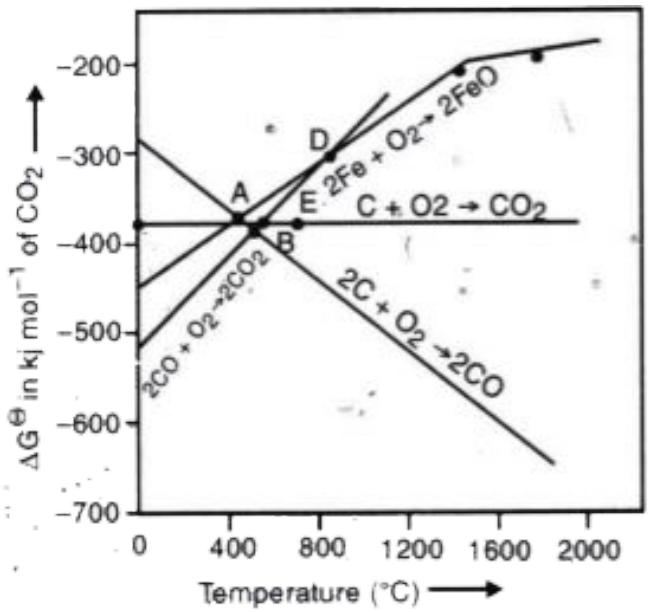
C. calcination followed by roasting.

D. thermal decomposition of metal complex.

Answer: A

Watch Video Solution

88.



Choose the correct option of temperature at which carbon reduces FeO to iron and produces CO.

A. Below temperature at point A.

B. Approximately at the temperature corresponding to point A.

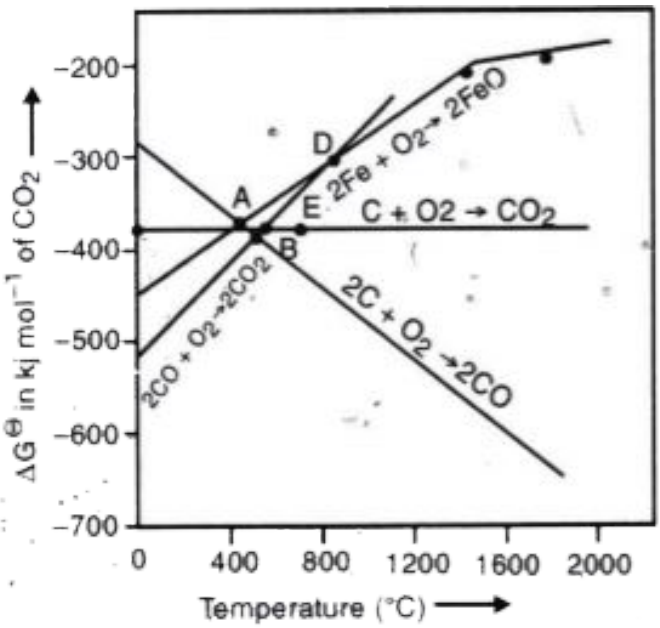
C. Above temperature at point A but below temperature at point D.

D. Above temperature at point A.

Answer: D

Watch Video Solution

89.



Below point 'A' FeO can

A. be reduced by carbon monoxide only.

B. be reduced by both carbon monoxide and carbon.

C. be reduced by carbon only.

D. not be reduced by both carbon and carbon monoxide.

Answer: A

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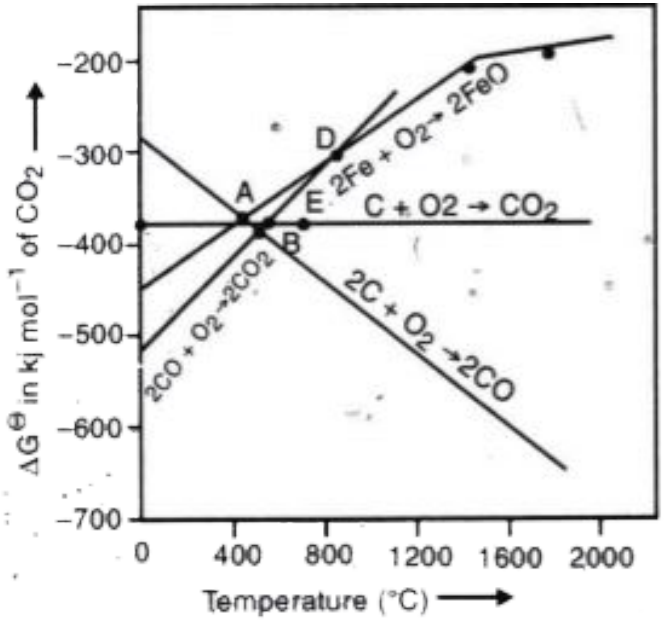
90.



