



## CHEMISTRY

### BOOKS - GRB CHEMISTRY (HINGLISH)

## METALLUGY

### Metallurgy

1. Calamine is an ore of

A. Zn

B. Mg

C. Ca

D. Pb

**Answer: A**

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2. Which of the following ore contains both Fe and Cu?

- A. Chalcopyrite
- B. Malachite
- C. Cuprite
- D. Azurite

**Answer: A**

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3. Which of the following is not an ore?

- A. Bauxite
- B. Corundum

C. Langbeinite

D. Argetite

**Answer: C**

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4. Which of the following is not an ore of Iron

A. Limonite

B. Cassiteite

C. Magnetite

D. None of these

**Answer: B**

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5. Which of the following is not an ore of Iron

A. Malachite

B. Calamine

C. Salt cake

D. Cerussite

**Answer: C**



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6. Which of the following set of elements mostly occur as sulphide ores.

A. Zn,Cu,Mg

B. Zn,Cu,Pb

C. Fe,Al,Ti

D. Cu,Ag,Au

**Answer: B**



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7. The metal which is obtained from both sea-water and ores from the earth's solid crust is:

A. magnesium

B. iron

C. silver

D. gold

**Answer: A**



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8. Which is not correct statements?

- A. Cassiterite, chromite and haematite are concentrated by hardraumatic washing (Tabling).
- B. Pure  $Al_2O_3$  is obtained from the bauxite ore by leaching in the Bayer's process.
- C. Sulphide ore is concentrated by calcination method.
- D. Roasting can convert sulphide into oxide or sulphate and of sulphide may also act as a reducing agent.

**Answer: C**

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9. Which material has been named incorrectly

- A. Bauxite :  $Al_2O_3 \cdot 2H_2O$
- B. Corundum:  $Al_2O_3$
- C. Cryolite:  $3NaF \cdot AlF_3$

D. Feldspar:  $Be_3Al_2Si_6O_{18}$

**Answer: D**



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**10. Black tin is:**

- A. an alloy of Sn
- B. an allotrope of Sn
- C. 60-70%  $SnO_2$
- D. 100%  $SnO_2$

**Answer: C**



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**11. Chemical leaching is useful in the concentration of:**

A. carnallite

B. bauxite

C. galena

D. zinc blende

**Answer: B**



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**12. Sulphide ores are generally concentrated by the :**

A. gravity separation process

B. calcination process

C. leaching process

D. None of these

**Answer: D**



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13. Sometimes, it is possible to separate two sulphide ores by adjusting proportion of oil to water or by using depressants. In case of an ore containing ZnS and PbS, the depressant used is



D. None of these

**Answer: B**



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14. Give the correct order of average oxidation state of Fe in the ores given: haematite (P). Magnetite (Q), siderite (R).

A.  $P < Q < R$

B.  $R < Q < P$

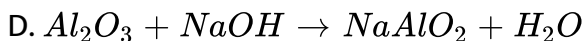
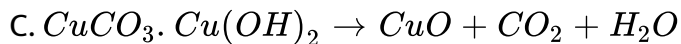
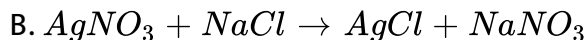
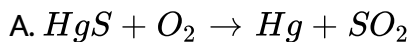
C.  $R < P < Q$

D.  $Q < P < R$

**Answer: B**

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15. which of the following reactions represents a calcination reaction?



**Answer: C**

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16. The formula of carnallite is

- A.  $LiAl(Si_2O_5)_2$
- B.  $KCl \cdot MgCl_2 \cdot 6H_2O$
- C.  $K_2O \cdot Al_2O_3 \cdot 6SiO_2$
- D.  $KCl \cdot MgCl_2 \cdot 2H_2O$

Answer: B



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17. Dolomite is mineral whose formula is:

- A.  $CaMg(CO_3)_2$
- B.  $MgCO_3$
- C.  $CaCO_3 \cdot MgCO_3$

D. a and c both

**Answer: D**



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**18.** The oxidation state of Cu and Fe in copper pyrites is respectively:

A. 1+and 2+

B. 2+and3+

C. 1+and3+

D. 1+and6+

**Answer: A**



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**19.** Which of the following is a carbonate ore?

A. Pyrolusite

B. Malachite

C. Diaspore

D. Cassiterite

**Answer: B**



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**20.** Oxidation states of the metal in the minerals haematite and magnetite, respectively, are

A. II,III in haematite and II in magnetite

B. II,II in haematite and II in magnetite

C. II In haematite and II, III in magnetite

D. III in haematite and II, III in magnetite

**Answer: D**



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21. Magnetic separation process may be used for the concentration of:

A. Chalcopyrite

B. bauxite

C. haematite

D. calamine

**Answer: C**



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22. Which pair of elements can form alloy?

A. Zn and Pb

B. Fe and Hg

C. Fe and Cr

D. C and Pt

**Answer: C**



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**23.** Which of the following does not contain Mg?

A. Magnetite

B. Magnesite

C. Asbestos

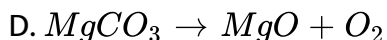
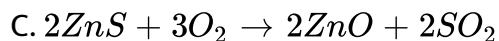
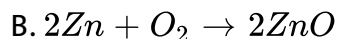
D. Carnallite

**Answer: A**



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



Answer: D



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25. Which of the following metals is obtained by the self reduction process?

A. Copper

B. Iron



C. Silver

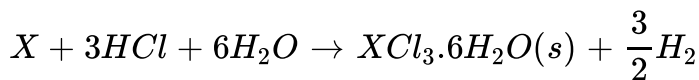
D. Magnesium

**Answer: A**

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## Comprehension

1. An element (X) which is the most abundant metal in the earth's crust and the third most abundant element, is extracted by the electrolysis of its fused oxide in melted cryolite and fluorspar.  $XCl_3$  exists as  $(XCl_3)_n$  in crystalline state and is only dimeric ( $X_2Cl_6$ ) in fused state



Anhydrous  $XCl_3$  fumes in moist air and is very hygroscopic

When  $XCl_3 \cdot 6H_2O(s)$  is heated strongly, the products formed are:

A.  $XCl_3$  and  $H_2O$

B.  $X_2O_3$ ,  $HCl$  and  $H_2O$

C.  $X(OH)_3$  and  $HCl$

D. no effect

**Answer: B**

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## Subjective type

1. For how many metals carbon reduction method is/are mainly applicable?

Sn, Al, Cr, Mn, Pb, Ca, Na, Zn

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## Others

1. Bauxite is leached with:

- A. KCl
- B. NaCN
- C. NaOH
- D.  $Na_2SO_4$

Answer: C



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2.  $NaCN$  is sometimes added in the froth flotation process as a depressant when  $ZnS$  and  $PbS$  minerals are expected because :

- A.  $Pb(CN)_2$  is precipitated while no effect on  $ZnS$
- B.  $ZnS$  forms soluble complex  $Na[Zn(CN)_4]$
- C.  $PbS$  forms soluble complex  $Na_2[Pb(CN)_4]$
- D. they cannot be separated by adding NaCN

**Answer: B**

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3. An ore of tin containing  $FeCrO_4$  is concentrated by

A. magnetic separation

B. froth floatation

C. leaching method

D. gravity separation

**Answer: A**

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4. Process of heating ore in air to remove sulphur is:

A. calcination

B. roasting

C. smelting

D. None of these

**Answer: B**



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5. In roasting:

A. moisture is removed

B. non metal as their volatile oxide are removed

C. ore become porous

D. all of the above

**Answer: D**



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6. Roasting is carried out in case of:

- A. galena
- B. iron pyrites
- C. copper galena
- D. all of the above

**Answer: D**



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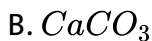
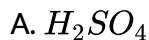
7. Which of the following is not an ore:

- A. Malachite Calamine
- B. Calamine
- C. Stellite
- D. Cerussite

**Answer: C**

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8. An ore after levigation is found to have acidic impurities. When of the following can be used as flux during smelting operation ?



**Answer: C**

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9. For low grade copper ore we use:

A. hydro metallurgy

B. pyro metallurgy

C. electro metallurgy

D. None of these

**Answer: A**



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**10. Which of the following is not an ore of iron?**

A. Magnetite

B. Haematite

C. Siderite

D. Chalcopyrite

**Answer: D**



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11. Hydraulic washing/gravity separation can be used to concentrate:

- A. Ore of Na
- B. Ore of K
- C. Carmalite
- D. Ore of Fe

**Answer: D**

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12. Froth floatation process is used to concentrate:

- A. sulphide ores
- B. oxide ores
- C. halide ores

D. elemental ores

**Answer: A**

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**13.** Which of the following statement is not correct for leaching?

A. Ore should be soluble in a suitable solvent

B. It is done for low grade ores.

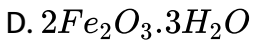
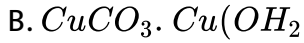
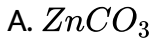
C. Leaching of  $Al_2O_3$  from bauxite is based on amphoteric nature of bauxite.

D. None of these

**Answer: D**

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14. Calcination cannot be done In case of



**Answer: C**



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15. Among the following statements, the incorrect one is

A. calamine and siderite are carbonate ores

B. argentite and cuprite are oxide ores

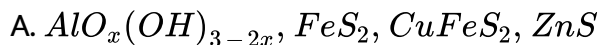
C. zinc blende and pyrites are sulphide ores

D. malachite and azurite are ores of copper

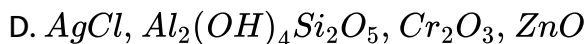
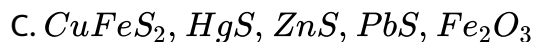
**Answer: B**

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**16.** Which one set of minerals is best suited for roasting?



B.



**Answer: C**

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**17.** Which is incorrect for function of flux?

- A. Lowers down the temperature of melting of ore
- B. Remove gangue
- C. Remove particles
- D. As solvent

**Answer: D**



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**18.** In froth floatation process for PbS (Galena) contains ZnS and FeS impurity the depressant we use is:

- A. NaCN
- B. Sodium ethylxanthate
- C. Pine oil
- D.  $CuSO_4$

**Answer: A**



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19. Which of the following is used as a froth stabilizer?

A. Pine oil

B.  $CuSO_4$

C.  $C_2H_5 - O - \underset{\begin{array}{c} || \\ S \end{array}}{C} - S^- / Na^+$

D. Aniline

Answer: D



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20. Select the correct statement:

A. Magnetite is an ore of manganese

B. Pyrolusite is an ore of lead

C. Siderite is carbonate ore of iron

D.  $FeSO_2$  is rolled gold

**Answer: C**

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21. Electromagnetic separation is used for:

A. When ore is non-magnetic and impurity is magnetic

B. When ore is magnetic and impurity is non-magnetic

C. Both a and b

D. None of these

**Answer: C**

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22. Among the following statements, the incorrect one is

- A. calamine and siderite are carbonate
- B. argentite and curprite are oxide
- C. zinc blende and pyrites are sulphide
- D. malachite and azrites are ores of copper

**Answer: B**



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23. Which one of the following is not a method of concentrain of ore?

- A. Electromagnetic separation
- B. Smelting
- C. Gravity separation
- D. Froth floatation process



**Answer: B**



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**24.** The metal that occurs in the native state as well as in the combined form is

- A. silver
- B. magnesium
- C. aluminium
- D. manganese

**Answer: A**



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**25.** Element found in the sediments in the ocean floor is:

A. iron

B. magnesium

C. gold

D. iodine

**Answer: B**



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**26.** The rocky and siliceous matter associated with an ore is called:

A. slag

B. mineral

C. matrix or gangue

D. flux

**Answer: C**



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27. "Fool's gold" is:

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

**Answer: A**

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28. The process of removing lighter gangue particles by washing in a current of water is called:

- A. levigation
- B. liquation

C. copper pyrites

D. bronze

**Answer: A**

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**29.** Gravity separation method is based upon:

A. preferential washing of ores and gangue particles

B. difference in chemical properties of ore particles and impurities

C.

D. None of these

**Answer: B**

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30. In the froth floatation process for the facilitation of ores the ore particles float because

- A. they are light
- B. they are insoluble
- C. their surface is preferentially wetted by oil
- D. they bear an electrolytic charge

**Answer: C**



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31. Gravity separation process may be used for the concentration of:

- A. Chalcopyrite
- B. bauxite
- C. haematite

D. calamine

**Answer: C**



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**32.** Wolframite is separated from cassiterite by:

- A. froth floatation method
- B. levigation
- C. electromagnetic separation method
- D. electrostatic separation method

**Answer: C**



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**33.** Froth floatation process used for the concentration of sulphide ore.

- A. is based on the difference in watability of different minerals
- B. used xanthates and fatty acids as collectors.
- C. uses NaCN as depressant in the mixtures of ZnS and PbS when ZnS soluble complex and PbS forms froth.
- D. all are correct statements

**Answer: D**

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**34. Haematite ore is conentrated by:**

- A. gravity separation process
- B. froth floatation
- C. amalgamation
- D. leaching

**Answer: A**



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**35.** The most common elements present in the crust of the Earth are:

A. oxygen, silicon, aluminium

B. oxygen, iron, magnesium

C. silicon, iron, potassium

D. oxygen, iron, silicon

**Answer: A**



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**36.** Froth floatation process for the concentration of sulphide ore is an illustration of the practical application of



- A. adsorption
- B. absorption
- C. sedimentation
- D. cagulation

**Answer: A**



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**37.** In Froth floatation process for, pine oil functions oil functions as:

- A. activator
- B. frother
- C. collector
- D. agitator

**Answer: B**



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38. Find the incorrect match

A. Azuite:  $CuCO_3 \cdot 2Cu(OH)_2$

B. Malachite:  $Cu(OH)_2 \cdot CuCO_3$

C. Anglesite:  $PbSO_4$

D. Chalcocite:  $Cu_2S$

Answer: A



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39. The substance not likely to contain  $CaCO_3$  is

A. sea shells

B. dolomite

C. marble statue

D. calcined gypsum

**Answer: D**



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**40.** Collectors are the substances which help in attachment of an ore particle to air bubble in froth. A popular collector used industrially is:

A. sodium ethyl xanthe

B. sodium xenate

C. sodium phosphosphate

D. sodium nitroprusside

**Answer: A**



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41. A non magnetic ore containing the impurity of  $FeCr_2O_4$  is concentrated by:

- A. magnetic separation
- B. gravity separation
- C. froth floatation method
- D. electrostatic method

**Answer: A**



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42. The reason for floating of ore particles in concentration by froth floatation process is that:

- A. they are light
- B. they are insoluble

C. they are charged

D. they are hydrophobic

**Answer: D**



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**43.** The process of isolation of metals by dissolving the ore in a suitable chemical reagent followed by precipitation of the metal by a more electropositive metal is called

A. hydro metallurgy

B. electrometallurgy

C. zone refining

D. electrofinning

**Answer: A**



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**44.** Choose the correct option the code regarding roasting process.

