



CHEMISTRY

ALLEN

METALLURGY

Examples

1. Magnetic separation is used for increasing concentration of the
:

A. Horn silver

B. Calcite

C. Hamatite

D. Magnesite

Answer: C



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2. Haematite ore having magnetic property can be separated by magnetic separation In blast furnace, iron oxide is reduced by-

A. Silica

B. CO

C. C

D. lime stone

Answer: B



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3. Steel consists of.....percentage of carbon-

- A. 3.1 – 4.5 %
- B. 2.2 – 3.1 %
- C. 0.15 – 0.28 %
- D. 0.15 – 1.5 %

Answer: D



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4. Refining of Iron is done by-

- A. Electrolytic method
- B. Zone refining
- C. Poling

D. Selective oxidation

Answer: C



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5. Sulphide ore of Iron is-

A. limonite

B. Siderite

C. Pyrites

D. Magnetite

Answer: C



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6. The atmosphere maintained in the hearth of blast furnace-

A. Reducing

B. Oxidising

C. Neutral

D. Acidic

Answer: A



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7. Exothermic reactions taking place in.....zone-

A. Central zone

B. Combustion zone

C. Fusion zone

D. Reduction zone

Answer: B



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8. Matte is obtained after this step-

A. Froth floatation

B. Roasting

C. Smelting

D. Refining

Answer: C



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9. Copper glance is.....type of ore-

A. Carbonate

B. Sulphides

C. Oxide

D. Sulphate

Answer: B



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10. High purity copper is obtained by

A. Zone refining

B. Poling

C. Electrolytic refining

D. Cupelling

Answer: C



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11. Copper matte consists of:-

- A. Copper oxide and ferrous sulphide
- B. Copper sulphide and ferrous oxide
- C. Copper sulphide and ferrous sulphide
- D. Copper oxide and ferrous oxide

Answer: C



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12. Reducing agent used for reduction of copper oxide in blast furnace is:-

- A. Coke
- B. Lime stone
- C. Aluminium
- D. No reducing agent is used

Answer: D



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13. Product obtained after Bessemerisation is called as.....because.....

- A. Concentrated copper, copper percentage is high
- B. Copper matte, of its appearance

C. Blister copper, of its appearance

D. Ultra pure copper, 100 percent copper

Answer: C



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Exercise 01

1. Name :

The most abundant elements in the earth's crust .

A. Tin

B. Hydrogen

C. Silicon

D. Oxygen

Answer: D



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2. Which of the following element is found in its native state:-

A. Sodium

B. Gold

C. Silver

D. Both (B) and (C)

Answer: D



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3. Which of the following contain both calcium and magnesium:-

A. Magnetite

B. Calamine

C. Carnalite

D. Dolomite

Answer: D



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4. Which of the following is not an ore of iron ?

A. Haematite

B. Limonite

C. Cassiterite

D. Magnetite

Answer: C



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5. Litharge is a mineral of

A. Magnesium

B. Lithium

C. Lead

D. Zinc

Answer: C



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6. Which one is mineral of manganese

A. Magnesite

B. Malachite

C. Magnetite

D. Pyrolusite

Answer: D



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7. Calamine is

A. $BaCO_3$

B. $ZnCO_3$

C. ZnS

D. ZnO

Answer: B



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8. Black Jack is

- A. Silicate ore
- B. Oxide ore
- C. Carbonate ore
- D. Sulphide ore

Answer: D



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9. Pyrolusite is

A. MnO

B. Mn_3O_2

C. SnO_2

D. MnO_2

Answer: D



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10. The impurities present in the ore is called

A. Slag

B. Flux

C. Alloy

D. Gangue

Answer: D



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11. Leaching method is used to concentrate the ores of

- A. Gold
- B. Silver
- C. Aluminium
- D. All of these

Answer: D



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12. Which of the following can be obtained by hydrometallurgy

A. Copper

B. Gold

C. Silver

D. All of these

Answer: D



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13. Which is wrongly matched

A. Gun metal- $Cu + Zn + Sn$

B. Duralumin - $Cu + Al + Mn$

C. German silver- $Cu + Zn + Ni$

D. Electron- $Pb + Sn$

Answer: D



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14. The process of converting hydrated alumina into anhydrous alumina is called

- A. Roasting
- B. Calcination
- C. Smelting
- D. Dressing

Answer: B



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15. 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



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16. Blister copper is

- A. Pure copper
- B. Ore of copper

C. Alloy of copper

D. Copper having 2 % impurity

Answer: D



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17. Among the following pairs of oxides, In which pair both are reduced by carbon

A. SnO_2 , MnO_2

B. Fe_2O_3 , PbO

C. ZnO , K_2O

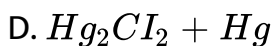
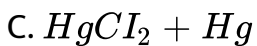
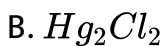
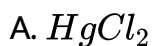
D. CaO , Cr_2O_3

Answer: B



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18. Calomel is the name of



Answer: B



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19. Hydrometallurgy method is used for the extraction of which of the following metals?



B. $Ag \& Cu$

C. $Zn \& Hg$

D. $Hg \& Cu$

Answer: B



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20. Heating pyrites to remove sulphur is called

A. Roasting

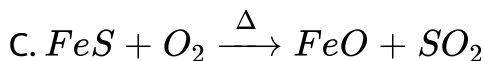
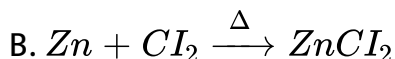
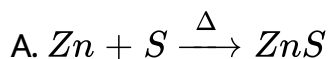
B. Calcination

C. Smelting

D. Froth-floatation

Answer: A

21. Write the reaction in which "Philosopher's wool" is formed ?



Answer: D

22. Which of the following metals are extracted by using *Al* as reducing agent ?



B. Cr from Cr_2O_3

C. Mn from MnO_2

D. Fe from Fe_2O_3

Answer: A



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23. The correct ste of carbonate ores is

(a) Magnesite (b) Siderite (c) Zincite (d) Argentite

A. a,b

B. a,d

C. c,d

D. b,c

Answer: A



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24. Calcination is the process of heating the ore strongly in the ____ of air.

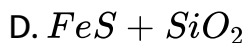
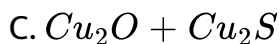
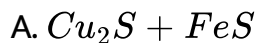
- A. in inert gas
- B. in the presence of air
- C. in the absence air
- D. in the presence of CaO and MgO

Answer: C



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25. Copper matte consists of:-



Answer: A



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26. Which of the following statements is correct for roasting

A. convert sulphide to oxide

B. Convert sulphide to carbonate

C. Remove arsenic and sulphur impurities

D. melt the ore

Answer: D



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27. Among the following statements, the incorrect one is

- A. Cassiterite ore of tin contains the impurities of Wolframite which are separated by electromagnetic separation.
- B. Tin metal is obtained by the carbon reduction of black tin
- C. In the extraction of lead from galena, the roasting and self-reduction are carried out in the same furnace at different temperature.
- D. None of these

Answer: D



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28. Fe can displace which of the following ions from their aqueous solutions?

(a) Na^+ (b) Zn^{2+} (c) Cu^{2+} (d) Ag^+

A. a & b

B. b & c

C. c & d

D. b,c,d

Answer: C



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29. There are following extraction process of silver but not :

- A. as a side product in electrolytic refining of copper
- B. Parke's process in which Zn is used to extract silver by solvent extraction from molten lead
- C. by reaction of silver sulphide with KCN and then reaction of soluble complex with Zn
- D. by heating $Na[Ag(CN)_2]$

Answer: D



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30. Which of the following is not an ore:

- A. malachite

B. calamine

C. stellite

D. cerussite

Answer: C



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31. In the Pidgeon process, Mg is produced by:

A. electrolysis of fused $MgCl_2$

B. reducing calcined dolomite with ferrosilicon at
high temperature under pressure

C. both are correct

D. none is correct

Answer: B



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32. Fool's gold is

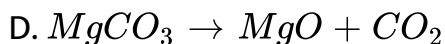
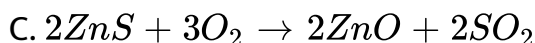
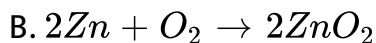
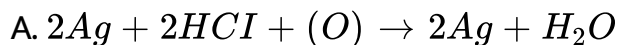
- A. iron pyrites
- B. horn silver
- C. copper pyrites
- D. bronze

Answer: A



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33. Which one of the following reactions is an example for calcination process?