For the reduction of FeO at the temperature

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B. ΔG value for the overall reduction reaction with a mixture of 1 mol carbon and 1 mol oxygen is positive.

C. ΔG value for the overall reduction reaction with a mixture of 2 mol carbon and 1 mol oxygen will be positive.

D. ΔG value for the overall reduction reaction with carbon monoxide is negative.

Answer: D

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Exercise Part I Objective Questions

1. Correct the following statements by changing the underlined part of the sentence :

Argentite is an ore of zinc.

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2. Correct the following statements by changing the underlined part of the sentence :

Brass is an alloy of copper and tin.

Watch Video Solution

3. Correct the following statements by changing the underlined part of the sentence :

Parke's process is used in the extraction of copper.

Watch Video Solution

4. Correct the following statements by changing the underlined part of the sentence :

The surface of copper is covered by a green thin film due to the action of dry air

Watch Video Solution

5. Correct the following statements by changing the underlined part of the sentence :

Aluminium is obtained by $\underline{\text{carbon reduction}}$ of alumina.

Watch Video Solution

6. Correct the following statements by changing the underlined part of the sentence :

Aluminium is mainly extracted from $\underline{\text{corrundum}}$

Watch Video Solution

7. Correct the following statements by changing the underlined part of the sentence :

Aluminium metal is purified by Baeyer's process

Watch Video Solution

8. Correct the following statements by changing the underlined part of the sentence :

Aluminium can be extracted by the electrolysis of an aqueous solution of an aluminium salt.

Watch Video Solution

9. Correct the following statements by changing the underlined part of the sentence :

Argentite is an ore of zinc.

Watch Video Solution

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11. Correct the following statements by changing the underlined part of the sentence :

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Aluminium is mainly extracted from corrundum

Watch Video Solution

15. Correct the following statements by changing the underlined part of the sentence :

Aluminium metal is purified by Baeyer's process

Watch Video Solution

16. Correct the following statements by changing the underlined part of the sentence :

Aluminium $\underline{\text{can be}}$ extracted by the electrolysis of an aqueous solution of an aluminium salt.

Watch Video Solution

17. Correct the following statements by changing the underlined part of the sentence :

Argentite is an $\underline{\text{ore of zinc}}$.

Watch Video Solution

18. Correct the following statements by changing the underlined part of the sentence :

Brass is an alloy of copper and tin.

Watch Video Solution

19. Correct the following statements by changing the underlined part of the sentence :

Parke's process is used in the extraction of copper.

Watch Video Solution

20. Correct the following statements by changing the underlined part of the sentence :

The surface of copper is covered by a green thin film due to the action of $\underline{\text{dry air}}$

Watch Video Solution

21. Correct the following statements by changing the underlined part of the sentence :

Aluminium is obtained by $\underline{\text{carbon reduction}}$ of alumina.

Watch Video Solution

22. Correct the following statements by changing the underlined part of the sentence :

Aluminium is mainly extracted from corrundum

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23. Correct the following statements by changing the underlined part of the sentence :

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Exercise Part I Objective Questions Match The Following

1. Match the following

Match list I (Type of ore) with list II.

List I (Type of ore)	List II (Example)
(*i*) Oxide ore	(*a*) Feldspar
(*ii*) Sulfide ore	(*b*) Barytes
(*iii*) Sulfate ore	(*c*) Fluorspar
(*iv*) Halide ore	(*d*) Galena
	(*e*) Corrundum

Watch Video Solution

2. Match the following

Match the items in column I with those in column II.

Column I	Column II
(*i*) Chalcopyrites	(*a*) Ore of tin
(*ii*) Pyragyrite	(*b*) Ore of copper
(*iii*) Bauxite	(*c*) PbS
(*iv*) Galena	(*d*) Ore of silver
(*v*) Cassiterite	(*e*) $Al_2O_3.2H_2O$

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3. Match the following

Match list I (Type of ore) with list II.

List I (Type of ore)	List II (Example)
(*i*) Oxide ore	(*a*) Feldspar
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Match list I (Type of ore) with list II.