(I) It is the process of heating the ore in air in a reverberatory furnace to obtain the oxide.

(II) It is an exothermic process.

(III) It is used for the concentration of sulphide ore.

(IV) It removes easily oxidisable volatile impurities present in the concentrated ore.

A. P,Q and R only

B. P,Q and S only

C. P,R and S only

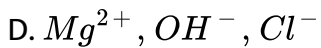
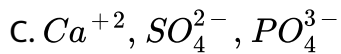
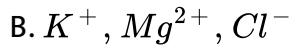
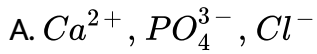
D. P,Q,R and S

**Answer: C**



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45. "Chlorapatite" is an important mineral of eleventh most abundant element of earth's crust.



**Answer: A**



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46. Oxidation of ore involved in:

A. calcination of calamine

B. heating of haematite with aluminum

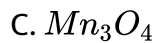
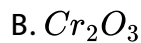
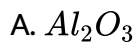
C. roasting of galena

D. None of these

**Answer: C**

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**47.** Many gemstone are impure from of:

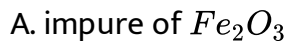


D. None of these

**Answer: A**

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**48.** Roasting process is used for:





B.  $CuFeS_2$

C. ZnS

D. all of these

**Answer: D**

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**49.** The beneficiation of the sulphide ores is usually done by:

A. electrolysis

B. smelting process

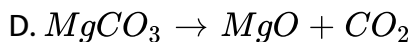
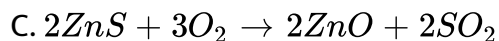
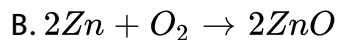
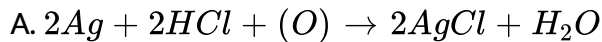
C. metal displacement method

D. Froth floatation method

**Answer: D**

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50. Which one of the following reaction is an example for calcination process?



Answer: D



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51. In the isolation of metals, calcination process usually results in:

A. metal oxide

B. metal carbonate

C. metal hydroxide

D. metal sulphide

**Answer: A**



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52. We have two minerals of one metal, first is sulphide and second is oxide. Then find the correct statement regarding extraction of metal from these two minerals.

- A. Sulphide mineral is good choice for extraction of metal
- B. Oxide mineral is good choice for extraction of metal
- C. Any of these two may be ore, depends on the concentration of the metal in the minerals, durability of the process and other relevant factors
- D. Always sulphide mineral will be the ore

**Answer: C**



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53. Which one of the following statements is false?

- A. During roasting, moisture is removed from the ore
- B. The ore becomes free from almost all organic impurities
- C. Calcination of ore is carried out in absence of any blast of air
- D. The concentrated zinc blende is subjected to calcination during its extraction by pyrometallurgy

Answer: D



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54. Zinc blende ore on roasting at above  $850^{\circ}C$  gives:

- A.  $ZnS$  and  $ZnSO_4$

B.  $CO_2$  and  $ZnO$

C.  $SO_2$  and  $ZnO$

D.  $Zn$  and  $SO_2$

**Answer: C**

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55. Which is not correct statements?

A. Cassiterite and chromite is concentrated by magnetic separation method.

B. Pure  $Al_2O_3$  is obtained from the baruxite ore by leaching in the Bayer's proces.

C. Sulphide ore is concentrated by calcination method.

D. Roasting can convert sulphide into oxide or sulphide and of sulphide may also act as a reducing agent.

**Answer: C**

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**56.** Which ore is having maximum percentage of 'Cu' by weight?

- A. Copper pyrites
- B. Copper glance
- C. Cuprite
- D. Malachite

**Answer: C**

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**57.** Which of the following ore is converted into oxide by roasti but not by calcination?

A. Chalcocite

B. Cerrusite

C. Anglesite

D. Dolomite

**Answer: A**

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**58.** Select the ore in which corresponding metal is represent to highest oxidation state among the given ores.

A. Copper pyrites

B. Zincite

C. haematite

D. Pyrolusite

**Answer: D**



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59. Which element is obtained commercially from seawater?

A. Bromine

B. Gold

C. Iron

D. Oxygen

**Answer: A**



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60. Bronze is an alloy of:

A. copper and tin

B. copper and zinc



C. nickel and tin

D. nikel and zinc

**Answer: A**

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61. Magnetite, which has the formula  $Fe_3O_4$  is comprised of iron(II) oxide and iron (III) oxide. What is the ratio of iron(II) ions to iron(III) ions in magnetite.

A. 1 : 1

B. 1 : 2

C. 2 : 3

D. 3 : 2

**Answer: B**

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62. Which one of the following ore is not the ore of Cu?

A. Chalcopyrite

B. Chalcocite

C. Pyrolusite

D. Cuprite

Answer: C

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63. In banxite  $AlO_x(OH)_{3-2x}$  the value of x is:

A.  $0 < x < 1$

B.  $1 < x < 0$

C.  $x=0$

D.  $X=1$

**Answer: A**



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**64.** From floatation process is based on:

- A. specific gravity of the ore particles
- B. magnetic properties of the ore particles
- C. wetting properties of the ore particles
- D. electrical properties of the ore particles

**Answer: C**



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65. The process of isolation of metals by dissolving the ore in a suitable chemical reagent followed by precipitation of the metal by a more electropositive metal is called

- A. hydro metallurgy
- B. electrometallurgy
- C. zone reffing
- D. electrorefining

**Answer: A**



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66. Ore dressing for iron is done by

- A. froth floatation method
- B. magnetic separation

C. hand picking

D. all of the above

**Answer: B**

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**67.** Which of the following mineral does not contain iron?

A. Copper pyrite

B. Iron pyrite

C. ilmenite

D. Tincal

**Answer: D**

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**68.** The correct statement is:

- A. dolomite is the ore of zinc
- B. galena is an ore of mercury
- C. pyrolusite is an ore of iron
- D. cassiterite is an ore of tin

**Answer: D**



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**69.** Leaching is a process of

- A. reduction
- B. concentration
- C. refining
- D. oxidation

**Answer: B**

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**70.** The purpose of roasting an ore is:

- A. to convert oxide ore to sulphide ore
- B. to reduce it
- C. to separate S, As, Sb impurities
- D. to obtain an alloy

**Answer: C**

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**71.** Smithsonite is American name of...ore (European name). Metal is extracted from Smithsonite by calcination followed by carbon reduction, European name of Smithsonite is:

A. Calamine

B. bauxite

C. dolomite

D. sphalerite

**Answer: A**



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**72.** Froth floatation process for the concentration of sulphide ore is an illustration of the practical application of

A. adsorption

B. absorption

C. coagulation

D. sedimentation

**Answer: A**





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**73.** When roasting is carried out:

(P) sulphide ore are converted into oxide and sulphate

(Q) Remove water of hydration

(R) Melt the ore

(S) Remove arsenic and sulphur impurities

A. P, Q and R are correct

B. P and S are correct

C. P, Q and S are correct

D. Q, R and S are correct

**Answer: C**



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

- A. Malachite
- B. Magnetite
- C. Siderite
- D. Galena

**Answer: D**



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75. Selection of temperature to carry out a reduction process depends so as to make:

- A.  $\Delta G$  negative
- B.  $\Delta G$  positive

C.  $\Delta H$ negative

D.  $\Delta H$ positive

**Answer: A**

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**76.** Select the correct statement.

A. In the decomposition of an oxide into oxygen and solid/liquid metal, entropy increases.

B. Decomposition of an oxide is an endothermic change

C. To make  $\Delta G^\circ$  negative, temperature should be high enough so that  $T\Delta S^\circ > \Delta H^\circ$ .

D. all are correct statements

**Answer: D**

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77. Which of the following fact is of no significance for roasting sulphide ores to the oxide and not subjecting the sulphide ores in carbon reduction directly ?

- A.  $CO_2$  is thermodynamically more stable than  $CS_2$
- B. Metal sulphide are less stable than the corresponding oxides
- C.  $CO_2$  is more volatile than  $CS_2$
- D. Metal sulphide are thermodynamically more stable than  $CS_2$

Answer: C



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

- A. it is non metal

- B. the heat of formation of  $CO_2$  is more than that of  $Al_2O_3$ .
- C. pure carbon is not easily available
- D. that heat of formation of  $Al_2O_3$  is too high

**Answer: D**

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**79.** Electrolytic reduction method is used for the extraction of

- A. high electronegative elements
- B. highly electropositive elements
- C. transition metals
- D. noble metals

**Answer: B**

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80. Which one of the following metals cannot be extracted by carbon reduction?

A. Pb

B. Fe

C. Zn

D. Al

**Answer: D**



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81. In which of the following pair of metals, both are commercially extracted from their respective ores by self-reduction method?

A. Zn, Cu

B. Pb, Cu

C. Sn,Zn

D. Al,Ag

**Answer: B**

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82. (viii) Amongst the following groups of oxides, the group containing oxides that cannot be reducing by carbon to give the respective metals is.

A.  $Cu_2O$ ,  $SnO_2$

B.  $Fe_2O_3$ ,  $ZnO$

C.  $CuO$ ,  $K_2O$

D.  $PbO$ ,  $FeO$

**Answer: C**

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83. The process of isolation of metals by dissolving the ore in a suitable chemical reagent followed by precipitation of the metal by a more electropositive metal is called

A. electrometallurgy

B. hydrometallurgy

C. electro-refining

D. zone refining

**Answer: B**



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84. (viii) Amongst the following groups of oxides, the group containing oxides that cannot be reducing by carbon to give the respective metals is.



A.  $CaO$  and  $K_2O$

B.  $Fe_2O_3$ ,  $ZnO$

C.  $Cu_2O$  and  $SnO_2$

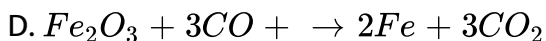
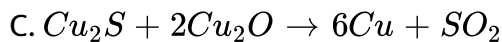
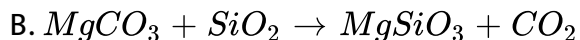
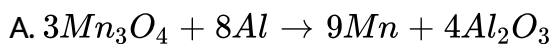
D.  $PbO$ , and  $Pb_3O_4$

**Answer: A**



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**85.** Which of the following represents the thermite reaction ?



**Answer: A**



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**86.** In metallurgy process, the flux used for removing acidic impurities is:

- A. silica
- B. sodium chloride
- C. lime stone
- D. sodium carbonate

**Answer: C**

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**87.** Which of the following metals can be extracted by both self-reduction and carbon reduction methods?

- A. Fe

B. Al

C. Pb

D. Ag

**Answer: C**

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**88.** An ore after levigation is found to have acidic impurities. When of the following can be used as flux during smelting operation ?

A.  $H_2SO_4$

B.  $CaCO_3$

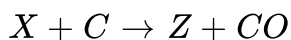
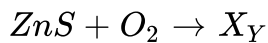
C.  $SiO_2$

D. Both  $CaO$  and  $SiO_2$

**Answer: B**

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89. The chemical reaction involved in roasting process:



Choose the correct statement

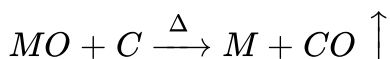
- A. Compound X is amphoteric in nature.
- B. X can be reduced by self reduction method.
- C. Y having  $p\pi - p\pi$  as well as  $p\pi - d\pi$  bond.
- D. Y is polar as well as planer molecule.

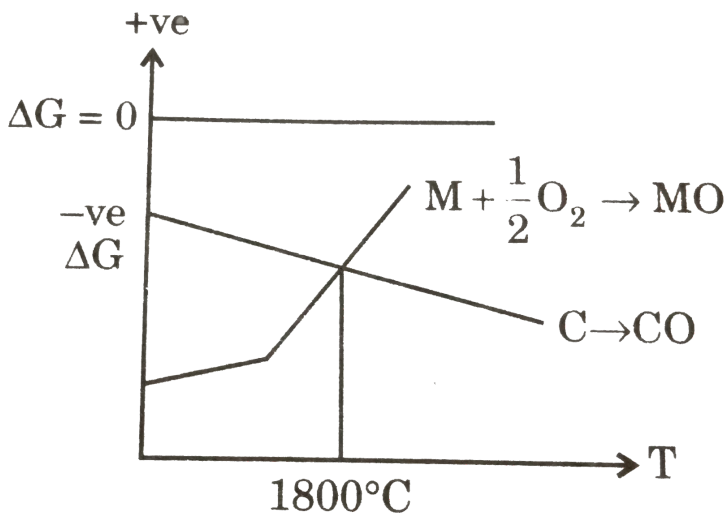
Answer: A,C,D



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90. In the following chemical reaction:





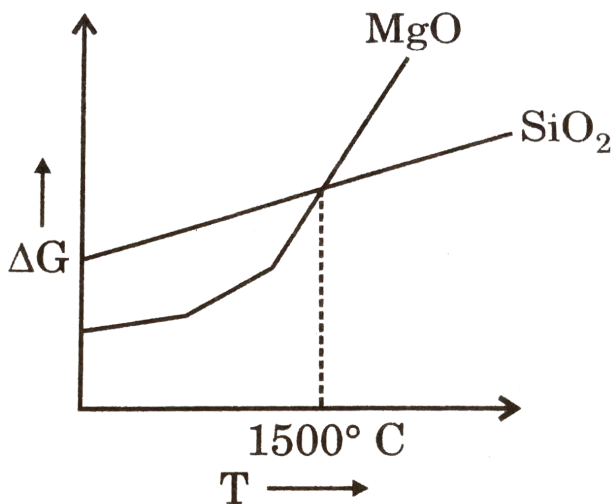
$\Delta G$  overall of the reaction is zero at what temperature

- A.  $1800^\circ C$
- B. More than  $1800^\circ C$
- C. Less than  $1800^\circ C$
- D. None of these

**Answer: A**

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91. For this graph which option is correct?