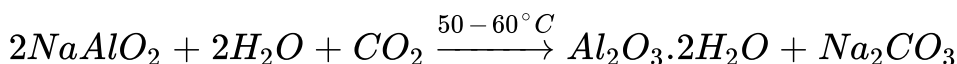
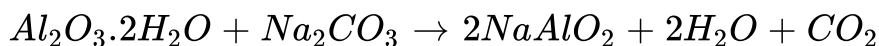


Answer: D



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34. Identify the process to which the following reaction belongs

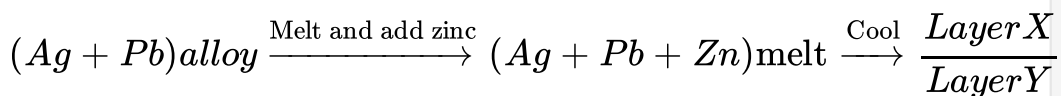


- A. Hall's process
- B. Baeyer's process
- C. Serpeck's process
- D. None of these

Answer: A

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35.



Select correct statements based on above scheme:

- A. Layer X contains zinc and silver
- B. Layer Y contains lead and silver but amount of silver in this layer is smaller than in the layer X

C. X and Y are immiscible layers

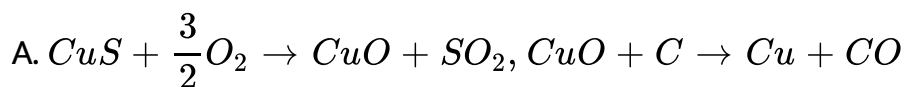
D. All are correct statements

Answer: D

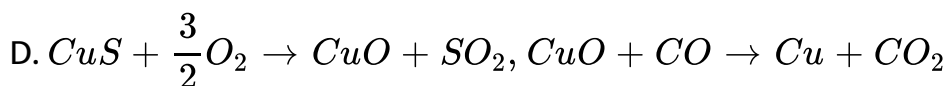
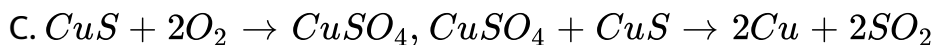
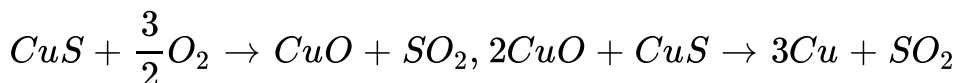


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36. Formation of metallic copper from sulphide ore in the normal thermometallurgical process essentially involves which of the following reactions



B.



Answer: B



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37. Bessemerisation is carried out for

(i) Fe (ii) Cu (iii) Al (iv) silver

A. i,ii

B. ii,iii

C. iii,iv

D. i,iii

Answer: A



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38. Consider the following statements :

Roasting is carried out to :

1. Convert sulphide into oxide
2. Melt the ore
3. Remove moisture, water of hydration and expel organic matter
4. Remove sulphur and arsenic in the form of volatile oxides

Out of these statements :

- A. (i),(ii) and (iii) are correct
- B. (i) and (iv) are correct
- C. (i),(ii) and (iv) are correct
- D. (ii),(iii) and (iv) are correct

Answer: C



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39. For extraction of sodium from $NaCl$, the electrolytic mixture $NaCl + Na_3AlF_6 + CaCl_2$ is used. During extraction process, only sodium is deposited on cathode but K and Ca do not because

A. Na is more reactive than K and Ca

B. Na is less reactive than K and Ca

C. NaCl is less stable than Na_3AlF_6 and $CaCl_2$

D. the discharge potential of Na^+ is less than that of K^+ and Ca^{2+} ions

Answer: D



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40. Among the following statements the incorrect one is:

- A. Calamine and siderite are carbonates
- B. Argentite and cuprite are oxides
- C. Zinc blende and pyrites are sulphides
- D. Malachite and azurite are ores of copper

Answer: B



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41. Pb and Sn are extracted from their chief ore respectively by

- A. Carbon reduction and self reduction respectively
- B. Self reduction and carbon reduction respectively
- C. Electrolysis and self reduction respectively
- D. Self reduction and electrolysis respectively

Answer: B



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Exercise 02

1. Statement-1: In cyanide process for the extraction of gold and silver from their native ores, the cyanide solution acts as a reducing agent

to reduce the gold and silver compounds present in the ores, into the metallic states.

Statement-2: In the extraction of gold and silver the cyanide solution acts as complexing reagent in the presence of air and form their respective soluble complexes.

A. a reducing agent

B. a complexing agent

C. and oxidizing agent

D. a lewis base

Answer: B::D



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2. Dolomite is mineral whose formula is

A. $CaCO_3 \cdot MgCO_3$

B. $Cu_2SFe_2S_3$

C. CdS

D. ZnS

Answer: A



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3. Which of the following ores is a double salt composition

A. Carnallite

B. Alum

C. Dolomite

D. Cerrusite

Answer: A::B::C



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4. The following metal-ore combination is correct

A. Pb-Galena

B. Fe-siderite

C. Al-Bauxite

D. Mn-Magnesite

Answer: A::B::C



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5. $NaCN$ used in the froth floatation method for the purification of ore is

A. ZnS which contain PbS

B. Cu_2S which contain Fe_2S_3

C. PbS which contain ZnS

D. PbS which contain SiO_2

Answer: C



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6. Which of the following metals cannot be extracted by the smelting process ?

Al, Zn, Fe and Pb.

A. Lead

B. Zinc

C. Iron

D. Aluminium

Answer: D



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7. Give reason : Reduction of Cr_2O_3 with Al is thermodynamically feasible, yet it does not occur at room temperature.

- A. Smelting
- B. Roasting
- C. Calcination
- D. Aluminothermic process

Answer: D



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8. Which metal is leached from its ore by the use of KCN

- A. Copper
- B. Zinc

C. Gold

D. Iron

Answer: C



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9. Name the flux to remove the impurity of SiO_2

A. P_4O_{10}

B. CaO

C. N_2O_5

D. Al_2O_3

Answer: B



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10. Mercury containers are made of

A. Fe

B. Pb

C. Sn

D. Zn

Answer: A



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11. Auto-reduction process is used for the extraction of :

A. $Cu \& Pb$

B. $Zn \& Hg$

C. $Cu \& Al$

D. $Fe \& Pb$

Answer: A



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12. When Alumina is electrolysed in presence of cryolite, the gas liberated at graphite anode is

A. F_2

B. O_2

C. CF_4

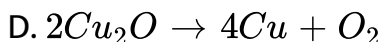
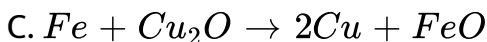
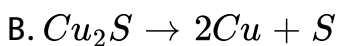
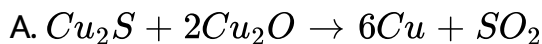
D. CI_2

Answer: B



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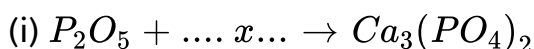
13. In the extraction of copper, metal is formed in the Bessemer converter due to which of the following reaction?

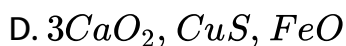
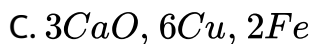
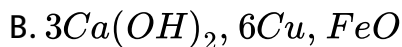
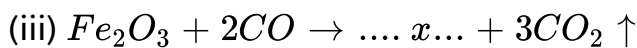
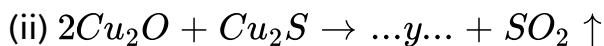


Answer: A

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14. x,y and z in the following processes are respectively



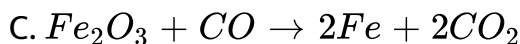
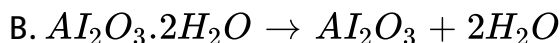
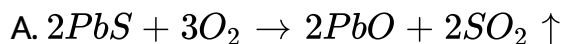


Answer: C



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15. Which of the following processes involves smelting





Answer: C



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16. Out of the following which ores are calcinated during extraction

(a) Copper pyrites (b) Malachite (c) Bauxite

Correct answer is

A. a,b,c

B. b,c

C. Only a

D. All

Answer: B



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17. Which of the following match are incorrect

A. Goldschmidt aluminothermite process Cr_2O_3

B. Mac Arther cyanide process – Fe

C. Mond process – Ni

D. Van Arkel process – Au

Answer: B::D



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18. Malachite on calcination gives $\rightarrow 'A' + CO_2 + H_2O$.