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Watch Video Solution

Exercise Part Ii Descriptive Questions Very Short Answer Questions

1. What is meant by the term native state?

Watch Video Solution

2. When an element is found to occur in the native state?

Watch Video Solution

3. What type of elements are found to occur in the combined state?

Watch Video Solution

4. What is a mineral?

Watch Video Solution

5. What is an ore?

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6. Comment on the statement that all ores are minerals but all the minerals are not the ores.

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7. What do you mean by gangue or matrix ?

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8. What is the difference between a rock and a mineral ?

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9. What type of ores can be concentrated by magnetic separation method ?

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10. Define the term metallurgy.

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11. Which metals are expected to occur in the native state?

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12. List three main steps in the extraction of a metal from its ores.

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Watch Video Solution

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Watch Video Solution

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83. Arrange in descending order of carbon content: Stainless steel, mild steel, cast iron, wrought iron.

Watch Video Solution

84. Name a metal which may be extracted from the respective ore by both electrolytic and carbon reduction process.

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Watch Video Solution

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174. Write a balanced equation for the reaction of argentite with KCN and name the products in solution.

Watch Video Solution

175. Work out the following using chemical equation.

In moist air, copper corrodes to produce a green layer on the surface?

Watch Video Solution

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Exercise Part Ii Descriptive Questions Short Answer Questions

1. Predict the modes of occurrence of the following three types of metals:

(i) Highly reactive (e.g., Na)

(ii) Moderately reactive (e.g., Fe)

(iii) Noble metal (e.g., Au)

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2. Name the chief forms of the occurrence of the following in the earth's crust :

(i) aluminium (ii) calcium (ii) sodium (iv) lead

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3. Discuss some of the factors which need consideration before deciding on the method of extraction of metal from its ore.

Watch Video Solution

4. What is the difference between a rock and a mineral ?

Watch Video Solution

5. How do elements generally occur?

Watch Video Solution

6. What is meant by minerals and ores ? Are all minerals ores?

Watch Video Solution

7. Name the methods used for the concentration of ores.

Watch Video Solution

8. What is calcination and roasting ?

Watch Video Solution

9. Giving appropriate examples (at least three), explain how the reactivity of a metal is related to its mode of occurrence in nature.

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10. The choice of a reducing agent in a particular case depends upon thermodynamic factor. How far do you agree with this statement ? Support your answer with examples.

Watch Video Solution

11. Name three metals which are obtained by the reduction of their oxides though they do not occur as such in earth crust.

Watch Video Solution

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Exercise Part Ii Descriptive Questions Long Answer Questions

1. What are the different methods to obtain concentrated ores?

Watch Video Solution

2. Describe the different steps involved in the extraction of metals from their ores.

Watch Video Solution

3. Explain the following terms used in metallurgy:

(a) Roasting (b) Calcination (c) Smelting

Watch Video Solution

4. Discuss briefly the important methods used to obtain free metal from a roasted or calcinated ore.

Watch Video Solution

5. Describe briefly a process used for the purification of a metal like copper.

Watch Video Solution

6. Describe various methods used for refining of metals.

Watch Video Solution

7. Describe the principle of each of the following processes in detail :

a) Mond's process (b) Zone refining (c) Electrolytic refining

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8. Discuss the electrolytic process to obtain aluminium metal from bauxite.

Watch Video Solution

9. How is copper extracted from copper pyrites ?

Watch Video Solution

10. Name the chief ore of aluminium. Describe briefly the extraction of aluminium from this ore.

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11. Discuss briefly, with equations, the principle of extraction of blister copper from its concentrated

sulfide ore.

Watch Video Solution

12. Describe the steps in the extraction of zinc metal from zinc blende.

Watch Video Solution

13. List the important ores of iron.

Watch Video Solution

14. Write a short note on alloy steels.

Watch Video Solution

15. Discuss the chromatographic method for purification of crude metals.

Watch Video Solution

16. Give uses of aluminium, copper and zinc.

Watch Video Solution

17. What is galvanization? How is galvanization done?

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18. Mention two important substances present in the 'anode mud' obtained in the electrorefining of copper.

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19. What is the main difference in the constituents of bell metal and brass ?