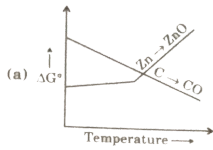
- A. At less than 1500° C, Mg acts as reducing agent for  $SiO_2$
- B. At more than 1500° C, Si acts as reducing agent for MgO
- C. Both a and b
- D. None of these

Answer: C

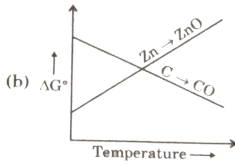


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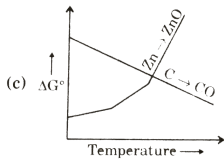
92. If metallic zinc is collected in the form of vapour by the carbon reduction process, the correct diagram would be represent as:



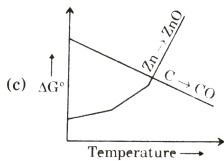
A.



B.



C.



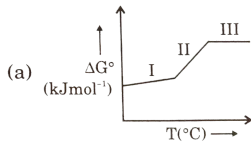
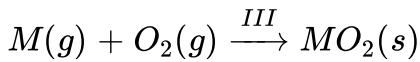
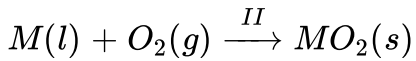
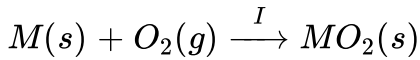
D.

Answer: C

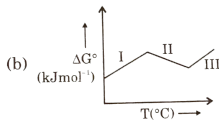


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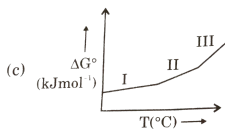
93. Which of the following plots between  $\Delta G^\circ$  and  $T(^{\circ}C)$  represents the sequence of oxide of formation of a metal in its different phase as given below? Assume the metallic oxide is thermally stable in different stages



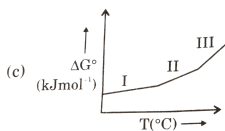
A.



B.



C.

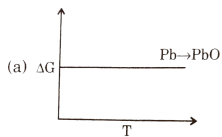


D.

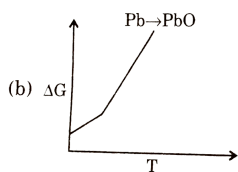
Answer: C



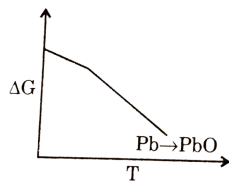
94. Which is correct representation for the following chemical reaction?



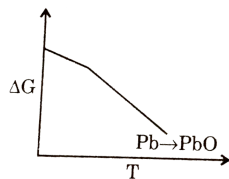
A.



B.



C.



D.

Answer: B

95. The standard free energy of formation of MgO AND CO at temperature  $1000^{\circ}C$  and  $2000^{\circ}C$  are given below (they refer to the reaction involving one mole of oxygen at one atmosphere pressure)  
The free energy change to the reaction.



$$\Delta G_{2000^{\circ}C} = -341kJ/mol$$



$$\Delta G_{2000^{\circ}C} = -628kJ/mol$$

A. At  $1000^{\circ}C$  temperature

B. At  $2000^{\circ}C$  temperature

C. Both a and b

D. None of these

**Answer: B**



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96. Which of the following is better reducing agent at 673K in pyrometallurgy?

A. C

B.  $CO_2$

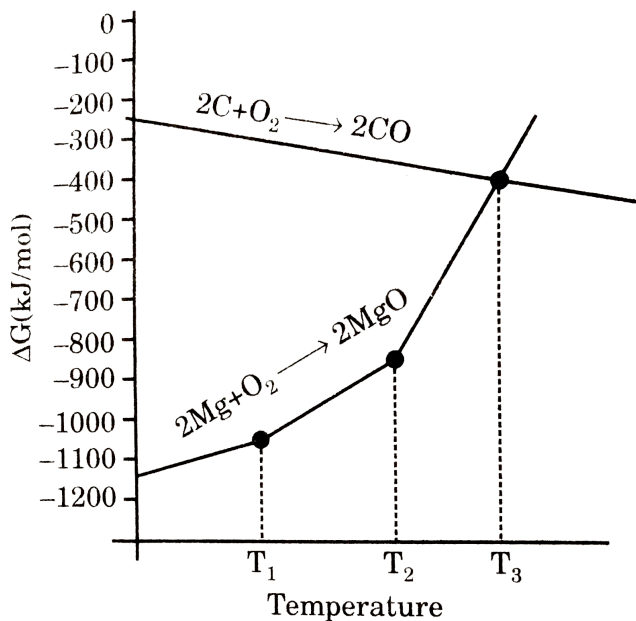
C. CO

D. None of these

**Answer: C**



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97.

Incorrect statement about the plot is/are:

- A.  $T_1$  and  $T_2$  are melting point and boiling point of Mg respectively.
- B.  $T_1$  and  $T_2$  are melting point and boiling point of MgO respectively.
- C. Reducing of MgO by coke is possible above  $T_3$ .
- D. Mg can be extracted from gaseous products by rapid cooling.

Answer: B



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98. Ellingham diagram represents:

- A. change of  $\Delta G$  with temperature
- B. change of  $\Delta H$  with temperature
- C. change of  $\Delta G$  with pressure
- D. change of  $(\Delta G - T\Delta S)$  with temperature

**Answer: A**



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99. A sulphide ore like  $ZnS$  is first roasted into its oxide prior to reduction by carbon because:

- A. A sulphide ore cannot be reduced to metal at all

- B. no reducing agent is found suitable for reducing a sulphide ore.
- C. the Gibb's free energy of formation of most sulphides are greater than that for  $CS_2$
- D. a metal oxide is generally less stable than the metal sulphide

**Answer: C**

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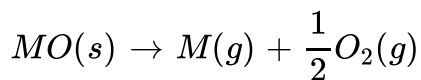
**100.** Ellingham diagram can be drawn for the following:

- A. Sulphides
- B. Oxides
- C. Halides
- D. All of these

**Answer: D**

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101. Select the correct statement for the conversion of



- A. Entropy increases
- B. It is an endothermic change
- C. To make  $\Delta G^\circ$  negative, temperature should be high enough so that  $T\Delta S^\circ > \Delta H^\circ$ .
- D. all are correct statements

**Answer: D**



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102. Carbon reduction is not possible for the oxide of alkaline earth metals because:

- A. of formation of carbides at high temperatures
- B. high temperature is not required for reduction
- C. carbon reduction is not possible for any alkaline earth metals except Be
- D. None of these

**Answer: A**

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**103.** Which of the following statements is incorrect regarding Ellingham diagram for a metal ?

- A. In general, on increasing temperature free energy change also increases
- B. Graph for which  $\Delta S$  is negative, will have positive slope
- C. Graph for which  $\Delta S$  is negative, will have negative slope



D. None of these

**Answer: C**

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**104.** Ellingham diagram represents:

- A. change of  $\Delta G$  with temperature
- B. change of  $\Delta H$  with temperature
- C. change of  $\Delta G$  with pressure
- D. change of  $(\Delta G - T\Delta S)$  with temperature

**Answer: A**

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105. From the Ellingham graphs of carbon, which of the following statement is false?

- A.  $CO_2$  is more stable than CO at less than 983K
- B. CO reduces  $Fe_2O_3$  to Fe at less than 983K
- C. CO is less stable than  $CO_2$  at more than 983K
- D. CO reduces  $Fe_2O_3$  to Fe in the reduction zone of blast furnace

Answer: C



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106. Which of the following metal oxide is more stable if the free of formation of  $Cr_2O_3$  and  $Al_2O_3$  per mole of oxygen consumed are  $-540Kj$  and  $-827kJ$  respectively?

- A.  $Cr_2O_3$
- B.  $Al_2O_3$

C. Both have equal stability

D. None of these

**Answer: B**

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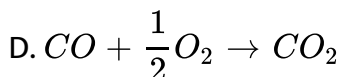
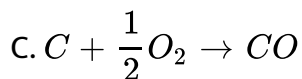
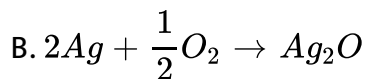
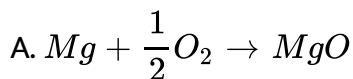
**107.** Carbon cannot reduce  $Fe_2O_3$  to Fe at a temperature below 983K because.

- A. free energy change the formation of CO is more negative than that  $Fe_2O_3$
- B. CO is thermodynamically more stable than  $Fe_2O_3$
- C. carbon has higher affinity towards oxygen than iron
- D. iron has higher affinity towards oxygen than carbon

**Answer: D**

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108.  $\Delta G^\ominus$  vs T plot in Ellingham diagram slopes downward for the reaction .

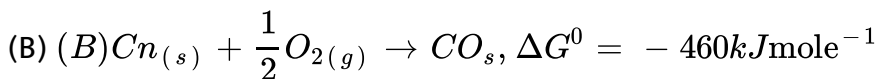
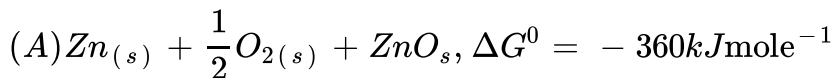


Answer: C



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109. Consider the following reaction at  $1000^\circ C$

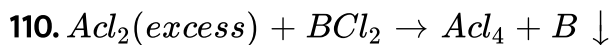


choose the correct statement at  $1000^\circ C$

- A. Zinc can be oxidised by CO
- B. Zinc oxide can be reduced by C
- C. Both statement (a) and (b) are true
- D. Both statement (a) and (b) are false

**Answer: B**

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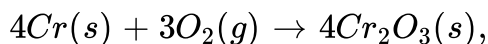
$BO \xrightarrow[>400^\circ C]{\Delta} \frac{1}{2}O_2 + B_2$ . If A and B metal then ore of B would be:

- A. siderite
- B. cinnabar
- C. malachite
- D. horn silver

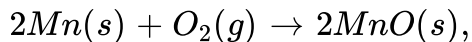
**Answer: B**



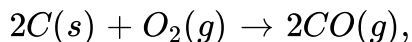
111. In pyro metallurgy the metals are extracted from ores and concentrates by heat treatment. This involves conversion to metal oxide. This is followed by the reduction of the oxide to the metal using carbon or carbon monoxide.



$$\Delta G^\circ = 1500kJ/\text{mol at } 1200^\circ C$$



$$\Delta G^\circ = -600kJ/\text{mol at } 1200^\circ C$$



$$\Delta G^\circ = -550kJ/\text{mol at } 1200^\circ C$$

- A. C(s) can reduce MnO(s) under given condition
- B. C(s) can reduce  $Cr_2O_3(s)$  under given condition
- C. Neither MnO(s) nor  $Cr_2O_3(s)$  be reduced by C(s) under given condition

D. Both will be reduced simultaneously if carbon is passed over a mixture  $MnO(s)$  and  $Cr_2O_3(s)$ .

**Answer: B**

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**112.** Select the statement which is correct?

- A. In Ellingham diagram  $M \rightarrow MO$  curves are having negative slope.
- B. MgO can be reduced by carbon at very high temperature ( $\approx 1800^\circ C$ )
- C. In blast furnace, carbon not reduce iron oxides
- D. Extraction of metals are based upon oxidation

**Answer: B**

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**113.** To obtain chromium from chromic oxide ( $Cr_3O_3$ ) the method used is

- A. Carbon reduction
- B. carbon monoxide reduction
- C. aluminothermite process
- D. electrolytic reduction

**Answer: C**

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**114.** By which process Pba and Sn are extracted respectively are:

- A. Carbon reduction and self reduction
- B. self reduction and Carbon reduction



C. electrolytic reduction and cyanide process

D. cyanide process and electrolytic reduction

**Answer: B**

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**115.** In which of the following isolations no reducing agent is required?

A. Iron from haematite

B. Tin from cassiterite

C. Mercury from cinnabar

D. Zinc from zinc blende

**Answer: C**

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**116.** A metal has a high concentration into the earth crust and whose oxides cannot be reduced by carbon. The most suitable method for the extraction of such metal is:

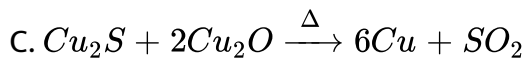
- A. aluminothermite process
- B. electrolysis process
- C. van-Arkel's process
- D. cupellation

**Answer: B**

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**117.** Copper is extracted by hydrometallurgy from low grade ores. Which of the following reaction is/are involved?

- A.  $Cu^{2+}(aq) + H_2(g) \rightarrow Cu(s) + 2H^+(aq)$
- B.  $Cu^{2+}(aq) + Fe(s) \rightarrow Cu(s) + Fe^{2+}(aq)$



D. Both a and b

**Answer: D**

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**118.** Which of the following metals is extracted by self reduction method from its sulphate ore?

A. Fe

B. Cu

C. Mg

D. Sn

**Answer: B**

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119. 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

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120. Self-reduction of  $Cu_2S$  to  $Cu$  can be carried out in.