Compound 'A' on reduction with carbon gives $\rightarrow CO + 'B'$

Here 'A' and 'B' are

A. Fe_2O_3 , Fe

B. CuO , Cu

C. $CuCO_3$, CuO

D. MgO , Mg

Answer: B



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19. Which of the following ores are calcined during extraction

A. Argentite

B. Calamine

C. Azurite

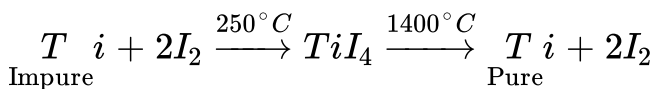
D. Copper pyrites

Answer: B::C



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20. Which process of purification is represented by the following reaction ?



A. Cupellation

B. Poling

C. Van Arkel

D. Zone refining

Answer: C



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21. Which are correctly is matched

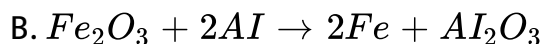
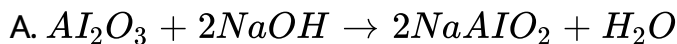
- A. Poling -refining of copper
- B. Cupellation -refining of silver
- C. Smelting- An oxidation process
- D. Roasting- An oxidation process

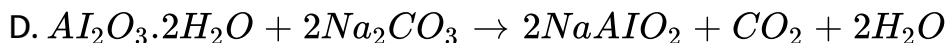
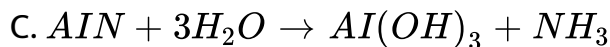
Answer: A::B::D



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22. Which of the following reactions is not involved in serpeck's process of leaching of Al_2O_3 from white bauxite ore ?

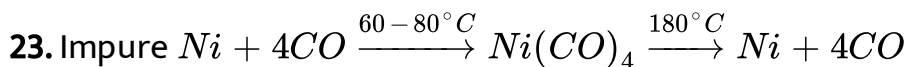




Answer: C



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The above process of purification of the metal is known as

A. Cupellation

B. Mond's process

C. Van Arkel method

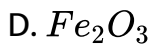
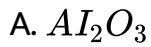
D. Zone refining

Answer: B



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24. Neutral refractory material used in furnaces is :



Answer: C

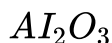


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25. Carbon cannot be used in the reduction of Al_2O_3 because :

A. it is an expensive

B. the enthalpy of formation of CO_2 is more than that of



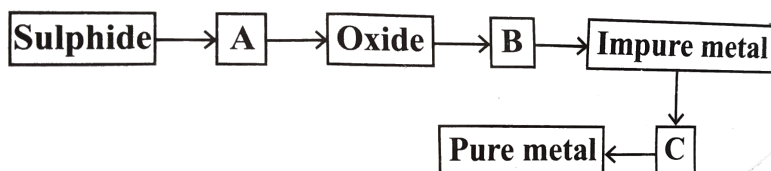
C. pure carbon is not easily available

D. the enthalpy of formation of Al_2O_3 is too high

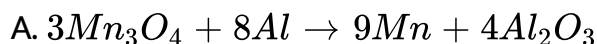
Answer: D

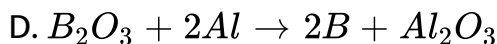
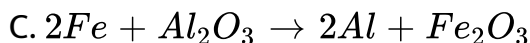
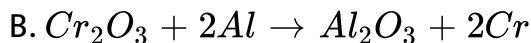
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26. From the following flowsheet for the extraction of pure metal, answer the given questions.



(vi) following reaction is not involved intermite process :



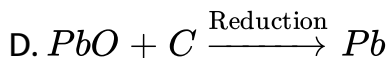
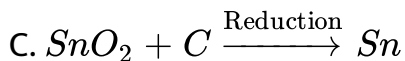
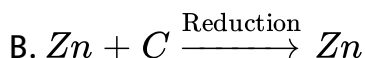
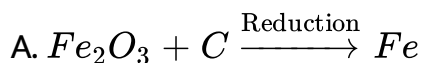


Answer: C



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27. Of the following reduction processes, correct processes are :



Answer: A::B::C::D

28. Consider the following steps:

$Cu_2S \xrightarrow{\text{roast in air}} A \xrightarrow{\text{Heating without air}} B$ Which is not the correct statement:

- A. it is self-reduction
- B. A is only Cu_2O & B is a mixture of Cu & SO_3
- C. A is a mixture of Cu_2O and Cu_2S and B is a mixture of Cu & SO_2
- D. all are incorrect statements

Answer: B

29. Main source of lead is galena (PbS). It is converted to Pb by :

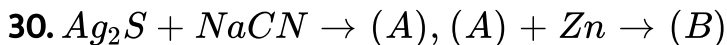


Self – reduction process is :

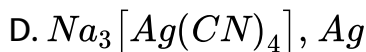
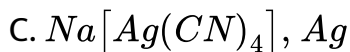
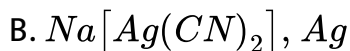
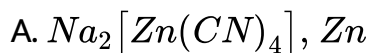
- A. i
- B. ii
- C. Both
- D. None

Answer: B

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(B) is a metal. Hence, (A) and (B) are



Answer: B



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31. The elemental phosphorus is made from rock phosphate, $\text{Ca}_3(\text{PO}_4)_2$ by making use of which one of the following reactions?

A. Thomas slag

B. Used in cement manufacturing

C. Used in manufacturing of phosphorus fertilizer

D. Used as a refractory material

Answer: A::B::C

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32. A: Bauxite is purified by leaching process

R: Aluminium oxide reacts with NaOH to form soluble sodium meta aluminate.

A. Hall's process

B. Baeyer's process

C. Serpeck's process

D. L.D. process

Answer: A::B::C

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33. The process which do use catalysts are

- A. Contact process
- B. Thermite process
- C. Ostwald's process
- D. Haber's process

Answer: A::C::D



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34. Metallurgy involves steps :

- A. concentration of ore
- B. Oxidation of ore

C. purification

D. Reduction of ore

Answer: A::C::D



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35. Which of the following metals is obtained by electrolytic reduction process ?

A. *Cu*

B. *Al*

C. *Mg*

D. *Ag*

Answer: B::C



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36. Which of the following ore is/are oxide ore (s) ?

A. Cassiterite

B. Bauxite

C. Cryolite

D. Haematite

Answer: A::B::C

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37. Which of the following are correctly matched?

A. Schweitzer's reagent → An ammoniacal solution of cupric sulphate

B. Bordeaux mixture $\rightarrow CuSO_4$ and $Ca(OH)_2$

C. Semiconductor $\rightarrow Ge$

D. Horn silver $\rightarrow AgNO_3$

Answer: A::B::C



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38. In which of the following pair(s) the minerals are converted in to metals by self-reduction process?

A. Cu_2S , PbS

B. PbS , HgS

C. PbS , ZnS

D. Ag_2S , Cu_2S

Answer: A::B



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39. Tin stone (cassiterite) is purified by magnetic separation method. Name and formulate the magnetic chemical present with it.

A. Magnetic separator

B. Roasting

C. Leaching

D. Calcination

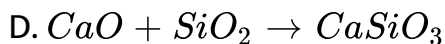
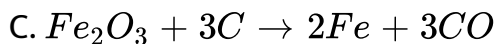
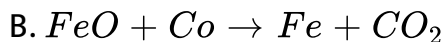
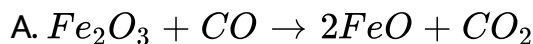
Answer: A



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40. The reaction (s) which does (do) not occur in the reduction zone

in the extraction of iron from haematite ore is (are)



Answer: C::D



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41. Which of the following statements(s) is (are) true?

- A. In process of the precipitation of silver sodium dicyanoargentate (I), the zinc acts as reducing agent as well as complexing agent
- B. In process of the roasting the copper pyrites is converted into a mixture of Cu_2S & FeS which, in turn are partially oxidised
- C. Limonite, haematite and magnesite are ores of iron
- D. Tin and lead both are extracted from their ores by self-reduction

Answer: A::B



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42. The major role of fluorspar (CaF_2), which is added in small quantities in the electrolytic reduction of alumina dissolved in fused cryolite (Na_3AlF_6), is

- A. to act as a catalyst
- B. to make the fused mixture very conducting
- C. to lower the temperature of the melt
- D. to decrease the rate of oxidation of carbon at the anode

Answer: B::C



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43. Which of the following are correctly matched?