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Isc Examination Questions Part I Objective Questions Complete The Following Statements By Selecting The Correct Alternative From The Choices Given

1. Copper is extracted from its ore by

A. electrolytic reduction

B. auto reduction

C. cyanide process

D. magnetic separation.

Answer: b

2. The process of removing impurity from a crude metal is called

A. concentration

B. calcination

C. refining

D. roasting

Answer: c

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3. Mac Arthur-Forrest process is used for the extraction of

A. aluminium

B. copper

C. silver

D. tin

Answer: c

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4. Copper is extracted from its ore by

A. electrolytic reduction

B. auto reduction

C. cyanide process

D. magnetic separation.

Answer: b

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5. The process of removing impurity from a crude metal is called

A. concentration

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Answer: c

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A. aluminium

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C. silver

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Answer: c

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A. electrolytic reduction

B. auto reduction

C. cyanide process

D. magnetic separation.

Answer: b

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Answer: c

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9. Mac Arthur-Forrest process is used for the extraction of

A. aluminium

B. copper

C. silver

D. tin

Answer: c

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Isc Examination Questions Part Ii Descriptive Questions

1. Write the chemical equations for reactions involved in the extraction of copper from copper pyrites.

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2. Copper pyrites is an ore of copper.

Describe the process by which copper pyrites is concentrated.

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3. Describe all the steps, with equations to convert the concentrated ore to blister copper.

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4. Describe the process of conversion of blister copper to pure copper.

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5. Write balanced equation for the reaction of silver sulfide and sodium cyanide.

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6. Describe the extraction of silver from its sulfide ore by the cyanide process.

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7. Give the balanced equation for the following: Zn is added to sodium argentocyanide.

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8. Give the equations for the conversion of argentite (Ag_2S) to metallic silver.

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9. In the extraction of zinc from zinc blende :

Give an equation to show how zinc oxide is converted to zinc.

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10. In the extraction of zinc from zinc blende :

How is impure zinc finally electro-refined ?

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12. Write the chemical equations for reactions involved in the extraction of copper from copper pyrites.

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13. Copper pyrites is an ore of copper.

Describe the process by which copper pyrites is concentrated.

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14. Describe all the steps, with equations to convert the concentrated ore to blister copper.

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15. Describe the process of conversion of blister copper to pure copper.

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16. Write balanced equation for the reaction of silver sulfide and sodium cyanide.

Watch Video Solution

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Give an equation to show how zinc oxide is converted to zinc.

Watch Video Solution

32. In the extraction of zinc from zinc blende :

How is impure zinc finally electro-refined ?

Watch Video Solution

33. Name the important ore of silver. Write all the steps and reactions in the cyanide process for the extraction of silver from its ore.

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Multiple Choice Questions

1. When lime stone is heated, CO_2 is given off. The metallurgical operation is :

A. Smelting

B. Reduction

C. Calcination

D. Roasting

Answer: C

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2. The process of zone refining is used in the purification of:

A. Al

B. Ge

C. Cu

D. Ag

Answer: B

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3. The ore of chromite is :

A. $FeCr_2O_4$

B. $CoCr_2O_3$

C. $CrFe_2O_4$

D. $FeCr_2O_3$

Answer: A

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4. Aluminium is extracted from alumina (Al_2O_3) by electrolysis of a molten mixture of:

A. $Al_2O_3 + HF + NaAlF_4$

B. $Al_2O_3 + CaF_2 + NaHF_4$

C. $Al_2O_3 + N\ a_2\ AIF_6 + CaF_2$

D. $Al_2O_3 + KF + Na_3AlF_6$

Answer: C

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5. Which of the following is not a sulphide ore?

A. Magnetite

B. Iron pyrites

C. Copper glance

D. Galena

Answer: A

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6. Which of the following pair of metals is purified by Van-Arkel method ?

A. Ga and In

B. Zr and Ti

C. Ag and Au

D. Ni and Fe

Answer: B

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7. Which of the following element is present as the impurity to the maximum extent in the pig iron ?