- A. bessemer converter
- B. blast furnace
- C. both a and b
- D. None of these

**Answer: A**



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**121.** In the extraction of Cu from its sulphide ore, the metal is formed by reduction of  $Cu_2O$  with

A. FeS

B. CO

C.  $Cu_2S$

D.  $SO_2$

**Answer: C**



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**122.** In Goldschmidt aluminothermic process, thermite mixture contains:

A. 3parts $Fe_2O_3$  and 2parts $Al$

B. 3parts $Al_2O_3$  and 2parts $Al$

C. 1parts $Fe_2O_3$  and 12parts $Al$

D. 3parts $Fe_2O_3$  and 1parts $Al$

**Answer: D**

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**123.** On heating a mixture of  $Cu_2O$  and  $Cu_2S$ , we get :

A.  $Cu + SO_2$

B.  $Cu + SO_3$

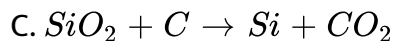
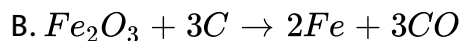
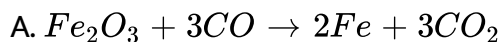
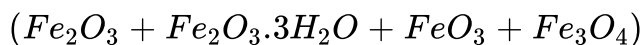
C.  $CuO + CuS$

D.  $Cu_2SO_3$

**Answer: A**

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124. The reactions which is not involved in the extraction of iron from the mixture from the mixture of its ores:



Answer: C

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125. The iron obtained from the blast furnace is called:

A. pig iron

B. cast iron

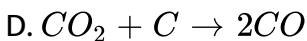
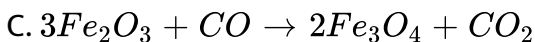
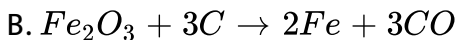
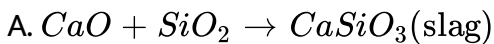
C. wrought iron

D. steel

**Answer: A**

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**126.** Which one of the following reactions occur during smelting in the reduction zone at lower temperature(in iron metallurgy)?



**Answer: C**

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**127.** Slag is a product of:

- A. flux and coke
- B. coke and metal oxide
- C. flux and impurities
- D. metal and flux

**Answer: C**



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**128.** Self reduction is not applied for the extraction of:

- A. Cu
- B. Pb
- C. Hg

D. Al

**Answer: D**



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**129.** Bessemerisation is carried out for:

(P) Fe, (Q) Cu,

(R) Al, (S) Ag

A. P,Q

B. Q,R

C. R,S

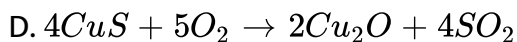
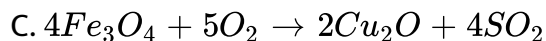
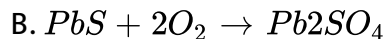
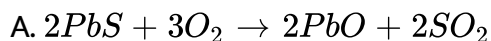
D. P,R

**Answer: A**



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130. Which of the following reaction is not involved in roasting?

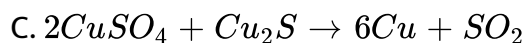
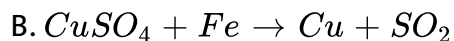
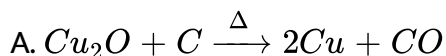


Answer: C



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131. Which of the following reactions is/are involved in the extraction of Cu from any ore of copper?



D. All of the above

Answer: D

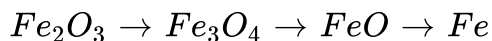
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132. Select the correct statement regarding extraction of iron from mixture of its oxide and carbonate ores.

A. Roasted mixture of ores mainly contain FeO.

B. Most of iron is obtained by reduction of its oxide by CO gas at very high temperature of  $1800^{\circ}C$

C. Reduction of  $Fe_2O_3$  into Fe follows the sequence



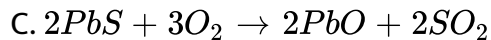
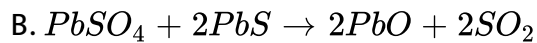
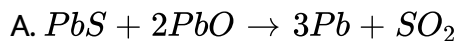
D. Coke powder is the reducing agent at lower temperature range ( $300 - 800^{\circ}C$ )

Answer: C



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**133.** Which of the following reaction is/are involved in the extraction of Pb from PbS?

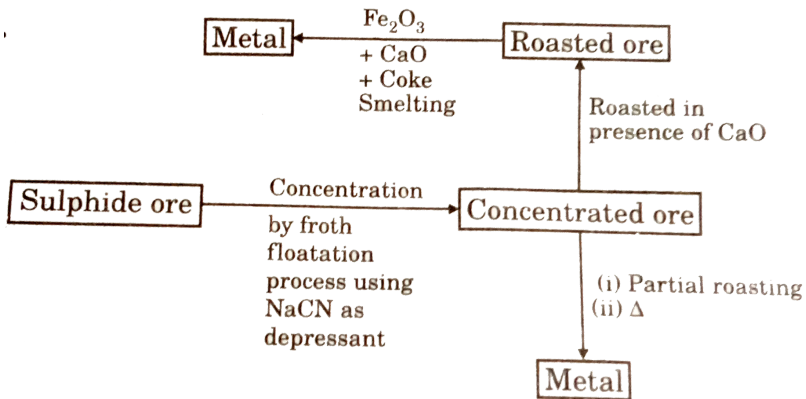


D. All of these

**Answer: D**



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134.

The given outline depicts the extraction of:

A. Ag from  $Ag_2S$

B. Zn from ZnS

C. Pb from PbS

D. Cu from  $CuFeS_2$

Answer: C

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**135.** Consider the following statement: Statement-1: In extraction of iron from haematite ore, the reduction reactions take place only in the lower temperature range in the blast furnace.

Statement-2: Calamine is a carbonate ore of zinc. Statement-3: The principle ore of aluminium, bauxite, usually contains silica, iron oxides and titanium, oxide as impurities.

Statement-4: Solidified copper obtained from silica lined converter (Bessemer converter) has blistered appearance due to the evolution of  $SO_2$  and arrange in the order of true/false.

A. FTTF

B. FTFF

C. FFTT

D. TFFT

**Answer: A**



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**136.** Consider the following statement:

Statement-1: In electrolytic refining, the impurities from the blister copper deposit as anode mud which contains antimony, selenium, tellurium, silver, gold and platinum. (From copper pyrites)

Statement-2: In Serpeck's process, silica is removed by heating the bauxite to  $1800^{\circ}C$  with coke in a current of  $N_2$ .

Statement-3: Chalcocite and azurite are ores of copper.

Statement-4: Tin is obtained by the carbon reduction of black tin.  
and arrange in the order of true/false.

A. TFFT

B. FTFF

C. FFTT

D. TTTT

**Answer: D**



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**137.** Consider the following statement:

Statement-1: Extraction of zinc from sphalerite involves roasting followed by carbon reduction.

Statement-2: In bessemer convertor, along with copper  $FeSiO_3$  is also obtained.

Statement-3: In extraction of lead, CaO prevents formation of  $PbSiO_3$ .

Statement-4: Copper is extracted by hydrogen metallurgy from low grade ores and scraps.

and arrange in the order of true/false.

A. TTTF

B. FTTF

C. TTTT

D. FFFT

**Answer: C**



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**138.** Blister copper is:

- A. impure copper
- B. obtained in self reduction process during bessemerisation
- C. both a and b are correct
- D. None of these

**Answer: C**

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**139.** Select the correct option for the given processes.

- (P) Process of heating steel to redness and then cooling it very slowly.
- (Q) Process of heating steel in presence of  $NH_3$  and producing hard coating of iron nitrate on the surface of steel.
- (R) Process of heating steel to redness and then cooling it suddenly by plunging it into water or oil.

(S) Process of heating quenched steel to a temperature well below redness and then cooling it slowly.

- A. Tempering , Nitriding, Annealing and Quenching respectively
- B. Quenching, Nitriding, Annealing and case Hardening respectively
- C. Tempering , Case hardening , Quenching Annealing respectively
- D. Annealing , Nitriding, Quenching , and Quenching Tempering respectively

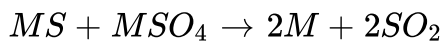
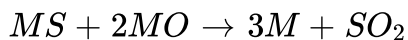
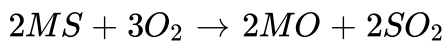
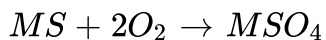
**Answer: D**



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**141.** Identify the metal M whose extraction is based on the following reaction:



A. magnesium

B. aluminium

C. lead

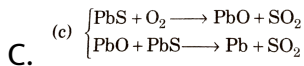
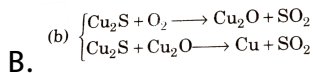
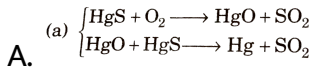
D. tin

**Answer: C**



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142. Which of the following reactions represents the self-reduction process?



D. All of the above

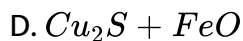
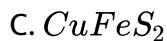
Answer: D



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





**Answer: B**

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**144.** Give the correct of initials T or F following statemetns. Use T if statement is true and F if it is false.

(P) Cu metal is extracted from its sulphide by reduction of  $Cu_2O$  with  $FeS$ .

(Q) An ore of Tin containing  $FeWO_4$  is concentrated by magnetic separation method.

(R) Auto redcuton process is used in the extraction of Cu and Hg.

Cassiterite and Rutile are oxide ore of the metals.

A. TFFT

B. TTFT

C. FTTT

D. FFFT

**Answer: C**

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**145.** Electric furnaces are lined with magnesia because

A. it is not affected by acids

B. it liberates oxygen on heating

C. it melts only at very high temperature

D. it has no effect of electricity

**Answer: C**

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**146.** Reduction of a metal oxide by excess carbon at high temperature is a method for the commercial preparation of some metals. This method can be successfully applied in the case of:

A.  $Be$  and  $Al_2O_3$

B. it liberates oxygen on heating

C.  $CaO$  and  $Cr_2O_3$

D.  $BaO$  and  $U_3O_8$

**Answer: B**



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**147.**  $SnO_2$  is reduced to metallic Sn on smelting oxide with anthracite, limestone and sand. In this, function of sand is:

A. it acts as a flux

B. it liberates oxygen on heating

C. both are correct

D. none is correct

**Answer: C**

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**148.** Which of the following statements is correct regarding the slag obtained during the extraction of a metal like copper or iron?

A. The slag is lighter and has lower melting point than the metal

B. it liberates oxygen on heating

C. The slag is lighter and has higher melting point than the metal

D. The slag is heavier and has higher melting point than the metal

**Answer: A**

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149. The slag consists of molten impurities, generally, in the form of

- A. metal carbonate
- B. it liberates oxygen on heating
- C. metal oxide
- D. metal nitrate

**Answer: B**

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150. In the metallurgy of iron, the upper layer obtained in the bottom of blast furnace mainly contains:

- A.  $CaSiO_3$
- B. it liberates oxygen on heating
- C.  $Fe_2O_3$

D.  $FeSiO_3$

**Answer: A**

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**151.** During extraction of iron from haematite, the flux used is \_\_\_\_\_.

A. silica

B. it liberates oxygen on heating

C. lime stone

D. coke

**Answer: C**

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**152.** The chemical process in the production of steel from haematite ore involves

- A. reduction
- B. it liberates oxygen on heating
- C. reduction followed by oxidation
- D. oxidation followed by reduction

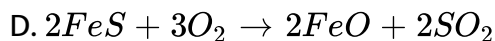
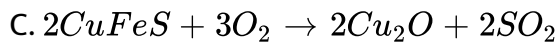
**Answer: C**



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**153.** In the extraction of  $Cu$  the reaction takes place Bessemer converter is:

- A.  $2Cu_2O + Cu_2S \rightarrow 6Cu + SO_2$
- B.  $2CuFeS_2 + O_2 \rightarrow Cu_2S + FeS + SO_2$



**Answer: A**

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**154.** Which of the following statement is incorrect about the extractive metallurgy of copper?

- A. Matte chiefly consists of iron sulphide and some ferrous oxide.
- B. The impurity of iron sulphide is removed as fusible slag,  $FeSiO_3$  during roasting.
- C. The copper pyrite is concentrated by froth floatation process.
- D. Copper is obtained by self reduction in bessemer converter.

**Answer: A**

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155. Which of the following steel treatment process is applicable for softening of the steel?

- A. Leaching
- B. Quenching
- C. Nitriding
- D. Annealing

**Answer: D**



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156. Spiegel (or spiegleisen), used in the manufacture of steel by the Bessemer process is an alloy of?

- A. Iron, nickel and carbon

B. Iron, manganese and carbon

C. Iron, tungsten and carbon

D. Iron, chromium and carbon

**Answer: B**

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**157.** Which of the following metal is extracted from the process of the process of hydrometallurgy?

A. Sn

B. Mg

C. Zn

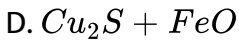
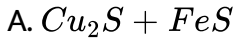
D. Cu

**Answer: B**

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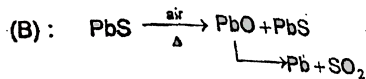
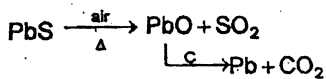
158. The chemical composition of slag formed during the smelting process in the extraction of copper is



Answer: B

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



Self – reduction process is :

A. only P

B. only Q

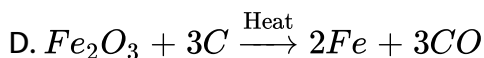
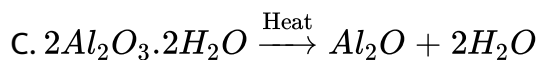
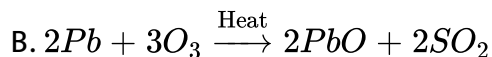
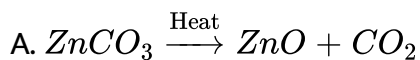
C. both P and Q

D. None of these

**Answer: B**

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**160.** which of the following processes involve smelting



**Answer: D**

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This method of extraction of Ag by complex formation and then its displacement is called.