A. Turquoise $\rightarrow CuAl_6(PO_4)_4(OH)_8 \cdot 4H_2O$

B. Peacock ore $\rightarrow Cu_4FeS_2$

C. Malachite $\rightarrow CuCO_3 \cdot Cu(OH)_2$

D. Chacopyrites $\rightarrow CuFeS_2$

Answer: A::C::D



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44. Which of the following statements are correct in connection with the extraction of silver?

A. silver is obatined as a by-product in the extraction of copper, lead and zinc.

B. Silver is obtained from the anode slime formed in the electrolytic refining of copper and zinc

- C. Zinc is used to extract silver by solvent extraction from molten lead in Parke's process
- D. Pattinsons process is used for desilverization of lead

Answer: A::B::C::D



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45. Which of the following does not disproportionate?

- A. Cu^{+}
- B. Au^{3+}
- C. Cu^{2+}
- D. Au^{+}

Answer: B::C

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Exercise 03

1. State True/False

Metals can be recovered from their ores by chemical methods.

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2. Sulphide ore of copper can be concentrated by

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3. Which of the following metal is purified by distillation process?

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4. Highly pure metals can be obtained by zone refining.



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5. Zinc carbonate is precipitated from zinc sulphate solution by the addition of:



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6. The slag obtained during the extraction of copper pyrites is composed mainly of $FeSiO_3$ True or False



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7. In calcination, ore is heated with absence of air



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



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9. Pitch blende is an ore of



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10. In the metallurgical process for electrorefining of the metal, the anode is made of _____ metal.



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11. In a thermite process Is used as reducing agent.



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12. The mineral ilmenite containsand.....metal



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13. Answer the following questions briefly.

What is the actual reducing agent of haematite in blast furnace ?



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14. Bessemer converter is used for manufacture of



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15. The transition metal present in the alloy gun metal is _____.



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16. The slag obtained during the extraction of copper pyrites is composed mainly of $FeSiO_3$ True or False



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17. If a spoon of copper metal is placed in a solution of ferrous sulphate-



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18.

Column – I (Ore) *Column – II (Created formula & properties)*

(A) Iron pyrites

(p) FeS_2

(B) Fool's gold

(q) Sulphide ore

(C) Galena

(r) Fe_2O_3

(D) Haematite

(s) Concentrated by froth

Match



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Column – I (Metal) *column – II*

(A) Magnesite

(p) Ore of magnesium

19. (B) Siderite

(q) Ore of aluminium

(C) Corundum

(r) Oxide ore

(D) Bauxite

(s) Carbonate ore

Match



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Column – I (Ore) *Column – II*

(A) Iron

(p) Carbon reduction method

20. (B) Lead

(q) Self reduction

(C) Copper

(r) Thermite process

(D) Chromium

(s) Hydrometallurgical process



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21. Statement-I : All the ores are mineral

Statement-II : Most of the ores contains metals in combined state

A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I

B. Statement-I is True, Statement-II is True, Statement-II is NOT a

correct explanation for Statement-I

C. Statement-I is True, Statement-II is False.

D. Statement-I is False, Statement-II is True.

Answer: B



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22. Statement-I : In the extraction of Ag the complex $Na[Ag(CN)_2]$ is reacted with Zn

Statement-II : Zn is transition metal according to electronic theory

A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I

B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I

C. Statement-I is True, Statement-II is False.

D. Statement-I is False, Statement-II is True.

Answer: C



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23. Aluminium powder is used in thermite welding because :

A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I

B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I

C. Statement-I is True, Statement-II is False.

D. Statement-I is False, Statement-II is True.

Answer: B

24. Statement-I : $CuFeS_2$ is concentrated by froath floatation method

Statement-II : $CuFeS_2$ is main ore of copper.

- A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I
- B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I
- C. Statement-I is True, Statement-II is False.
- D. Statement-I is False, Statement-II is True.

Answer: B

25. Reducing agent used for reduction of copper oxide in blast furnace is:-

- A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I
- B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I
- C. Statement-I is True, Statement-II is False.
- D. Statement-I is False, Statement-II is True.

Answer: C



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26. Assertion : Extraction of iron metal from iron oxide ore is carried out by heating with coke.

Reason : The reaction $Fe_2O_{3(g)} \rightarrow Fe_{(x)} + 3/2O_{2(g)}$ is a spontaneous process.

- A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I
- B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I
- C. Statement-I is True, Statement-II is False.
- D. Statement-I is False, Statement-II is True.

Answer: C



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27. Tin stone (cassiterite) is purified by magnetic separation method. Name and formulate the magnetic chemical present with it.

- A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I
- B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I
- C. Statement-I is True, Statement-II is False.
- D. Statement-I is False, Statement-II is True.

Answer: C



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28. Assertion : Tin is refined by liquation method.

Reason : Tin has low melting point as compared to impurities .

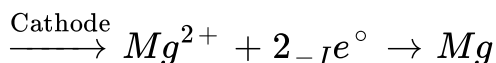
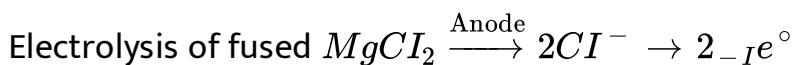
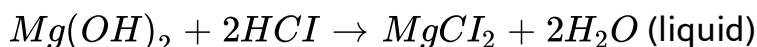
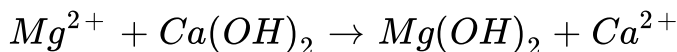
- A. Statement-I is True, Statement-II is True, Statement-II is a correct explanation for Statement-I
- B. Statement-I is True, Statement-II is True, Statement-II is NOT a correct explanation for Statement-I
- C. Statement-I is True, Statement-II is False.
- D. Statement-I is False, Statement-II is True.

Answer: A



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29. Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated in sun light and is then treated with skaked lime. Magnesium hydroxide is heated in a stream of HCl to give $MhCi$ which is electrolysed to dischate Mg . the mixture is in the ratio $35 \% MgCl_2 + 50 \% NaCl + 15 \% CaCl_2$. $NaCl_2$ and $CaCl_2$ are added to lower the fusion temperature and to increase the conductance.



Mg electrolysed is protected from atmospheric oxidation by a blanket of inert gases.

$Mg^{2+} + Ca(OH)_2 \rightarrow Mg(OH)_2 \downarrow + Ca^{2+}$ This reaction indicates:

A. $Mg(OH)_2$ is weaker base than $Ca(OH)_2$

B. Solubility products of $Mg(OH)_2$ is less than that of $Ca(OH)_2$

C. Polarising power of Mg^{2+} is more than that of Ca^{2+} ion

D. Both (B) and (C)

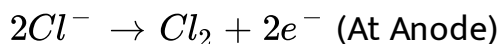
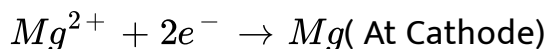
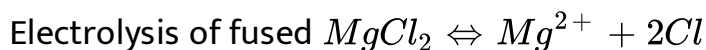
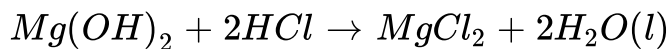
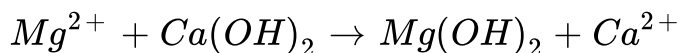
Answer: D



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30. Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated in sun-light and is then treated with slaked lime. Magnesium hydroxide is heated in a stream of HCl to give $MgCl_2$ which is electrolysed to discharge Mg. The mixture is in the ratio 35% $MgCl_2$ + 50 % $NaCl$ + 15 % $CaCl_2$. $NaCl$ and $CaCl_2$ are added

to lower the fusion temperature and to increase the conductance.



Mg electrolysed is protected from atmospheric oxidation by a blanket of inert gases.

In the hydrated chloride of Mg the value of x is :

A. 6

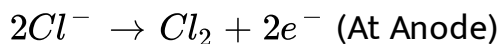
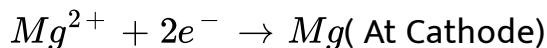
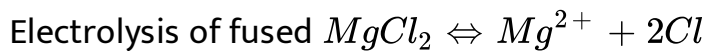
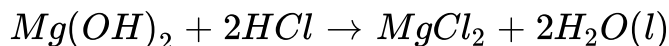
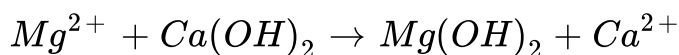
B. 4

C. 8

D. 10

Answer: A

31. Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated in sun-light and is then treated with slaked lime. Magnesium hydroxide is heated in a stream of HCl to give $MgCl_2$ which is electrolysed to discharge Mg. The mixture is in the ratio 35% $MgCl_2 + 50\% NaCl + 15\% CaCl_2$. NaCl and $CaCl_2$ are added to lower the fusion temperature and to increases the conductance.