A. Manganese

B. Carbon

C. Silicon

D. Phosphorus

Answer: B

View Text Solution

8. For which ore of the metal, froth floatation process is used for concentration?

A. Horn silver

B. Bauxite

C. Cinnabar

D. Haematite

Answer: C

View Text Solution

9. Which of the following metal is leached by cyanide process?

A. Ag

B. Na

C. Al

D. Cu

Answer: A

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10. In aluminothermic process, Al is used as:

A. Reducing agent

B. Oxidising agent

C. Catalyst

D. Electrolyte

Answer: A

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11. The temperature of the slag zone in the metallurgy of iron using blast furnace is:

A. $1500 - 1600^{\circ} C$

B. $400 - 700^{\circ} C$

C. $800 - 1000^{\circ} C$

D. $1200 - 1500^{\circ} C$

Answer: C

View Text Solution

12. Which one contains both iron and copper?

A. Cuprite

B. Chalcocite

C. Malachite

D. Copper pyrites

Answer: D

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13. Duralumin is used in aircraft industry for its light weight and high strength. It is an alloy of:

A. Al, Cu, Mg and Mn

B. Al, Zn, Fe and Sn

C. Al, Ti, Ce and Fe

D. Al, Fe, Zn and Sn

Answer: A

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14. Identify the alloy containing a non-metal as a constituent in it:

A. Invar

B. Steel

C. Bell metal

D. Bronze

Answer: B

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15. Which one of the following is an oxide ore?

A. Malachite

B. Copper glance

C. Haematite

D. Zinc blende

Answer: C

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16. The chemical composition of 'slag' formed during the melting process in the extraction of copper is:

A. $Cu_2O + FeS$

B. $FeSiO_3$

C. $CuFeS_2$

D. $Cu_2S + FeO$

Answer: B

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17. The method of zone refining of metals is based on the principle of:

A. Greater mobility of the pure metal than that of the impurity.

B. Higher melting point of the impurity than that of the pure metal.

C. Greater noble character of the solid metal than that of impurity.

D. Greater solubility of the impurity in the molten state than in the solid.

Answer: D

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18. During the process of electrolytic refining of copper, some metals present as impurity settle as 'anode mud'. These are:

A. Pb and Zn

B. Sn and Ag

C. Fe and Ni

D. Ag and Au

Answer: D

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19. Heating ore with carbon in the absence of air is known as:

A. Reduction

B. carbon-reduction

C. Smelting

D. Roasting

Answer: B

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20. Heating pyrites to remove sulphur is called:

A. Smelting

B. Calcination

C. Liquation

D. Roasting

Answer: D

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21. The flux used in the extraction of iron from haematite ore is:

A. Limestone

B. Silica

C. Coke

D. Calcium phosphate

Answer: A

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22. Extraction of zinc from zinc blende is achieved by:

A. Electrolytic reduction

B. Roasting, followed by reduction with carbon

C. Roasting, followed by reduction with another metal

D. Roasting, followed by self-reduction

Answer: B

View Text Solution

23. When lime stone is heated in the absence of air, which gas is evolved?

A. Sulphur dioxide

B. Carbon monoxide

C. Carbon dioxide

D. Chlorine

Answer: C

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Question Based On The Extraction Of Metals

1. The chief ore of copper is copper pyrite ($CuFeS_2$)

How is the sulphide ore concentrated?

A. By Gravity separation process

B. By Froth-floatation process

C. By Electromagnetic separation process

D. By Leaching process

Answer: B

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2. The chief ore of copper is copper pyrite ($CuFeS_2$) Copper is purified by electrolytic refining of blister copper. The correct statement about this process is:

A. Impure copper strip is used as cathode

B. Impurities do not settle as anode mud

C. Pure copper deposits at cathode

D. Acidified silver nitrate is used as electrolyte

Answer: C

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3. For the extraction of metal, answer the following:

The smelting of iron ore in blast furnace involves all the processes except:

A. Combustion

B. Reduction

C. Slag formation

D. Sublimation

Answer: D

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4. For the extraction of metal, answer the following:

Which of the following metal is obtained by leaching the concentrated ore with dilute sodium cyanide solution, followed by treatment with zinc?

A. Aluminium

B. Iron

C. Copper

D. Silver

Answer: D

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5. Copper pyrite or chalcopyrite $(CuFeS_2)$ is the main ore of copper. The extraction of copper from its ore involves, concentration, partial roasting, removal of iron and self-reduction.

On heating the mixture of Cu_2O and Cu_2S, which one of the following will be obtained?

A. Cu_2SO_3

B. $Cu + SO_3$

C. CuO + CuS

D. $Cu + SO_2$

Answer: D

View Text Solution

6. Copper pyrite or chalcopyrite $(CuFeS_2)$ is the main ore of copper. The extraction of copper from its ore involves, concentration, partial roasting, removal of iron and self-reduction.