- A. Parke's method
- B. McArthur-Forest method
- C. Serpeck method
- D. Hall's method

**Answer: B**



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162. The smelting of iron in a blast furnace involves all the steps except

- A. reduction

B. fusion

C. decomposition

D. sublimation

**Answer: D**

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**163.** Before introducing  $FeO$  in blast furnace, it is converted to  $Fe_2O_3$  by roasting so that

A. it may not be removed as slag with silica

B. it may not evaporate in the furnace

C. Presence of it may increase the m.o.t. Of charge

D. None of these

**Answer: A**

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**164.** The sulphide ore of copper are heated in reverberatory furnace. If the ore contains iron, it is mixed with silica ( $SiO_2$ ) before heating. Iron oxide slags off as iron silicate then  $SiO_2$  acts as a:

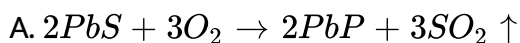
- A. reducing agent
- B. flux
- C. oxidising agent
- D. None of these

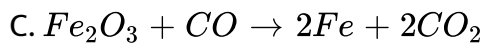
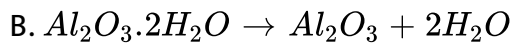
**Answer: B**



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**165.** Which of the following process involves smelting

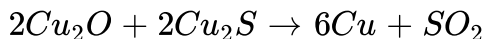
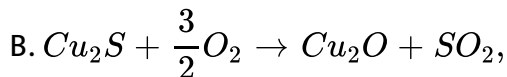
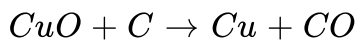
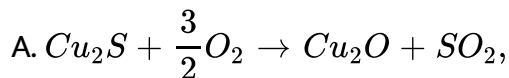


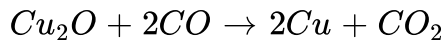
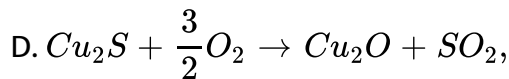
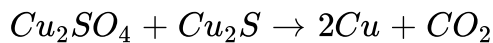
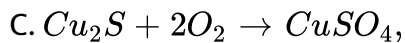


**Answer: C**

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

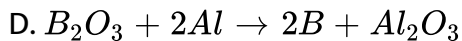
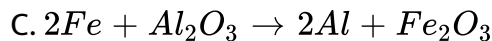
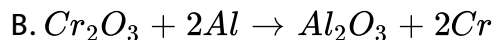
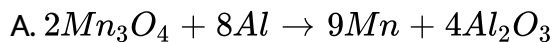




**Answer: B**

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**167.** Which of the following reaction is not involved in thermite process?



**Answer: C**

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168. Which of the following statement is correct?

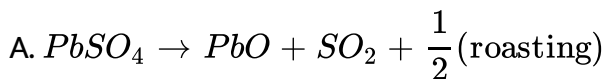
- A.  $CuCO_3 \cdot Cu(OH)_2$  is concentrated by froth floatiation method using NaCN
- B. Calcination, roasting both are only thermal
- C. In reverberatory furnace when ore is heated with excess  $O_2$  is called calcination
- D. Commercial extraction of Ti is done by thermite process

Answer: D

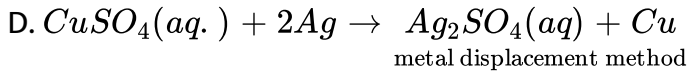
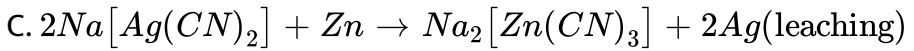
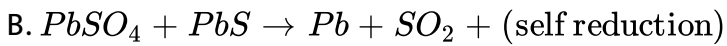


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169. Which of the following conversion is correct for indicated process?







**Answer: B**

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**170.** Which form of iron has highest carbon content?

A. Steel

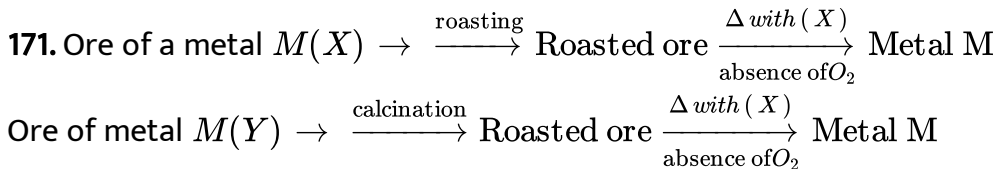
B. Pig iron

C. Cast iron

D. Wrought iron

**Answer: B**

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A. X=chalcocite Y=malachite

B. X=Galena Y=Cerussite

C. X-Zinc blende Y=Calamine

D. a and b both are correct

**Answer: D**



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172. Blister Cu is about

A. 60% Cu

B. 90% Cu

C. 98% Cu

D. 100% Cu

**Answer: C**



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**173.** Silica is added to roasted copper during extraction in order to remove:

- A. Cuprous sulphide
- B. ferrous oxide
- C. ferrous sulphide
- D. cuprous oxide

**Answer: B**



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174. Which of the following statement is correct regarding  $Cu$  extraction ?

- A. In the smelting step, carbon reduction takes place
- B. During partial roasting,  $Cu_2S$  remain almost unaffected
- C. In Bessemer converter, only self reduction occur, not slag formation
- D. Blister formed in the blister of  $Cu$  is due to dissolved of  $CO_2$

**Answer: B**



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175. Refractory materials are generally used in furnaces because

- A. they are chemically inert
- B. they can withstand high temperature

C. they do not contain impurities

D. they decrease melting point of ore

**Answer: B**

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**176.** Magnesium is extracted from ore carnallite by :

A. the self reduction process

B. the carbon-reduction process

C. the electrolytic process

D. treating the ore with aqueous NaCN and then reducing the mixture

**Answer: C**

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177. Extraction of silver from  $Ag_2S$  by the use of sodium cyanide is example of

- A. roasting
- B. hydrometallurgy
- C. electrometallurgy
- D. smelting

**Answer: B**



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178. 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. argoon

**Answer: B**

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179.  $NaCl$  and  $CaCl_2$  are added to fused  $MgCl_2$  in the electrolysis of  $MgCl_2$  since:

A. melting point is decreased and conductivity is increased

B. melting point is increased and conductivity is decreased

C. melting point and conductivity is decreased

D. melting point and conductivity is increased

**Answer: A**

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180. Which of the following processes of leaching/concentration is not correctly matched

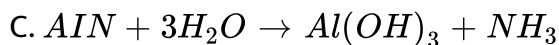
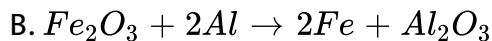
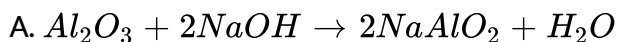
- A. Red bauxite Baeyer's process
- B. White bauxite-Serpeck's process
- C. Low grade red bauxite Hall's process
- D. None of these

Answer: D

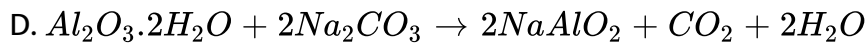


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181. Which of the following reaction is a part of Hall's process?







**Answer: D**



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**182.** In the leaching of  $Ag_2S$  with  $NaCN$ , a stream air is also passed. It is because of

- A. reversible nature of reaction between  $Ag_2S$  and  $NaCN$
- B. to oxidise  $Na_2S$  formed into  $Na_2SO_4$  and sulphur
- C. both a and b
- D. none of the above

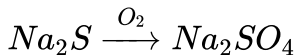
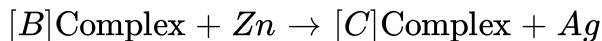
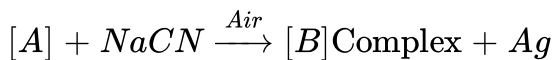
**Answer: C**



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**183.** In hydrometallurgy process, silver is extracted from argentite ore

as:



Then B is:

A. paramagnetic and octahedral complex

B. diamagnetic and linear complex

C. coordination of central atom is 6

D. complex 'B' is  $Na_2[Zn(CN)_4]$

**Answer: B**



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**184.** Which metal is extracted using a hydrometallurgical process involving complexation ?

A. Mg

B. Ag

C. Cu

D. Sn

**Answer: B**



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**185.** Which of the following metals cannot be extracted by the carbon reduction process?

A. Zn

B. Fe

C. Al

D. Sn

**Answer: C**

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**186.** In electrolysis of  $Al_2O_3$  by Hall-Heroult process:

A. cryolite  $Na_3[AlF_6]$  lowers the melting point of  $Al_2O_3$  and increases its electrical conductivity

B. Al is obtained at cathode and probably  $CO_2$  at anode

C. both a and b are correct

D. None of these

**Answer: C**

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**187.** In the electrolysis of molten alumina during the manufacture of aluminium:

- A.  $Al_2O_3$  undergoes dissociation
- B. cryolite undergoes dissociation
- C.  $Al_2O_3$  and cryolite both undergo dissociation
- D. neither of the two undergoes dissociation

**Answer: B**



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**188.** During the electrolytic production of aluminium , the carbon anodes are replaced from time to time because

- A. the carbon anodes get decayed

- B. the carbon prevents atmospheric oxygen from coming in contact with aluminium
- C. oxygen liberated at the carbon anodes reacts with anodes to form CO and  $CO_2$ .
- D. carbon converts  $Al_2O_3$  to Al

**Answer: C**

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**189.** Select the correct statement:

- A. Leaching is done for low grade ore.
- B. Highly reactive elements of group I and group II are extracted by the electrolysis of aqueous solution of their halides.
- C. Iron pyrites is  $CuFeS_2$

D. The reaction  $Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s)$  is not feasible.

**Answer: A**

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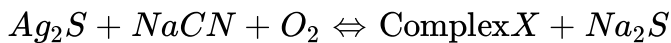
**190.** In the cyanide solution acts as a:

- A. Presence of  $O_2$  is required to oxidise  $Na_2$  into  $Na_2SO_4$ .
- B. Hybridisation of X is  $sp^2$ .
- C. Complex X is linear in shape.
- D. Reaction is a typw of Hydrometallurgy.

**Answer: B**

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191. In the following process:



Which option is incorrect for above process?

- A. Presence of  $O_2$  is required to oxidise  $Na_2$  into  $Na_2SO_4$ .
- B. Hybridisation of X is  $sp^2$ .
- C. Complex X is linear in shape.
- D. Reaction is a typw of Hydrometallurgy.

**Answer: B**

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192. Leaching of  $Ag_2S$  is carried out by heating it with a dilute solution of:

- A. NaCN only
- B. HCl



C. NaOH

D. NaCN in presence of  $O_2$

**Answer: D**

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**193.** Which of the following term is not related to Al extraction

A. Serpeck's process

B. Hall-Heroult's process

C. Thermite process

D. Hoopes process

**Answer: C**

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**194.** Cryolite is:

- A.  $Na_3AlF_6$  and is used in the electrolysis of alumina for decreasing electrical conductivity.
- B.  $Na_3AlF_6$  and is used in the electrolysis of alumina for lowering the melting point of alumina.
- C.  $Na_3AlF_6$  and is used in the electrolytic purification of alumina.
- D.  $Na_3AlF_6$  and is used in the electrolysis of alumina for increasing the melting point and electrical conductivity.

**Answer: B**



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**195.** Consider the following metallurgical process:

(P) Heating impure metal with CO and distilling the resulting volatile carbonyl (*b. p.*  $43^\circ C$ ) and finally decomposing at  $150^\circ - 200^\circ C$  to get

the pure metal.

(Q) Heating the sulphide ore in air until a part is converted to oxide and then further heating in the absence of air to let the oxide react, with unchanged metal sulphide.

(R) Electrolysis of the molten electrolyte containing approximately equal amounts of the metal chloride and NaCl to obtain the metal

The processes used for obtaining manganese, nickel and copper are respectively:

A. P, Q and R only

B. Q, R and P

C. R, P and Q

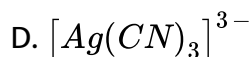
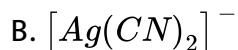
D. Q, P and R

**Answer: C**



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196. Silver ore dissolve in the dilute solution of NaCN in the presence of air to form:



**Answer: B**



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197. Select the correct statement.

A. Group I and group II elements are generally extracted by the electrolysis of aqueous solution of their chlorides.

B. Irona is extracted by aluminio-thermic process.

C. Calcination and roasting involve heating of concentrated ores above their fusion temperature

D. Lead can be extracted by carbon reduction as well as self reduction method.

**Answer: D**

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**198.** Electrolytic reduction of alumina to aluminium by Hall-Heroult process is carried out:

A. in the presence of NaCl

B. in the presence of  $BaF_2$

C. in the presence of cryolite which forms a melt with lower melting temperature

D. in the presence of cryolite which forms a melting with higher melting temperature

**Answer: C**

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**199.** Aluminium is extracted in the electrolysis of :

A. alumina

B. bauxite

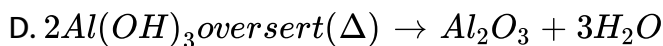
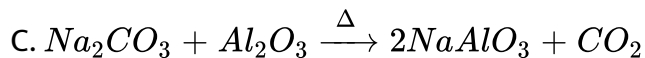
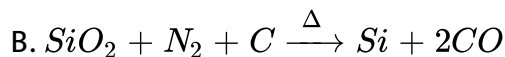
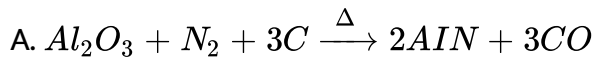
C. molten cryolite

D. alumina mixed with molten cryolite

**Answer: D**

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200. 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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201. The metal extracted by leaching with cyanide is

A. Mg

B. Ag

C. Cu

D. Na

**Answer: B**



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**202.** In the purification of aluminium by Hoopes's process, impurities of silicon and copper are added to molten aluminium in order to

- A. make the melt conducting
- B. lower the melting point of the melt
- C. smooth deposit of aluminium
- D. make the melt heavier

**Answer: D**



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**203.** Extraction of silver from its ore involving NaCN, air and an active metal is known as:

- A. Pattinson's method
- B. Amalgamation method
- C. Mc Arthur forest method
- D. Parke's method

**Answer: C**



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**204.** In the extraction of aluminium

Process  $X$ : employed for red bauxite to remove iron oxide (main impurity)

Process  $Y$ : (Serpeck's process): used for white bauxite to remove  $Z$

(main impurity) then,

Select correct option for the process  $X$  and impurity  $Z$ .