Mg electrolysed is protected from atmospheric oxidation by a blanket of inert gases.

Molten mixture contains Mg^{2+} , Na^{+} and Ca^{2+} but at cathode only Mg^{2+} is discharged because :

- A. Standard reduction potential of Mg is least among the three
- B. Standard oxidation potential of Mg is least among the three
- C. Discharge potential of Mg is highest
- D. None of these

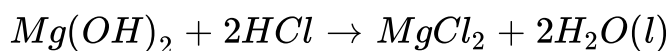
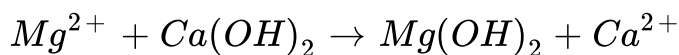
Answer: B



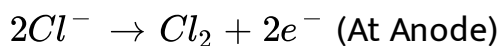
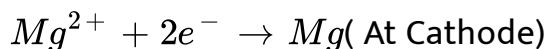
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32. Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated in sun-light and is then

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Electrolysis of fused $MgCl_2 \rightleftharpoons Mg^{2+} + 2Cl^-$



Mg electrolysed is protected from atmospheric oxidation by a blanket of inert gases.

Molten mixture of NaCl and $CaCl_2$ is added to the heated $MgCl_2$ because :

A. $MgCl_2 \cdot xH_2O + dryHCl \xrightarrow{973 - 1023K}$ Partially dehydrated

$MgCl_2$ and molten $(NaCl + CaCl_2)$ makes it fully dehydrated

B. $CaCl_2$ is dehydrating agent

C. $(CaCl_2 + NaCl)$ lowers the m.p. of $MgCl_2$

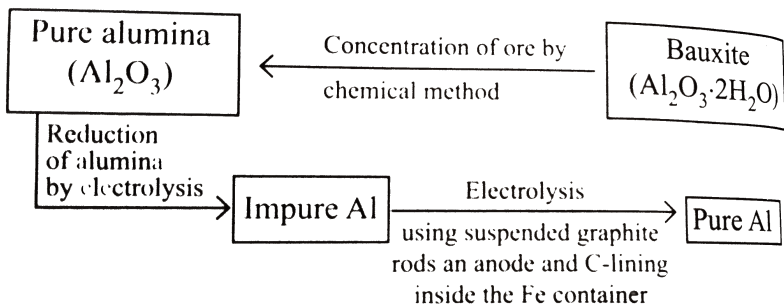
D. None of the above

Answer: C



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33. Extraction of aluminium can be understood by :



Electrolytic reduction of Al_2O_3 :

Electrolysis : $Al_2O_3 + Cryolite + CaF_2$

Cathode : Carbon inside the Fe container

Anode : Graphite rods.

The purpose of adding cryolite is.

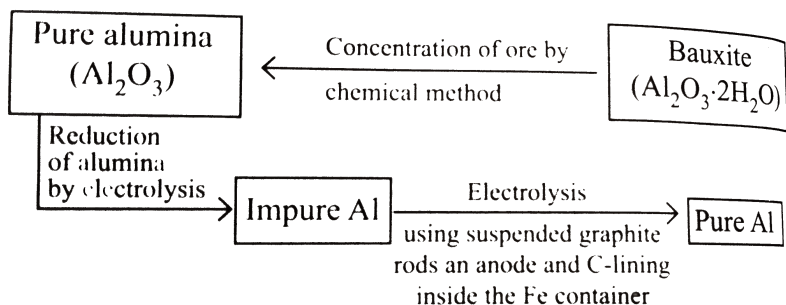
- A. to decrease the electrical conductivity of pure aluminium
- B. to lower the melting point of Al_2O_3
- C. to remove the impurities as slag
- D. to increase the $Al\%$ in the yield

Answer: B



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34. Extraction of aluminium can be understood by :



Electrolytic reduction of Al_2O_3 :

Electrolysis : $\text{Al}_2\text{O}_3 + \text{Cryolite} + \text{CaF}_2$

Cathode : Carbon inside the *Fe* container

Anode : Graphite rods.

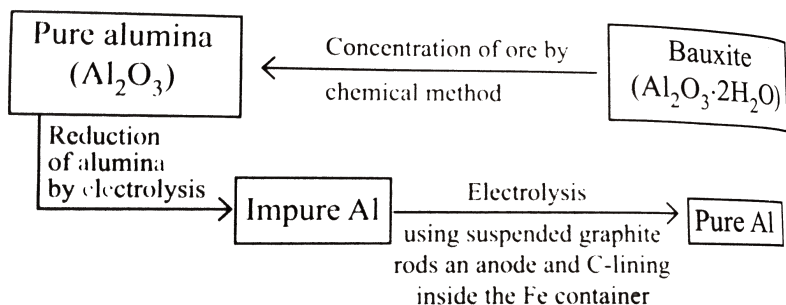
Coke power is spread over the molten electrolyte to.

- A. prevent the heat radiation from the surface
- B. prevent the corrosion of graphite anode
- C. prevent oxidation of molten aluminium by air
- D. both (A) & (B)

Answer: D

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35. Extraction of aluminium can be understood by :



Electrolytic reduction of Al_2O_3 :

Electrolysis : $\text{Al}_2\text{O}_3 + \text{Cryolite} + \text{CaF}_2$

Cathode : Carbon inside the *Fe* container

Anode : Graphite rods.

The function of fluorspar (CaF_2) is.

A. to increase the melting point of electrolyte

B. to increase electrolytic conductivity power

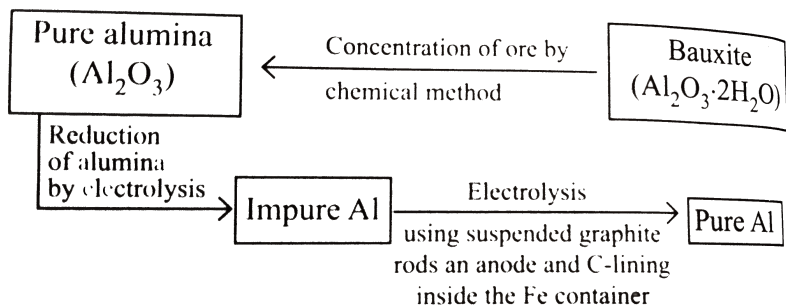
C. to remove the impurities as slag

D. all of the above

Answer: B

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36. Extraction of aluminium can be understood by :



Electrolytic reduction of Al_2O_3 :

Electrolysis : $\text{Al}_2\text{O}_3 + \text{Cryolite} + \text{CaF}_2$

Cathode : Carbon inside the *Fe* container

Anode : Graphite rods.

The molten electrolytes contain Na^{\oplus} , Al^{3+} and Ca^{2+} but only Al gets deposited at cathode because,

- A. Standard reduction potential of Al is more than those of $Na \& Ca$
- B. Standard oxidation potential of Al is more than those of $Na \& Ca$
- C. Graphite reacts only with Al^{3+} and not with $Na^{+} \& Ca^{2+}$
- D. Discharge potential of Al^{3+} is higher than $Na^{+} \& Ca^{2+}$

Answer: A



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Exercise 04

1. 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:



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

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

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

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

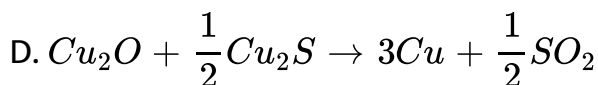
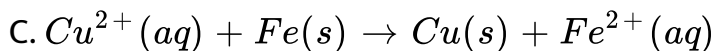
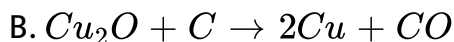
D. sulphides of copper (I) and iron (III)

Answer:



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3. Which of the following reaction is an example of autoredution ?