Iron is removed during the extraction of copper as:

A. FeO

B. FeS

C. $FeSiO_3$

D. Fe_2O_3

Answer: C

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Fill In The Blanks

1. Calcination and roasting process are carried out in ..... furnace. Zinc oxide is reduced by at ..... 1673K to form zinc and..... .

A. reverberatory, coke, carbon monoxide

B. Blast, aluminium, zinc oxide

C. reverberatory, aluminium, zinc oxide

D. Blast, coke, carbon monoxide

Answer: A

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2. Two acidic fluxes are ..... and ..... The two basic fluxes are ..... and ..... .

A. Silicon (Si), Lime (CaO), Borax ($Na_2B_4O_{7.10}H_2O$), Limestone ($CaCO_3$)

B. Lime (CaO), Limestone ($CaCO_3$), Borax ($Na_2B_4O_{7.10}H_2O$), Silicon (Si)

C. Silicon (Si), Borax ($Na_2B_4O_{7.10}H_2O$), Calcium (Ca), Calcium Carbonate ($CaCO_3$)

D. Sand (SiO_2), Borax ($Na_2B_4O_{7.10}H_2O$), Lime (CaO), Limestone ($CaCO_3$)

Answer: D

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3. In electrolytic refining impure metal is made ..... while pure metal act as ..... . The process used for refining of aluminium is known as ..... .

A. Anode, Cathode, concentration of ore

B. Cathode, Anode, Smelting

C. Anode, cathode, Hoope's process

D. Cathode, Anode, roasting

Answer: C

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4. The frothing agent used in froth floatation process is ..... . Levigation generally used in froth floatation process is ..... .

A. Pine oil, nascent hydrogen

B. Pine oil, oxide

C. Liquid benzene, nascent hydrogen

D. Palm oil, Chlorine

Answer: B

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5. The purest form of iron is ..... . Invar contain iron and ..... .

A. wrought iron, nickel

B. Pig iron, zinc

C. cast iron, aluminium

D. Pig iron, nickel

Answer: A

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6. Limonite is the ore of ..... having chemical formula ..... . The actual reducing agent of haematite in blast furnance is ..... .

A. Aluminium, Al_2O_3, nascent hydrogen

B. Zinc, Zns, Coke

C. Silver, Ag_2S, CO

D. Iron, $FeO(OH).nH_2O$, CO

Answer: D

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7. The undesired impurities present in the ores are called ..... . To remove the volatile impurities from the ore, the ..... process is carried out.

A. Gangue, roasting

B. Anode mud, leaching

C. Gangue, Calcination

D. Gangue, Smelting

Answer: C

View Text Solution

8. Flux combines with non-fusible impurities to form ..... CaO acts as a ..... flux.

A. Anode mud, basic

B. Solution, acidic

C. Matrix, acidic

D. Slag, basic

Answer: D

View Text Solution

9. Iron is extracted from its most common ore ..... . Its formula is ..... .

A. Magnetite Fe_2O_4

B. Heamatite, Fe_2O_3

C. Pyrite, FeS_2

D. Limonite, $FeO(OH) - n(H_2O)$

Answer: B

View Text Solution

10. The two valencies exhibited by Iron are ..... and ..... . Iron, when reacts with ..... forms anhydrous Iron (III) chloride.

A. +3, +4, coke

B. +2, +3, Dry chlorine

C. +4, +5, Zinc

D. +1, +2, nascent hydrogen

Answer: B

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Match The Following

1. Match the columns:

Column I	Column II
1 Cyanide Process	(p) Dressing of ZnS
2 Froth Floatation process	(q) Ultra pure Ge
3 Electrolytic reduction	(r) Extraction of Al
4 Zone refining	(s) Purification of Ni

A. 1-(p), 2-(r), 3-(q), 4-(s)

B. 1-(s), 2-(q), 3-(r), 4-(p)

C. 1-(r), 2-(p), 3-(q), 4-(s)

D. 1-(q), 2-(s), 3-(p), 4-(r)

Answer: A

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2. Match the columns:

Column I	Column II
1. Blistered Cu	(p) $2Cu_2O + Cu_2S \rightarrow 6Cu + SO_2$
2. Blast Furnace	(q) Aluminium
3. Reverberatory Furnace	(r) Iron
4. Hall-Heroult process	(s) $FeO + SiO_2 \rightarrow FeSiO_3$