A.  $X$ =Hall and Heroult's process and  $Z=SiO_2$

B.  $x$ =Bayer's process and  $Z=SiO_2$

C.  $X$ =Serpeck's process and  $Y$ = iron oxide

D.  $X$ =Bayer's process and  $Y$ =iron oxide

**Answer: B**



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**205.** Magnesium is extracted electrolysing fused magnesium chloride containing  $NaCl$  and  $CaCl_2$  using:

A. a nickel cathode and a graphite anode

B. the iron container as anode a nickel cathode

C. the iron container as cathode and a graphite rod as anode

D. the nickel container as cathode and iron anode

**Answer: C**

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**206.** During the electrolysis of fused carnalite,  $MgCl_2$  is decomposed to liberate Mg at cathode and not KCl to liberate the K at cathode. This is because of:

- A. lower decomposition voltage of  $MgCl_2$  than that of KCl
- B. higher decomposition voltage of  $MgCl_2$  than that of KCl
- C. higher melting point of  $MgCl_2$  than KCl
- D. none of the above

**Answer: A**

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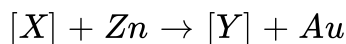
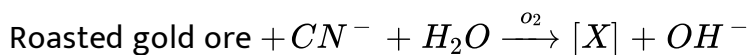
207. Which of the following process is used in the extractive metallurgy of magnesium ?

- A. Fused salt electrolysis
- B. Self reduction
- C. Aqueous solution electrolysis
- D. Thermite reduction

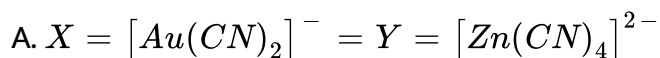
**Answer: A**

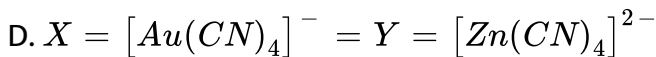
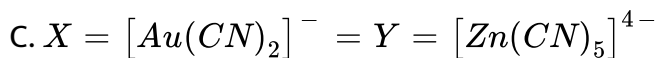
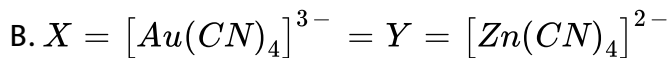
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208. In the process of extraction of gold,



Identify the complexes [X] and [Y]





**Answer: A**

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**209.** From the low grade copper ore, leached copper can be reduced by either zinc or iron but iron is given preference over zinc because:

A. iron is more reactive than zinc

B. iron is less costlier metal than zinc

C. melting point of iron is low

D. iron can acquire +3 oxidation state while Zn can acquire +2 oxidation state

**Answer: B**



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210. A mixture containing chlorides of sodium, calcium and zinc is electrolysed in presence of water. The product obtained at cathode will be:

A. Na

B.  $H_2$

C. Ca

D. Zn

**Answer: B**



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211. Electrolysis is used commercially to isolate which metas(s):

(P) (Q) Fe

- A. P only
- B. Q only
- C. both P and Q
- D. Neither P nor Q

**Answer: A**

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**212.** Coke powder is spreaded over the molten electrolyte in electrolytic reduction of  $Al_2O_3$  in order to:

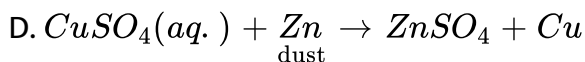
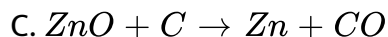
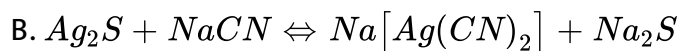
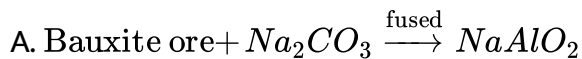
- A. prevent in electrolytic reduction from the surface
- B. prevent the corrosion of graphite anode.
- C. prevent oxidation of molten aluminium by air.
- D. Both a and b

**Answer: D**



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213. Which of the following reaction is an example of reduction of calcined or roasted or into metal?



Answer: C



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214. The element which could be extracted by electrolytic reduction of its oxide dissolved in a high temperature melt is:

A. sodium



B. magnesium

C. fluoroine

D. aluminium

**Answer: D**



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**215.** Which of the following statements is correct

A. Leaching of gold with  $CN^\ominus$  is an oxidation reaction

B. Argentite is an oxide ore of silver

C. In the precipotation of gold from the soluble complex, zinc acts  
as a reducing agent

D. a and c both

**Answer: D**



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**216.** Read the following statements:

Choose the correct set of statement(s):

(P) Al has greater affinity than that of Fe. For oxygen

(Q) Cast iron of nickel impurity of zinc and lead

(R) Refining of nickel is done by vapour phase refining

(S) In cyanide process, oxygen and zinc dust are used as oxidising agent and reducing agent respectively:

A. P,R

B. Q,R,S

C. P,R,S

D. P,S

**Answer: C**



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217. The process of the extraction of gold involves:

- A. Parke's process
- B. Cyanide process
- C. both a and b
- D. none of these

**Answer: B**



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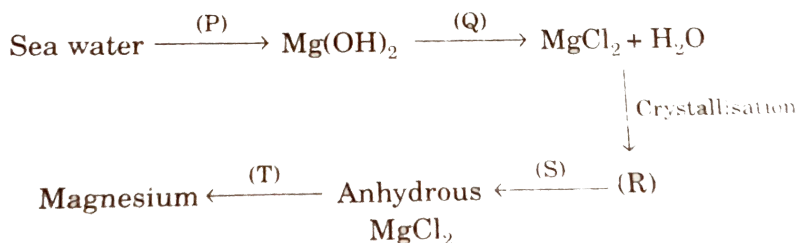
218. Which of the following term is not related to Al extraction

- A. Serpeck's process
- B. Hall-Heroult's process
- C. Thermite process
- D. Hoopes process

Answer: C

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219. The following flow diagram represents the extraction of magnesium from sea water?



Which of the following option describes the correct reactants, product and reaction conditions?

	(A)	(B)	(C)	(D)
(P)	Milk of magnesia	Lime water	Milk of lime	Milk of lime
(Q)	HCl(aq)	HCl(aq)	HCl(aq)	HCl(aq)
(R)	MgCl <sub>2</sub> · 2H <sub>2</sub> O	MgCl <sub>2</sub>	MgCl <sub>2</sub> · 6H <sub>2</sub> O	MgCl <sub>2</sub> · 6H <sub>2</sub> O
(S)	Heating in limited supply of air	Heating in absence of air	Heating in presence of dry HCl	Heating in presence of dry HCl
(T)	Reduction by coke	Electrolytic reduction in molten state	Electrolytic reduction in molten state	Electrolysis of aqueous solution



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220. Dow's process

- A. involves purification of copper
- B. involves extraction of magnesium
- C. gives metal chlorides as product
- D. gives pure Na as product

**Answer: B**



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

- A.  $Al(OH)_3$  in NaOH solution

B. an aqueous solution of  $Al_2(SO_4)_3$

C. a molten mixture of  $Al_2O_3$ ,  $Na_3AlF_6$  and  $CaF_2$

D. a molten mixture of  $Al_2O_3$  and  $Al(OH)_3$

**Answer: C**

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**222.** During electrolytic conductance and lower the temperature of melt in order to make fused mixture very conducting. X and Y are:

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**223.** For extraction of sodium from  $NaCl$ , the electrolytic mixture  $NaCl + Na_3AlF_6 + CaCl_2$  is used. During extractions process, only sodium is deposited in 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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**224.** Carnallite on electrolysis gives

A.  $Ca$  and  $Cl_2$

B.  $Na$  and  $CO_2$

C.  $Al$  and  $Cl_2$

D.  $Mg$  and  $Cl_2$

**Answer: D**

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225. What will occur if 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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226. Poling process:

- A. reduces  $SnO_2$  to  $Sn$
- B. oxidises impurities like iron and removes them as scum



C. uses green poles

D. all of the above are correct

**Answer: D**

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227. Poling process is used for:

A. the removal of  $Cu_2O$  from  $Cu$

B. the removal of  $Al_2O_3$  from  $Al$

C. the removal of  $Fe_2O_3$  from  $Fe$

D. Purification of silver

**Answer: A**

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**228.** Aluminium metal is purified by :

- A. Hoopes process
- B. Hall-Heroult's process
- C. Serpeck process
- D. Baeyer's process

**Answer: A**

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**229.** Which of the following metals may be present in the anode mud during electrorefining of copper?

- A. P and Q
- B. Q and S
- C. P and R

D. R and S

**Answer: C**



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**230.** Which one of the following process involves in the principle of fractional crystallisation for the refining of impure metals?

A. Parker's process

B. Mond's process

C. van-Arkel's process

D. zone refining

**Answer: D**



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**231.** High purity copper metal is obtained by

- A. carbon reduction
- B. hydrogen reduction
- C. electrolytic reduction
- D. Thermite reduction

**Answer: C**



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**232.** In electrolytic refining of lead, Sb, Cu, Ag and Au are found:

- A. on anode
- B. in electrolyte solution
- C. in anode mud
- D. in cathode mud

**Answer: C**



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**233.** The anode mud in the electrolytic refining of silver contains :

A. Zn,Cu,Ag,Au

B. Zn,Ag,Au

C. Cu,Ag,Au

D. Au only

**Answer: D**



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**234.** Silver can be separated from lead by:

A. fractional crystallisation

B. liquation

C. cupellation

D. addition of zinc (Parke's method)

**Answer: D**

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**235.** In electrolytic refining of lead, reelectrolyte consists of:

A.  $H_2SiF_6$  only

B.  $Pb_2SiF_6$  only

C.  $H_2SiF_6$  only

D.  $H_2SiF_6$  and  $PnSiF_6$

**Answer: D**

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

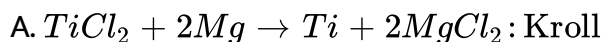
- A. greater mobility of the pure metal than that of impurity
- B. higher melting point of the impurity than that of the pure metal
- C. greater noble character of the solid metal than that of the impurity
- D. greater solubility of the impurity in the molten state than in solid

**Answer: D**



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**237.** Which does not represent correct method ?



C.  $Ag_2CO_3 \rightarrow 2Ag + CO_2 + O_2$ : Van Arkel

D.  $ZrI_4 \rightarrow Zr + 2I_2$ : Van Arkel

**Answer: C**

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**238.** Which is correct process-mineral group in metallurgical extraction ?

A. leaching:silver

B. Zone-refining:lead

C. Liquation:tin

D. Van Arkel:Zr

**Answer: B**

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**239.** During the process of electrolytic refining of copper some metals present as impurity settle as anode mud. These are

A. Sn and Ag

B. Pb and Zn

C. Ag and Au

D. Fe and Ni

**Answer: C**



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**240.** If the impurity in a metal has a greater affinity for oxygen and is more easily oxidised than the metal, then the purification of metal may be carried out by

A. liquation

B. distillation

C. zone reffing

D. cupellation

**Answer: D**

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**241.** AgCl on fusion with  $Na_2CO_3$  forms:

A.  $Ag_2CO_3$

B.  $Ag_2O$

C. Ag

D.  $Ag_2C_2$

**Answer: C**

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**242.** Give the correct order of initials T and F for the following statements. Use T if statement is true and F if it is false.

(P) In Gold Schmidt thermite process, aluminium acts as a reducing agent.

(Q) Mg is extracted by electrolysis of aq. solution  $MgCl_2$ .

(R) Extraction of Pb is possible by smelting.

(S) Red bauxite is purified by Serpeck's process.

A. TTTT

B. TFFT

C. FTTT

D. TFTF

**Answer: D**



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**243.** Select correct statement regarding silver extraction//purification process.

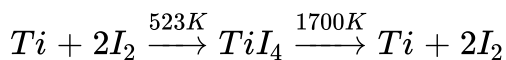
- A. When the lead silver alloy is rich in silver, lead is removed by the cupellation process.
- B. When the lead silver alloy is rich in lead, silver is removed by parke's or pattinson's process.
- C. Zinc forms an alloy with lead, from which lead is separated by distillation.
- D. Zinc forms an alloy with silver, from which zinc is separated by distillation.

**Answer: C**



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**244.** Which method of purification is represented by the following equations

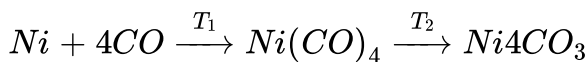


- A. Cupellation
- B. Poiling
- C. Van Arkel
- D. Zone refining

**Answer: C**

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**245.** Formation of volatile  $Ni(CO)_4$  and then its subsequent decomposition into Ni and CO makes basis of Mond's process:



$T_1$  and  $T_2$  are:

A.  $100^{\circ}C$ ,  $50^{\circ}C$

B.  $50^{\circ}C$ ,  $100^{\circ}C$

C.  $50^{\circ}C$ ,  $200^{\circ}C$

D.  $200^{\circ}C$ ,  $50^{\circ}C$

**Answer: C**



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**246.** Which method is not correct given for refining of crude metals ?

A. Distillation:zinc and mercury

B. Liquefaction:tin

C. Van Arkel:titanium

D. Mond's process:Lead

**Answer: D**



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**247.** Consider the following isolation/purification process:

(P) Heating impure metal with  $I_2$  at  $150 - 200^\circ C$  and passing the resulting volatile iodide on hot tungsten filament at  $1400^\circ C$  to get the pure metal.

(Q) Heating the sulphide ore in air until a part is converted to oxide and then further heating in the absence of air to let the oxide react with unchanged metal sulphide to get the metal.