Answer:



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4. 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:



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5. Zone refining is based on the principle that

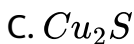
- A. impurities of low boiling metals can be separated by distillation
- B. impurities are more soluble in molten metal than in solid metal
- C. different components of a mixture are differently adsorbed on an adsorbent.
- D. vapour of volatile compound can be decomposed in pure metal

Answer:



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

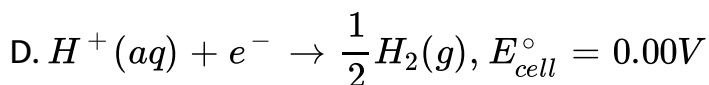
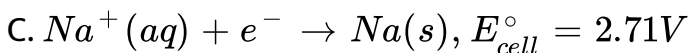
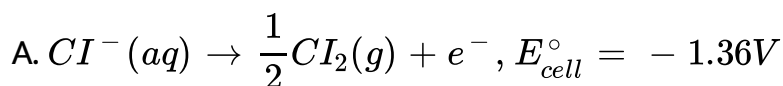


Answer:



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



Answer:



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8. 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:



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9. 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:



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10. 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

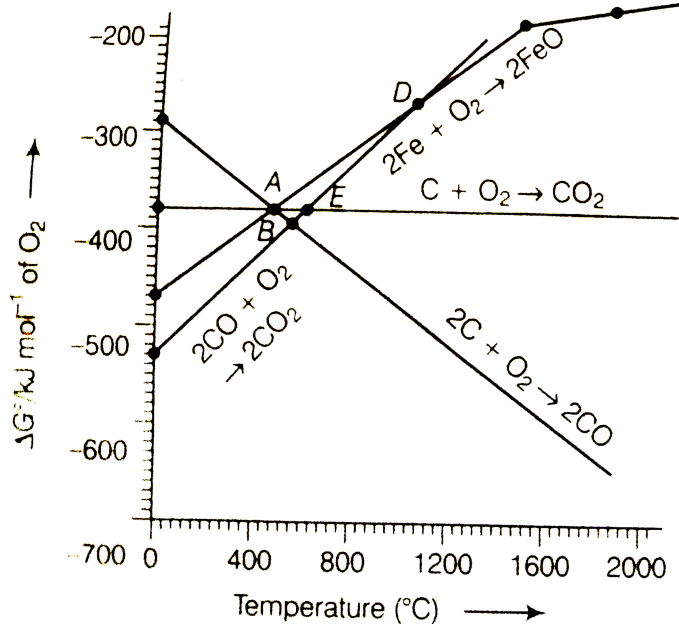
D. thermal decomposition of metal complex

Answer:



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11. 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

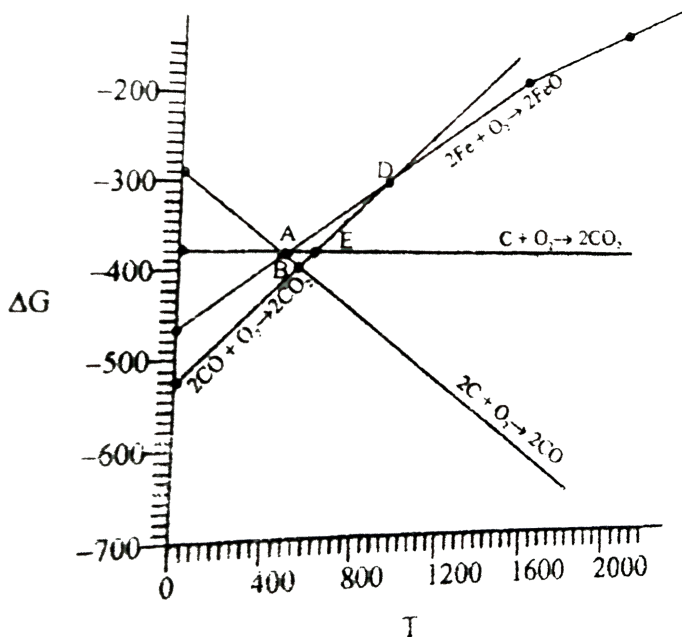
D. Above temperature at point A

Answer:



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12. 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

A. be reduced by carbon monoxide only

B. be reduced by both carbon monoxide and carbon

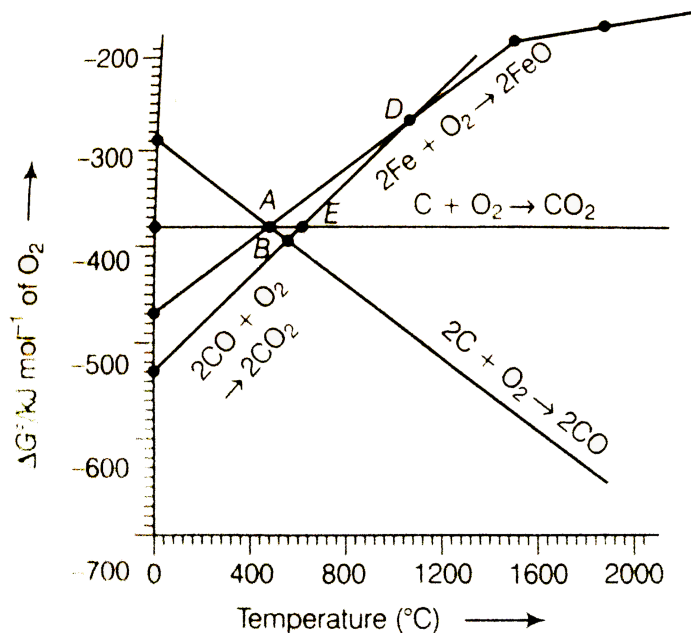
C. be reduced by carbon only

D. not be reduced by both carbon and carbon monoxide

Answer:

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13. 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 mole carbon 1 mol oxygen is positive
- C. ΔG value for the overall reduction reaction with a mixture of 2 mole carbon and 1 mole oxygen will be positive
- D. ΔG value for the overall reduction reaction with carbon monoxide is negative

Answer:



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14. Which of the following options are correct ?

- A. Cast iron is obtained by remelting pig iron with scrap iron and coke using hot air blast
- B. In extraction of silver is extracted as cationic complex
- C. Nickel is purified by zone refining
- D. Zr and Ti are purified by van Arkel method

Answer:



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15. In the extraction of aluminium by Hall-heroult Process, purified Al_2O_3 is mixed with CaF_2 to

- A. lower the melting point of Al_2O_3
- B. increases the conductivity of molten mixture
- C. reduce Al^{3+} into $Al(s)$

D. acts as catalyst

Answer:



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16. Which of the following statements is correct about the role of collectors added during froth floatation process ?

- A. Collectors enhance the non-wettability of the mineral particles
- B. Collectors enhance the wettability of gangue particles
- C. By using depressants in the process two sulphide ores can be separated
- D. Froth stabilisers decrease wettability of gangue

Answer:



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17. In the froth floatation process, zinc sulphide and lead sulphide can be separated by

- A. using collectors
- B. adjusting the proportion of oil to water
- C. using depressant
- D. using froth stabilisers

Answer:



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18. Common impurities present in bauxite are

A. CuO

B. ZnO

C. Fe_2O_3

D. SiO_2

Answer:



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19. Which of the following ore are concentrated by froth floatation ?

A. Haematite

B. Galena

C. Copper pyrites

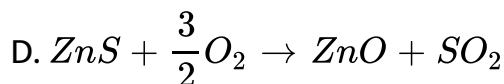
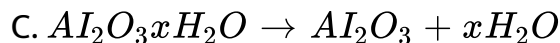
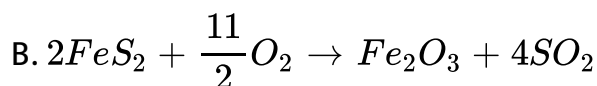
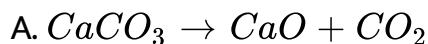
D. Magnetite

Answer:



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20. Which of the following reaction occur during calcination ?



Answer:



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21. For the meallurgical process of which of the ores calcined ore can be reduced by carbon ?

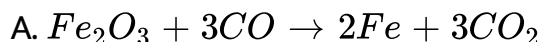
- A. haematite
- B. calamine
- C. iron pyrites
- D. sphalerite

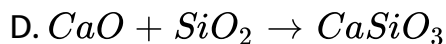
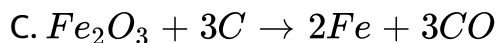
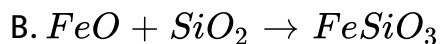
Answer:



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22. The main reaction occuring in blast furnance during extraction of iron from haematite ore





Answer:



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23. In which of the following method of purification, metal is converted to its volatile compound which is decomposed to give pure metal ?

A. heating with stream of carbon monoxide

B. heating with iodine

C. liquation

D. distillation

Answer:



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24. Which of the following statements are correct?