A. 1-(s), 2-(q), 3-(p), 4-(r)

B. 1-(r), 2-(s), 3-(p), 4-(q)

C. 1-(q), 2-(s), 3-(r), 4-(p)

D. 1-(p), 2-(r), 3-(s), 4-(q)

Answer: D

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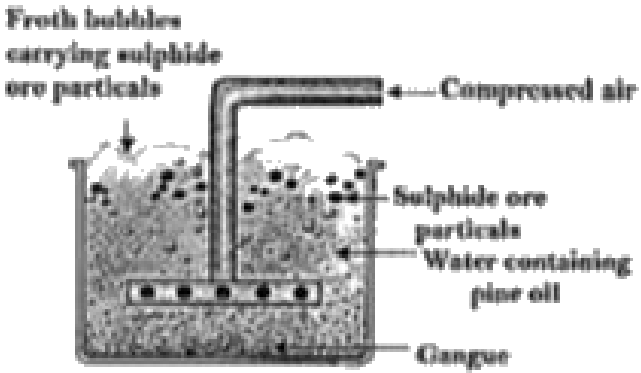
Structure Based Questions

1. Removal of unwanted materials (e.g. sand, clays, etc.) from the one is known as concentration, dressing or benefaction. If involves several steps and selection of these steps depends upon the differences in physical properties of the compound of the metal present and that of the gangue. It also depends upon the type of the metal and the environmental factors. Froth flotation is one of the important method used for the concentration of ores.



Froth floatation process for the concentration of sulphide ores.

Write the principle behind froth flotation process.

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2. Removal of unwanted materials (e.g. sand, clays, etc.) from the one is known as concentration, dressing or benefaction. If involves several steps and selection of these steps depends upon the differences in physical properties of the compound of the metal present and

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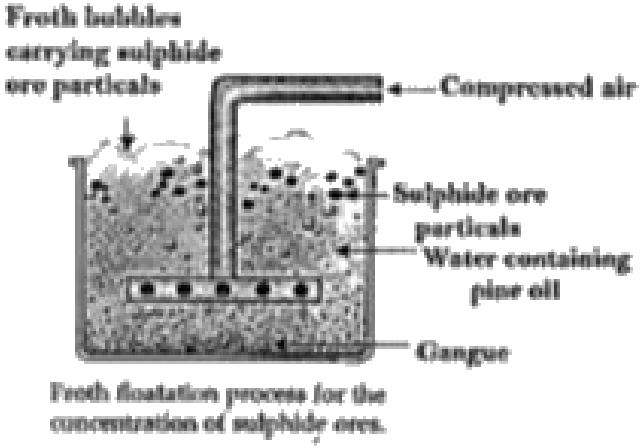

Froth floatation process for the concentration of sulphide ores.

What is the role of collectors and froth stabilisers in this method?

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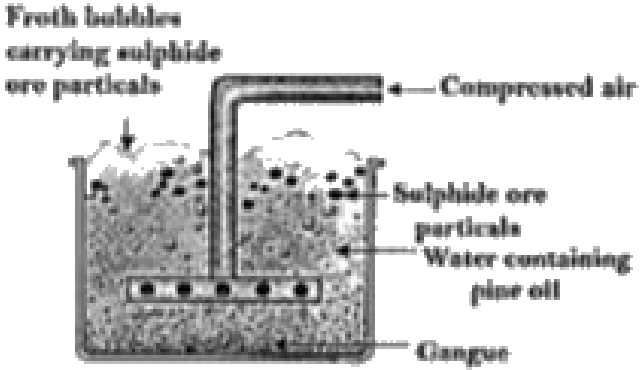
3. Removal of unwanted materials (e.g. sand, clays, etc.) from the one is known as concentration, dressing or benefaction. If involves several steps and selection of these steps depends upon the differences in physical properties of the compound of the metal present and that of the gangue. It also depends upon the type of the metal and the environmental factors. Froth flotation is one of the important method used for the concentration of ores.



Froth floatation process for the concentration of sulphide ores.

Which of the following ore can be concentrated by this and why?