(R) Electrolysis of the molten electrolyte containing metal oxide and cryolite or fluorspar to obtain the metal

The process used for obtaining aluminium, titanium and lead are respectively,

A. P, Q and R only

B. Q, R and P

C. R, P and Q

D. Q, P and R

**Answer: C**



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**248.** In van Arkel method, if  $I_2$  is introduced at  $1800K$  anode impure zirconium metal, the product will be:

- A. iodide of the metal
- B. pure metal
- C. impurities react with iodine
- D. none of these

**Answer: D**



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**249.** Refining of impure copper with zinc impurity is to be done by electrolysis using electrodes as:



- A. Cathod                  Anode  
(a) pure copper    pure zinc
- B. Cathod                  Anode  
(a) pure zinc    pure copper
- C. Cathod                  Anode  
(a) pure coper    impure copper
- D. Cathod                  Anode  
(a) pure zinc    impure zinc

**Answer: C**

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**250.** Van Arkel method of purification of metals involves converting the metal to

- A. volatile stable compound
- B. volatile unstable compound
- C. non-volatile compound
- D. none of the above

**Answer: B**



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**251.** Copper and tin are refined by:

- A. liquaiton
- B. cupellation
- C. bessermerisation
- D. poling

**Answer: D**



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**252.** The process of zone refining is used for :

- A. silicon
- B. germanium

C. gallium

D. all of these

**Answer: D**



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**253.** Tin and zinc can be refined by:

A. Cupellation

B. liquation

C. poling

D. bessemerisation

**Answer: B**



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254. Which of the following option is incorrect

A. B is purified by Van Arkel method because  $BI_3$  is volatile iodide.

B. Si and Ge are purified by Zone refining method.

C. Chemical reaction:  $Fe_2O_3 + Al \rightarrow Al_2O_3 + Fe$

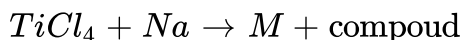
("its an endothermic process)

D. The affinity of  $Cu^{2+}$  towards  $S^{-2}$  is more than  $O^{-2}$

Answer: C

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255. In the following chemical reaction:



M(metal) is purified by:

A. Van Arkel method

B. E.R.M method

C. Mond process

D. Zone refining method

**Answer: A**

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**256.** Poling method is used for the purification of:

A. Pb and Sn

B. Pb and Cr

C. Sn and Cu

D. Fe and Pb

**Answer: C**

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257. Which of the following is a purification method

(P) Bessersisation (q) Levigation

(R) VanArkel method (S) Leaching

A. P,Q and R only

B. P and R

C. Q and S

D. Q,R and S

**Answer: B**



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258. Van Arkel method can be applied for the purification of:

A. B

B. Zr

C. Ti

D. all of these

**Answer: D**

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**259.** Consider the following statement:

Statement-1: Poling process is used to refining of copper and lead.

Statement-2: The scavenger which is used in the manufacture of steel is maganese.

Statement-3: The chemical comosition of mattert in  $Cu_2O + Cu_2S$ .

Statement-4: In the extraction of aluminium from alumina  $Al_2O_3$  undergoes dissociation.

And arrange in the order of ture/false

A. FTFF

B. TTFF

C. FFTT

D. TTFT

**Answer: A**

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260.  $TiCl_4 + Na \xrightarrow{\Delta} (X) + \text{compound}$

A. Van Arkel method

B. Mond's process

C. Zone refining method

D. Parke's method

**Answer: C**

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**261.** Which of the following option is incorrect

- A.  $Fe_2O_3$  can be reduce by coke as well as aluminium.
- B. Red bauxite is concentrate by leaching method.
- C. Impure Zn is purified by either distillation or electrolytic refining method
- D. Pig rion is a purest form of iron.

**Answer: D**



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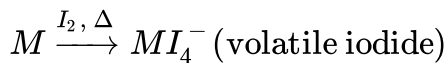
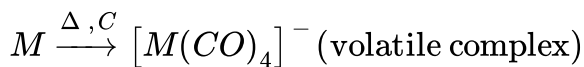
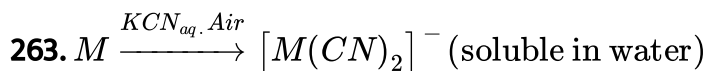
**262.** Desilverisation process is used for:

- A. Cu
- B. Pb
- C. Sn and Cu

D. Fe

**Answer: B**

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Metals in reaction (i),(ii) and (iii) are respectively

A. Au, Ni, Ti

B. Ni, Au, Ti

C. Ag, Zn, Ti

D. Ag, Ni, Pb

**Answer: A**

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**264.** Softening of lead means

- A. melting pure lead at high temperature
- B. removal of impurities, except silver, present in commercial lead.
- C. formation on of lead alloy
- D. formation of 100% pure lead

**Answer: B**



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**265.** Which of the following metal is NOT purified by Van Arkel method

- A. Ti
- B. Zr
- C. Ni

D. Hf

**Answer: C**

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**266.** From gold amalgam, gold may be recovered by:

- A. addition of Zn metal
- B. electrolytic refining
- C. distillation
- D. dissolving Hg in  $HNO_3$

**Answer: C**

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267. The purest form of metal can be obtained by:

- (a) electrolytic refining (b) puddling  
(c) zone refining (d) chromatography

A. electrolytic refining

B. puddling

C. zone refining

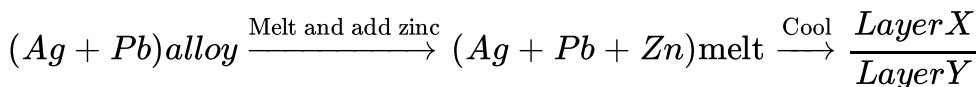
D. chromatography

Answer: C



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268.



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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**269.** The metal for which, its property of formation of volatile complex is taken into account for its purification is:

- A. cobalt
- B. nickel
- C. vanadium
- D. iron

**Answer: B**



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270. Which of the following statements is/are incorrect?

- A. Combination of tin stone and wolframite is non magnetic.
- B. No external reducing agent is required for the extraction of Hg from HgO.
- C. For Cu extraction in bessemer converter, the process like slag formation, oxidation and reduction take takes.
- D. Poling method is mainly used when impure metal is having its oxide as impurity.

Answer: A



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271. High purity copper metal is obtained by

- A. carbon reduction
- B. hydrogen reduction
- C. electrolytic reduction
- D. Thermite reduction

**Answer: C**

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**272.** In the extraction of nickel of Mond's process, the metal is obtained by:

- A. electrochemical reduction
- B. thermal decomposition
- C. chemical reduction by aluminium
- D. reduction by carbon

**Answer: B**





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273. Zone refining is based on the principle of:

- A. fractional distillation
- B. fractional crystallisation
- C. partition coefficient
- D. chromatographic separation

**Answer: B**



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274. Si and Ge used for semiconductors are required to be of high purity and hence purified by:

- A. zone refining

- B. electrorefining
- C. Van Arkel's process
- D. cupellation process

**Answer: A**

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**275.** Mercury is purified by:

- A. passing through dilute  $HNO_3$
- B. distillation
- C. distribution
- D. vapour phase refining

**Answer: B**

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**276.** When an impurity in a metal has greater affinity for oxygen and is more easily oxidised than the metal itself. Then, the metal is refined by

- A. Cupellation
- B. zone refining
- C. distillation
- D. electrolytic process

**Answer: A**



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**277.** Which of the following process is not associated with recovery of the silver

- 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 boiling  $Na[Ag(CN)_2]$  aq.

**Answer: D**



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**278.** Blister copper is refined by stirring molten impure metal with green logs of wood because such a wood liberates hydrogen gases (*like*  $CH_4$ ). This process X is called.....and the metal contains impurities of Y is...

A. X=cupellation, Y= $CuO_2$

B. X=poling, Y= $Cu_2O$

C. X=poling, Y=CuO

D. X=Cupellatio, Y=CuO

**Answer: B**



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**279.** A piece of steel is heated until redness and then plunged into cold water or oil. This treatment of steel makes it:

A. soft and allleable

B. hard but not brittle

C. more brittle

D. hard and brittle

**Answer: D**



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**280.** Modern method of steel manufacturing is:

- A. open heath process
- B. L.D. process
- C. bessermerisation
- D. cupellation

**Answer: B**



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**281.** Railway wagon axles are made by heating rods of iron embedded in charcoal powder. The process is known as

- A. sherardising
- B. annelaling
- C. tempering

D. case hardening

**Answer: D**



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**282.** Galvanisation is applying a coating of

A. Zn

B. Pb

C. Cr

D. Cu

**Answer: A**



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**283.** Statement-1: Carbon cannot be used as a reducing agent for the extraction of second group metals.

Statement-2: Second group metals are extracted from their fused salts by electrolytic reduction:

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: B**



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**284.** Statement-I : Wolframite impurities are separated from cassiterite by electromagnetic separation

Statement-II : Cassiterite being magnetic is attached by the magnet and forms a separate heap.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: C**



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**285.** Statement-1: Aluminium is used as reducing agent in the commercial extraction of iron from haematite ore.

Statement-2: Reduction of  $B_2O_3$  to boron by aluminium is called as Goldschmidt aluminothermic process.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: D**



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**286.** 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 compound present in the ores into the metallic states.

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

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: D**



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**287.** Statement-1: Electrolytic reduction of alumina to aluminium by Hall-Heroult process is carried in the presence of cryolite.

Statement-2: Cryolite contains aluminium.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: B**



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**288.** Assertion: Wrought iron is prepared from cast iron by oxidising impurities in a reverberatory furnace lined with haematite.

Reason: Haematite oxidises carbon to carbon monoxide.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: B**



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**289.** Assertion: Sulphide ores of  $Zn$  and  $Pb$  are generally converted into their respective oxides, prior to reduction.

Reason: The zinc oxide and lead oxide are reduced by carbon to their respective free metals.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**

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**290.** Assertion: During calcination the ore is heated well below its melting point in the limited supply of air or absence of air.

Reason: The process of calcination is carried out for sulphide ores.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: C**

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**291.** Assertion: Electropositive metals like  $Mg$ ,  $Al$  are extracted by electrolysis of their salt solutions.

Reason: Highly electropositive metals cannot be reduced by chemical reduction methods.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: D**

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**292.** Assertion: In Hall-Heroult process aluminium is extracted by the electrolytic reduction of alumina dissolved in molten cryolite or fluorspar.

Reason: The cryolite ore fluorspar lower the melting point of melt and make it more conducting



- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: B**

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**293.** Assertion: In extraction of copper from chalcopyrite after roasting in supply of air at moderate temperature, the temperature of the roasting ore is increased above the fusion temperature and then silica is added in reverberatory furnace.

Reason: In the extraction of copper from chalcopyrites during smelting,

the impurity of iron is removed as fusible slag ( $FeSiO_3$ ) in blast furnace or reverberatory furnace.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: D**

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**294.** Statement-1: Galena on heating in a reverberatory furnace above the melting point of metal gives metallic lead.

Statement-2: Galena is partially converted to  $PbO$  and  $PbSO_4$  which are reduced by excess galena to metallic lead.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**

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**295.** Statement-1: The reduction of a metal oxide is easier if the metal formed is in liquid state at the temperature of reduction.

Statement-2: The value of entropy change  $\Delta S$  of the reduction process is more on +ve side when the metal formed is in liquid state and the metal oxide being reduced is in a solid state. Thus, the value of the  $\Delta G$  becomes more or negative side.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**

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**296.** Assertion: Extraction of zinc from sphalerite ore involves the roasting followed by reduction with coke.

Reason: Zinc can be extracted by hydrometallurgy.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: C**



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**297.** Assertion: Silica is added as a flux in reverberatory furnace, in the extraction of copper from copper pyrites.

Reason: Silica decreases the melting point of the ore and increases the conductivity.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: C**

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**298.** Statement-1: Oxide ore of iron are concentrated through calcination/roasting in an reverberatory furncae.

Statement-1: The water of crystallisation of hydrated oxide ore get get lost as mositure, carbonate ore get decomposed to form oxide and sulphide if present is oxidised.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: A**

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**299.** Statement-1: In the Hoopes's process of aluminium purification, the fused materials remain in three different layers. These layers remain intact even in the electrolytic reduction.

Statement-2: All the layers have different densities.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: A**



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**300.** Assertion : In froth floatation process sodium ethyl xanthate is used as collector.

Reason : Sulphide ores are water soluble.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.



C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: C**

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**301.** Statement-1: In the electrolytic reduction of  $Al_2O_3$ , cryolite lowers the melting point of the mixture and brings conductivity:

Statement-2: Cryolite is an ore of aluminium.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: B**



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**302.** Assertion : Reduction of ZnO with carbon is done at  $1100^{\circ}C$ .

Reason : At this temperature,  $\Delta G^{\circ}$  is negative and the process is spontaneous.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**



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**303.** Statement-1: Graphite is used as anode by not diamond.

Statement-2: Mobile electrons are present in graphite layer which help in the electrical conductivity.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**



**View Text Solution**

**304.** Statement-1: Pb, Sn and Bi are purified by liquation.

Statement-2: Impurities have lower melting point than metal.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: C**



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**305.** Statement-1: All ores are minerals but all minerals are not ores.

Statement-2: Minerals are obtained from mines.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: B**

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**306.** Statement-1: Aluminium is the most abundant element in earth's crust yet it is obtained from bauxite.

Statement-2: Bauxite is available in large quantities.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: A**



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**307.** Statement-1: In blast furnace inner surface is lining of refractory materials.

Statement-2: These refractory materials are acidic and basic in nature generally.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: B**

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**308.** Statement-1: Platinum and gold occur in native state in nature.

Statement-2: Platinum and gold are noble metals.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: A**



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**309.** Statement-1: Sulphide ores are concentrated by froth floatation process.

Statement-2: Pine oil acts as a frothing agent in froth floatation process.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.



**Answer: B**

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**310.** Statement-I : Wolframite impurities are separated from cassiterite by electromagnetic separation

Statement-II : Cassiterite being magnetic is attached by the magnet and forms a separate heap.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: C**





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**311.** Statement-1: Al is used as a reducing agent in aluminothermy.

Statement-2: Al has a lower melting point than Fe, Cr and Mn

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: B**



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**312.** Statement-1: Alkali metal can not prepared by the elctrolysis of their chlorides in aqueous solution.

Statement-2: Reduction potentials of alkali metals cations is much lower than that  $H_2O$ .

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explantion for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explantion for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: A**



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**313.**  $Ti$  can be purified by Van Arkel process.

$TiI_4$  is a volatile compound which decomposes at a high temperature.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**



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**314.** Statement-1: Nickel is purified by the thermal decomposition of nickel tetracarbonyl.

Statement-2: Nickel is a transition element.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: B**

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**315.** Assertion: In smelting process, the roasted ore is heated with powdered coke in presence of flux.

Reason: Oxides are reduced to metal by carbon or CO and impurities are removed as slag.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.
- B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.
- C. Statement-1 is True, Statement-2 is False.
- D. Statement-1 is True, Statement-2 is True.