- A. A depressant prevents certain type of particle to come to the froth.
- B. Copper matte contains Cu_2S and ZnS
- C. The solidified copper obtained from reverberatory furnace has blistered appearance due to evolution of SO_2 during the extraction.
- D. Zinc can be extracted by self-reduction

Answer:



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25. Extraction of chlorine from brine is based on

- A. ΔG° for the overall reaction is negative
- B. ΔG° for the overall reaction is positive
- C. E° for overall reaction has negative value
- D. E° for overall reaction has positive value

Answer:



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26. Why is an external emf of more than 2.2 V required for the extracation of Cl_2 from brine ?



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27. At temperature above 1073K, coke can be used to reduce FeO to Fe. How can you justify this reduction with Ellingham diagram ?



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28. Impurities of sulphur, silicon and phosphorus can be removed from cast iron by adding



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29. How is copper extracted from low grade copper ores ?



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30. Write two basic requirements for refining of a metal by Mond's process and by van Arkel Method.



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31. Although carbon and hydrogen are better reducing agents but they are not used to reduce metallic oxides at high temperature. Why ?



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32. How do we separate two sulphide ores by froth floatation method ? Explain with an example ?



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33. The purest form of iron is prepared by oxidising impurities from cast iron in a reverberatory furnace. Which iron ore is used to line the furnace? Explain by giving reaction.



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34. The mixture of compounds A and B is passed through a column of Al_2O_3 by using alcohol as eluant. Compound A is eluted in preference to compound B. Which of the compound A or B, is more readily adsorbed on the column ?



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35. Why is sulphide ore of copper heated in a furnace after mixing with silica ?



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36. Sulphides ores are converted to oxides before reduction . This is explained on the basis of which of the following ?



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37. Which method is used for refining Zr and Ti ? Explain with equation.



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38. What should be considered during the extraction of metal by electrochemical method ?



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39. What is the role of flux in metallurgical processes?



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40. How are metals used as semiconductors refined ? What is the principle of the method used like germanium, silicon etc. ?



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41. Write down the reaction taking place in blast furnace related to the metallurgy of iron in the temperature range 500-800 K.



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42. Give two requirements for vapour phase refining.



43. Write the chemical reactions involved in the process of extraction of Gold . Explain the role of dilute NaCN and Zn in this process .

44. Match the items of column I with items of column II and assign the correct code.

<i>Column I</i>	<i>Column II</i>
(A) Pendulum	(1) Chrome steel
(B) Malachite	(2) Nickel steel
(C) Calamine	(3) Na_3AlF_6
(D) Cryolite	(4) $CuCO_3 \cdot Cu(OH)_2$
	(5) $ZnCO_3$

A. A (1) B (2) C (3) D (4)

B. A (2) B (4) C (5) D (3)

C. A (2) B (3) C (4) D (5)

D. A (4) B (5) C (3) D (2)

Answer:



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45. Match the items of Column I with the items of Column II and assign the correct code:

Column I

(A) Coloured bands

(B) Impure metal to volatile complex

(C) Purification of Ge and Si

(D) Purification of mercury

Column II

(1) Zone refining

(2) Fractional distillation

(3) Mond process

(4) Chromatography

(5) Liquation

A. A (1) B (2) C (4) D (5)

B. A (4) B (3) C (1) D (2)

C. A (3) B (4) C (2) D (1)

D. A (5) B (4) C (3) D (2)

Answer:



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46. Match items of Column I with the items of Column II and assign the correct code:

Column I

(A) Cyanide process

(B) Froth Floatation Process

(C) Electrolytic reduction

(D) Zone refining

Column II

(1) Ultrapure Ge

(2) Dressing of ZnS

(3) Extraction of Al

(4) Extraction of Au

(5) Purification of Ni

A. A (4) B (2) C (3) D (1)

B. A (2) B (3) C (1) D (5)

C. A (1) B (2) C (3) D (4)

D. A (3) B (4) C (5) D (1)

Answer:



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47. Match the items of Column I with the items of Column II and

assign the correct code:

<i>Column I</i>	<i>Column II</i>
(A) Sapphire	(1) Al_2O_3
(B) Sphalerite	(2) $NaCN$
(C) Depresant	(3) Co
(D) Corundum	(4) ZnS
	(5) Fe_2O_3

A. A (3) B (4) C (2) D (1)

B. A (5) B (4) C (3) D (2)

C. A (2) B (3) C (4) D (5)

D. A (1) B (2) C (3) D (4)

Answer:



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48. Match the items of Column I with items of Column II and assign the correct code:

Column I

Column II

(A) Blistered Cu

(1) Aluminium

(B) Blast furnace

(2) $2Cu_2O + Cu_2S \rightarrow 6Cu + SO_2$

(C) Reverberatory furnace

(3) Iron

(D) Half-Heroult process

(4) $FeO + SiO_2 \rightarrow FeSiO_3$

(5) $2Cu_2S + 3O_2 \rightarrow 2Cu_2O + 2SO_2$

A. A (2) B (3) C (4) D (1)

B. A (1) B (2) C (3) D (5)

C. A (5) B (4) C (3) D (2)

D. A (4) B (5) C (3) S (2)

Answer:



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49. Assertion (A) Nickel can be purified by Mond's process.

Reason (R) $Ni(CO)_4$ is a volatile compound which decomposes at 460 K to give pure Ni,

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true

Answer:



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50. Assertion (A) Zirconium can be purified by van Arkel method.

Reason (R) ZrI_4 is volatile and decomposes at 1800 K.

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true

Answer:



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51. Assertion (A) Sulphide ores are concentrated by froth floatation method.

Reason (R) Cresol stabilise the froth in froth floatation method.

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

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

C. Assertion is true but reason is false

D. Assertion is false but reason is true

Answer:



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52. Assertion (A) Zone refining method is very useful for producing semiconductors.

Reason (R) Semiconductors are of high purity.

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true

Answer:



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53. Assertion (A) Hydrometallurgy involves dissolving the ore in a suitable reagent followed by precipitating by a more electropositive metal .

Reason (R) Copper is extracted by hydrometallurgy

- A. Both assertion and reason are true and reason is the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is false
- D. Assertion is false but reason is true

Answer:



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54. Explain the following

- (a) CO_2 is a better reducing agent below 710 K whereas CO is a better reducing agent above 710 K .
- (b) Generally sulphide ores are converted into oxides before reduction.
- (c) Silica is added to the sulphide ore of copper in the reverberatory furnace.
- (d) Carbon and hydrogen are not used as reducing agents at high temperature.
- (e) Vapour phase refining method is used for the purification of Ti



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Exercise 05 A

1. Aluminium is extracted from bauxite by the electrolysis of aluminium oxide dissolved in cryolite. Now answer the following

question:

Write the formula of cryolite.

- A. Bauxite
- B. Alumina
- C. Alumina mixed with molten cryolite
- D. Molten cryolite

Answer: C



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2. Barytes is a/an:-

- A. Oxidised ore
- B. Sulphide ore
- C. Carbide ore

D. Not an ore

Answer: A



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3. Which one of the following ores is best concentrated by froth floatation method?

A. Galena

B. Cassiterite

C. Magnetite

D. Malachite

Answer: A



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4. Which of the following is used as reducing agent in Goldschmidt method?

- A. Calcium
- B. Coke
- C. Sodium
- D. Al-power

Answer: D



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5. Calcination is the process in which

- A. Ore is heated strongly below its melting point in the presence of excess of air and is used for the conversion of

carbonates and hydrated oxide ores to their respective oxides.

B. Ore is heated strongly below its melting point in the absence or limited supply of air and is used for conversion of sulphide ores to their respective oxides

C. Ore is heated strongly below its melting point either in the limited or absence of air and is used to convert carbonate and hydrated oxide ores to their respective oxides

D. Ore is heated strongly above its melting point in the limited supply of air to convert sulphide ores to their respective oxides.

Answer: C



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6. Which form of iron is extracted from blast furnace :

- A. Steel
- B. Wrought Iron
- C. Cast Iron
- D. Pig Iron

Answer: D



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7. The metal that cannot be obtained by electrolysis of an aqueous solution of its salts is :

- A. Cu
- B. Cr

C. Ag

D. Ca

Answer: D



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8. Galvanisation of iron denotes coating with _____

A. Zn

B. Pb

C. Cr

D. Cu

Answer: A



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9. Which one of the following ores is best concentrated by froth floatation method?

A. Malachite

B. Magnetite

C. Siderite

D. Galena

Answer: D



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10. What will happen when a block of copper metal is dropped into a beaker containing a solution of $1M ZnSO_4$?