Fe_2O_3, ZnS, Al_2O_3

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4. Removal of unwanted materials (e.g. sand, clays, etc.) from the one is known as concentration, dressing or benefaction. If involves several steps and selection of these steps depends upon the differences in physical properties of the compound of the metal present and that of the gangue. It also depends upon the type of the metal and the environmental factors. Froth flotation is one of the important method used for the

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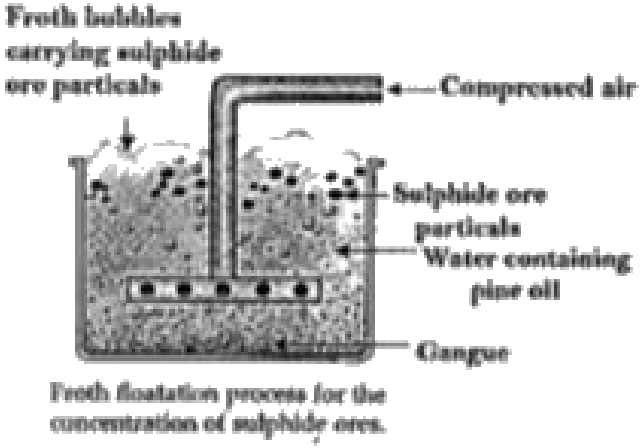

Froth floatation process for the concentration of sulphide ores.

What are depressants and give their significance in froth flotation method?

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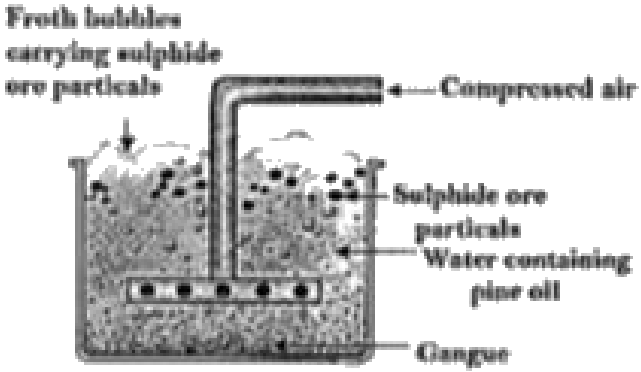

Froth floatation process for the concentration of sulphide ores.

Name any other method used for the concentration of ores.

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Assertion And Reason Based Questions

1. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Minerals are naturally occurring chemical substances in the earth's crust obtainable by mining.

Reason: Minerals are also known as ores.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: C

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2. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Roasting is a process in which the ore is heated strongly in presence of air.

Reason: Concentration of sulphide ore is done by calcination.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: C

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3. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct

choice as:

Assertion: Levigation is used for the separation of oxide ores from impurities.

Reason: Ore particles are removed by washing in a current of water.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: C

View Text Solution

4. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Reduction of a metal oxide is easier if the metal formed is in liquid state at the temperature of reduction.

Reason: The entropy is lower if the metal is in liquid state.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: C

View Text Solution

5. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Leaching is a process of concentration.

Reason: Leaching involves treatment of the ore with a

suitable reagent so as to make it soluble while impurities remains insoluble.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: A

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6. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Nitrate ores are very rare.

Reason: Bond dissociation energy of N_2 is very high.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: A

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7. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Reduction of the metal oxide usually involves heating it with some other substance acting as a reducing agent.

Reason: The reducing agent combines with the oxygen of the metal oxide.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: B

View Text Solution

8. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct

choice as:

Assertion: Cu is leached out using acid or bacteria.

Reason: The solution containing Cu^{2+} is treated with scrap iron or H_2.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: B

View Text Solution

9. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: In froth floatation method, collectors such as pine oil or xanthates are added to the suspension of powdered ore.

Reason: Collectors stabilise the froth.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: C

View Text Solution

10. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Iron pyrite is not useful in the extraction of Fe.

Reason: SO_2 polluting gas is produced during extraction.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: A

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11. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct

choice as:

Assertion: Volatile matter escapes during calcination leaving behind the metal oxide.

Reason: Calcination is a process of converting metal ore into oxide by heating.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: A

View Text Solution

12. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Burning of coke supplies all the heat required in a blast furnace.

Reason: In a blast furnace reduction of iron oxides takes place at different ranges.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: B

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13. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Cast iron is hard and brittle.

Reason: Cast iron is the purest form of iron.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: C

View Text Solution

14. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct

choice as:

Assertion: At temperatures above 1073 K (approx.), coke will reduce FeO and will itself be oxidised to CO.

Reason: At temperatures above 1073 K, the C, CO line comes below the Fe, FeO line in Ellingham diagram.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: A

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15. In the following question, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

Assertion: Ellingham Diagram cannot indicate whether a reaction is possible or not.

Reason: Ellingham Diagram is not based on thermodynamic approach.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. both assertion and reason are false.

Answer: D

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