- A. The copper metal will dissolve and zinc metal will be deposited
- B. No reaction will occur
- C. The copper metal will dissolve with evolution of oxygen gas
- D. The copper metal will dissolve with evolution of hydrogen gas

Answer: B



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11. Extraction of copper by smelting uses silica as an additive to remove:



C. Cu_2S

D. FeS

Answer: B



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Exercise 05 B

1. When the ore haematite is burnt in air with coke around $2000K$ along with lime, the process not only produces steel but also produces a silicate slag that is useful in making building materials such as cement. Discuss the same and show through balanced chemical equation.



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2. In the commercial electrochemical process for aluminium extraction, the electrolyte used is

- A. $Al(OH)_3$ in $NaOH$ solution
- B. An aqueous solution of Al_2O_3 and Na_3AlF_6
- C. A molten mixture of Al_2O_3 and Na_3AlF_6
- D. A molten mixture of $AlO(OH)$ and $Al(OH)_3$

Answer: C



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3. Write the chemical reactions involved in the extraction of metallic silver from argentite.



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4. Write down the reactions involved in the extraction of *Pb*.

What of the oxidation number of lead in litharge ?



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5. The chemical process in the production of steel from haematite ore involves Oxidation followed by reduction. True/False

A. Reduction

B. Oxidation

C. Reduction followed by oxidation

D. Oxidation followed by reduction

Answer: D



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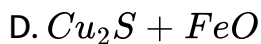
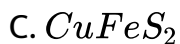
6. Electrolytic reduction of alumina to aluminium by Hall-Heroult process is carried out.

- A. In the presence of $NaCl$
- B. In the presence of fluorite
- C. In the presence of cryolite which forms a melt with lower melting temperature
- D. In the presence of cryolite which forms a melt with higher melting temperature

Answer: C

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7. The chemical composition of slag formed during the smelting process in the extraction of copper is



Answer: B



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8. Which of the following processes is used in extractive metallurgy of magnesium ?

A. Fused salt electrolysis

B. Self reduction

C. Aqueous solution electrolysis

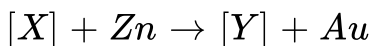
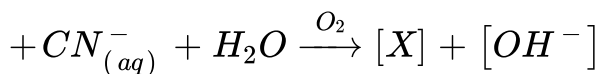
D. Thermite reduction

Answer: A

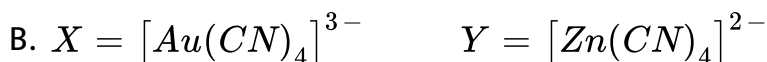


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9. In the process of extraction of gold , Roasted gold ore



Identify the complexes [X] and [Y]



Answer: A



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10. The methods chiefly used for the extraction of lead and tin from their ores, respectively, are

- A. self reduction and carbon reduction
- B. self reduction and electrolytic reduction
- C. carbon reduction and self reduction
- D. cyanide process and carbon reduction

Answer: A



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11. Which ore contains both potassium and magnesium?

- A. Carnallite

B. Horn silver

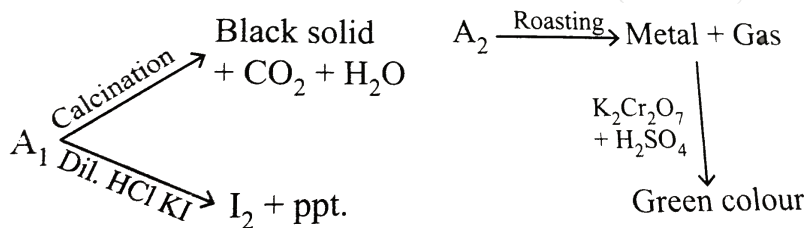
C. bauxite

D. Malachite

Answer: C

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12. A_1 and A_2 are two ores of metal M . A_1 on calcination gives a black precipitate, CO_2 and water. Identify A_1 and A_2 .



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13. Match the column :

A. *Column I* *Column II*
Self reduction (p) Lead

B. *Column I* *Column II*
Carbon reduction (q) Silver

C.

Column I *Column II*
Complex formation and displacement by metal (r) Copper

D. *Column I* *Column II*
Decomposition of iodide (s) Boron

Answer: A::B::C::D



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14. By which process and is extracted from zinc blende?

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

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15. Match the column:

- | | | |
|----|--------------------------|----------------------|
| | <i>Column I</i> | <i>Column II</i> |
| A. | $PbS \rightarrow PbO$ | (p) Roasting |
| | <i>Column I</i> | <i>Column II</i> |
| B. | $CaCO_3 \rightarrow CaO$ | (q) Calcination |
| | <i>Column I</i> | <i>Column II</i> |
| C. | $ZnS \rightarrow Zn$ | (r) Carbon reduction |
| | <i>Column I</i> | <i>Column II</i> |
| D. | $Cu_2S \rightarrow Cu$ | (s) Self reduction |

Answer: A::B::C::D

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16. Native silver metal forms a water soluble complex with a dilute aqueous solution of $NaCN$ in the presence of

- A. nitrogen
- B. oxygen
- C. carbon dioxide
- D. argon

Answer: B



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17. Copper is the most noble of first row transition metals and occurs in small deposits in several countries. Ores of copper include chalcanthite ($CuSO_4 \cdot 5H_2O$), atacamite $[Cu_2Cl(OH)_3]$,

cuprite (Cu_2O), copper glance (Cu_2S), and malachite $[Cu_2(OH)_2CO_3]$. However, 80 % of the world copper production comes from the ore chalcopyrite ($CuFeS_2$). The extraction of copper from chalcopyrite involves partial roasting, removal of iron and self-reduction.

Partial roasting of chalcopyrite produces

- A. Cu_2S and FeO
- B. Cu_2O and FeO
- C. CuS and Fe_2O_3
- D. Cu_2O and Fe_2O_3

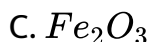
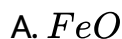
Answer: A



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18. Copper is the most noble of first row transition metals and occurs in small deposits in several countries. Ores of copper include chalcantite ($CuSO_4 \cdot 5H_2O$), atacamite $[Cu_2Cl(OH)_3]$, cuprite (Cu_2O), copper glance (Cu_2S), and malachite $[Cu_2(OH)_2CO_3]$. However, 80 % of the world copper production comes from the ore chalcopyrite ($CuFeS_2$). The extraction of copper from chalcopyrite involves partial roasting, removal of iron and self-reduction.

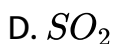
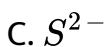
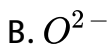
Iron is removed from chalcopyrite as.



Answer: D

19. Copper is the most noble of first row transition metals and occurs in small deposits in several countries. Ores of copper include chalcantite ($CuSO_4 \cdot 5H_2O$), atacamite $[Cu_2Cl(OH)_3]$, cuprite (Cu_2O), copper glance (Cu_2S), and malachite $[Cu_2(OH)_2CO_3]$. However, 80 % of the world copper production comes from the ore chalcopyrite ($CuFeS_2$). The extraction of copper from chalcopyrite involves partial roasting, removal of iron and self-reduction.

In self-reduction, the reducing species is.



Answer: C



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20. Extraction of metal from the ore cassiterite involves

- A. carbon reduction of an oxide ore
- B. self-reduction of a sulphide ore
- C. removal of copper impurity
- D. removal of iron impurity

Answer: A::C::D



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21. Oxidation state of the metal in the mineral zincite is

22. In the cyanide extraction process of silver from argentite ore, the oxidizing and reducing agents used are

- A. O_2 and CO respectively
- B. O_2 and Zn dust respectively
- C. HNO_3 and Zn dust respectively
- D. HNO_3 and Cl respectively

Answer: B

23. Sulphide does are common for the metals

A. Ag , Cu and Pb

B. Ag , Cu and Zn

C. Ag , Mg and Pb

D. Al , Cu and Pb

Answer: A



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24. The carbon-based reduction method is NOT used for the extraction of

A. tin from SnO_2

B. iron from Fe_2O_3

C. aluminium from Al_2O_3

D. magnesium from $MgCO_3$. $CaCO_3$

Answer: C::D



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25. Upon heating with Cu_2S , the reagent (s) that give copper metal is//are.

A. (ii),(iii),(iv)

B. (ii),(iii)

C. (i),(ii),(iii),(iv)

D. (ii),(iv)

Answer: B::C::D



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26. How is copper extracted from copper pyrites ?

- A. crushing followed by concentration of the ore by froth-flotation
- B. removal of iron as slag
- C. self-reduction step to produce 'blister copper' following evolution of SO_2
- D. refining of 'blister copper' by carbon reduction

Answer: A::B::C



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