**Answer: A**

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**316.** Statement-1: Magnesia and quick lime are used as basic flux.

Statement-2:  $\text{MgO}$  and  $\text{CaO}$  can withstand very high temperatures.

- A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: B**

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**317.** Statement-1: Wolframite impurity is separated from  $SnO$ , by magnetic separation.

Statement-2: Tin stone is ferromagnetic, therefore attracted by magnet.

A. Statement-1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement-1.

B. Statement-1 is True, Statement-2 is True, Statement-2 is not a correct explanation for Statement-1.

C. Statement-1 is True, Statement-2 is False.

D. Statement-1 is True, Statement-2 is True.

**Answer: C**

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**318.** Which of the following process is/are used to refine the metals?

A. levigation

B. Cupellation

C. Mond's process

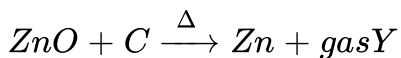
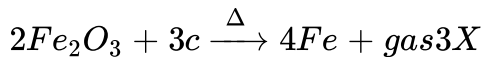
D. Poling

**Answer: B,C,D**

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**319.** In the following carbon reduction process:



Note: C stands for carbon.

Which of the following option is/are correct regarding X and Y?

- A. X is neutral oxide and Y is acidic oxide.
- B. Both have  $\pi - \pi$  bond
- C. Both have  $\pi - \pi$  back bond
- D. Both have same number of  $\pi$  bonds

**Answer: B,D**



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**320.** Poling is used for the purification of:

- A. Sn

B. Cu

C. Pb

D. Zn

**Answer: A,B**

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**321.** Which of the following option are correct?

A. Wrought iron is a purest form of iron.

B.  $Ca_3(PO_4)_2O$  is called Thomas slag, used as a fertilizer.

C. In a puddling process,  $Fe_2O_3$  act as a oxidising agent.

D.  $FeSiO_3$  slag is formed during the extraction of Cu.

**Answer: A,C,D**

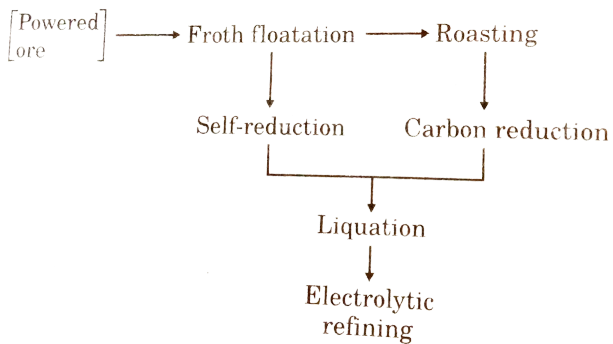
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322. Dolomite is an ore of:

- A. aluminium
- B. magnesium
- C. calcium
- D. potassium

Answer: B,C

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323.

Select the correct option(s).

- A. The flow chart represents extraction of Pb from PbS.
- B. Concentration of ore involves use of NaCN as depressant.
- C. Metal obtained contains Ag as one of the impurities which is removed by Parke's process.
- D. Impure metal is very soft.

**Answer: A,B,C**



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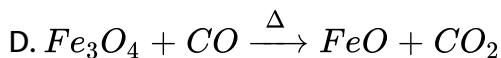
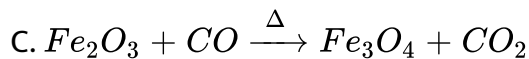
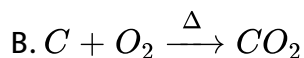
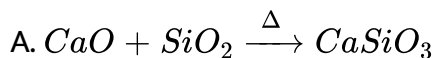
**324.** Egg shell is made up of a chemical. IN which of the following ore this chemical is present?

- A. dolomite
- B. Calamine
- C. lime stone
- D. Feldspar

Answer: A,C

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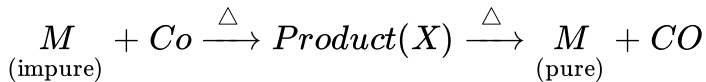
325. Which of the following chemical reaction takes place in blast furnace during extraction of iron?



Answer: A,B,C,D

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326. Which of the following option is incorrect regarding following process :



- A. X is a high spin complex
- B. It is Mond's process
- C. X is tetrahedral in shape
- D. X is diamagnetic in nature

**Answer: A,B**



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**327.** Which of the following is/are manufactured by the electrolysis of their fused salts?

- A. copper
- B. Sodium
- C. Aluminium
- D. Platinum

**Answer: B,C**



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**328.** The smelting of iron in a blast furnace involves, which of the following process(es)?

- A. Combustion
- B. Redcution
- C. Slag formation
- D. sublimation

**Answer: A,B,C**



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**329.** The addition of high proportions of maganese makes steel useful in making rails or railroads because manganese useful in making rails

or railroads because manganese

- A. gives hardness to steel
- B. helps in the formation of oxides of iron
- C. can remove oxygen and sulphur
- D. can show highest oxidation state of +7

**Answer: A,C**



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**330.** In Poling process of purification of  $Cu$ ,  $O_2$  oxidises following group of elements.

- A. S,Sb,As
- B. Sb,As,Fe
- C. S,Sb,As
- D. As,Ag,Au



**Answer: A,B,C**

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**331.** Partin of gold may be done with:

A. sulphuric acid

B. sodium hydroxide

C. borax

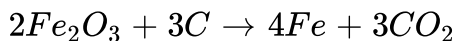
D. Chlorine( $Cl$ )<sub>2</sub>

**Answer: A,D**

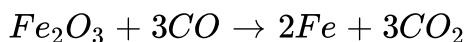
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**332.** During the production of iron and steel.

A. The oxide ore is primarily reduced to iron by solid coke according to the reaction:



B. The oxide ore is reduced by the carbon monoxide according to the reaction



C. Major silica impurities are removed as calcium silicate slag by addition of a fluxing agent lime stone.

D. The converter slag containing phosphorus is used as fertilizer.

**Answer: B,C,D**



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**333.** Which of the following process is involved in the extraction of corresponding metal when Zinc Blende is used as ore?

A. Calcination

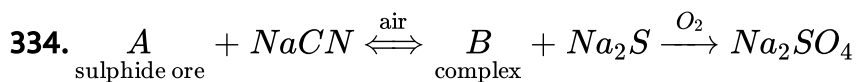
B. Roasting

C. froth floatation method

D. Carbon reduction

**Answer: B,C,D**

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then B is:

A. paramagnetic

B. diamagnetic

C. coordination number of central atom is 4.

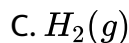
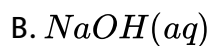
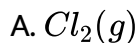
D. coordination number of central atom is 6.

**Answer: B**



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335. What products are formed during the electrolysis of a concentrated aqueous solution of NaCl?



Answer: A,B,C



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336. Which of the following process(es) occur(s) during the extraction of copper from chalcopyrites?

A. froth floatation method

B. Roasting

C. bessermerisation

D. Calcination

**Answer: A,B,C**

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**337.** Calcination and roasting process of ores to form their oxides are beneficial:

A. to convert ores into porous form so that their redcution becomes easier.

B. as impurities like S, As, Sb, are removed.

C. as organic impurities are removed.

D. as the ores are converted into oxide form which makes the reduction easier.

Answer: A,B,C,D



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338. Calcination silicate(slag) formed in the slag formation zone in extraction of iron from haematite ore:

- A. does not dissolve in molten iron
- B. being lighter floats on the molten iron
- C. is used in cement industry and as building material
- D. prevents the re-oxidation of molten iron

Answer: A,B,C,D



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339. The majore role of flurospar ( $CaF_2$ ) which is added in small quantities in the electrolytic reduction of alumina dissolved in fused

cryolite ( $Na_3AlF_6$ ) is:

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

**Answer: B,C**

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**340.** Which of the following statement(s) is (are) incorrect?

- A. In Serpeck's process silica is removed by heating the bauxite to  $1800^\circ C$  with coke in a current of  $N_2$
- B. In extraction of lead from galena roasting and self reduction takes places in the same furnace but under different conditions of temperatures and supply of air

C. Then tin is obtained by the carbon reduction of black tin

D. none of these

**Answer: D**



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**341.** Liquation process may be applied for the purification of:

A. copper

B. tin

C. iron

D. bismuth

**Answer: B,D**



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**342.** In the alumino-thermite process, Al acts as :

A. oxidising agent

B. flux

C. reducing agent

D. solder

**Answer: C**

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**343.** Which of the following statement(s) is (are) correct?

A. Cuprite and zincite are oxides ores

B. Magnesite and carballite are carbonate ores

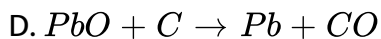
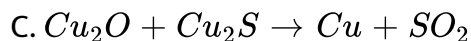
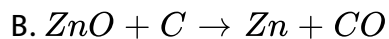
C. Chalcocite and azurite are ores of copper

D. Feldspar and albite minerals contains aluminium

Answer: A,C,D

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344. Of the following reduction process, the correct process(es) is/are:



Answer: A,B,C,D

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345. Roasting of copper pyrites is done:

A. to remove moisture

B. to oxidise free sulphur and antimony

C. to convert pyrite completely into  $Cu_2O$  and  $FeO$

D. to remove volatile organic impurities

**Answer: A,B,D**

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**346.** In which of the following pairs, both the minerals are oxides ?

A. Sylvine, saltpetre

B. Cassiterite, litharge

C. Siderite, corundum

D. Cuprite, tin stone

**Answer: B,D**

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**347.** Select the correct statement(s) with respect to the differences between roasting and calcination

- A. In roasting at higher temperature sulphide ores of the some metal like Cu,Pb,Hg etc., are rduced directly to metal but not in calcination.
- B. Partial fusion occurs in calcination but not in roasting
- C. Calcination is done is limited supply of air or absence of air but in roasting supply of excess air is required.
- D. Combination reaction occurs in roasting but not in calcination.

**Answer: A,C**



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**348.** 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,D**

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**349.** Select the correct statement:

- A. Dolomite contains both magnesium and calcium.
- B. Extraction of lead from galena involves roasting in limited supply of air at moderate temperature followed by self reduction of higher temperature (to melt the charge).
- C. Extraction of zinc from zinc blende involves roasting followed by reduction with carbon.

D. The chemical composition of 'slag' formed during the extraction of iron and copper is  $FeSiO_3$ .

**Answer: A,B,C**

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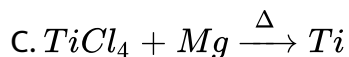
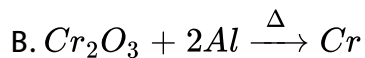
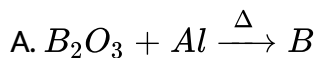
**350.** Which of the following statement(s) is/are true for the extraction of tin from ore cassiterite

- A. Impurity of wolframite is removed by magnetic separation.
- B. The concentrated ore containing 60-70%  $SnO_2$  is called as black tin.
- C. Tin is obtained by the carbon reduction of  $SnO_2$
- D. Angiesite is an another ore of tin.

**Answer: A,B,C**

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351. Of the following reduction process, the correct process(es) is/are:



Answer: A,B,C,D



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352. In which of the following extraction no reducing agent is required?

A. Iron from haematite

B. Aluminium from bauxite

C. Magnesium from carnallite

D. Zinc from zinc blende

**Answer: B,C**



[View Text Solution](#)

**353.** The smelting of iron in a blast furnace involves the following processes:

A. Combustion

B. reduction

C. Slag formation

D. fusion

**Answer: A,B,C,D**



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354. Out of  $Cu_2S$ ,  $HgS$ ,  $Ag_2S$ ,  $PbS$  and  $ZnS$ , roasting will convert, the minerals into metal in case of:

A.  $Cu_2S$ ,  $PbS$

B.  $HgS$ ,  $ZnS$

C.  $Cu_2S$ ,  $AgS$

D.  $HgS$ ,  $Cu_2S$

Answer: A,C,D



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355. Why lime stone is added in the extraction of lead from galena?

A. It prevents the formation of  $PbSO_4$

B. It removes the impurity of silica as fusible slag

C. It converts lead silicate to lead oxide

D. It remove the impurity of iron oxide as fusible

**Answer: A,B,C**



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**356.** Which of the following is/are correctly matched?

A. Copper Bessemer converter

B. Iron blast furnace

C. Chromium aluminothermic process

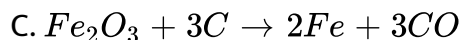
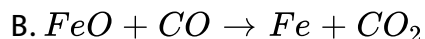
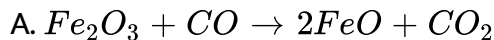
D. Tin-electrolytic reduction

**Answer: A,B,C**



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357. The reaction(s) which (do) not occur in the reduction zone in the extraction of iron from haematite ore is(are):



Answer: C,D



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358. Which of the following statement(s) is(are) true?

A. In the process of precipitation of silver from sodium dicyanoargentate (I), the zinc acts as reducing agent as well as complexing agent.

- B. In process of the roasting, the copper pyrite is converted into a mixture of  $Cu_2S$  and  $FeS$  which, in turn, are partially oxidised.
- C. Limonite, haematite and magnetite of  $Cu_2S$  and  $FeS$  Iron
- D. Tin and lead both are extracted from their ores by self reduction.

**Answer: A,B**

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**359.** Which of the following is a correct statement?

- A. Calamine is an ore of zinc
- B. Prostate is a mineral of silver
- C. Copper Glance is ore of copper
- D. Diaspore is the ore of aluminium

**Answer: A,B,C,D**

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**360.** The chemical treatment of the ore for concentration is done in the case of :

- A. aluminium
- B. silver
- C. copper
- D. gold

**Answer:** A,B,D

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**361.** Froth floatation:

- A. is a physical method of separation mineral from the gangue

B. is a method of concentration of ore depending on the difference in watability of gangue and the ore particles

C. is used for the concentration of sulphide ores

D. is a method in which impurities sink to be bottom and ore particles pass on the surface with froth

**Answer: A,B,C,D**



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**362.** Which of the following pair consists of ore of the same metal ?

A. Bauxite, limonite

B. Haematite, siderite

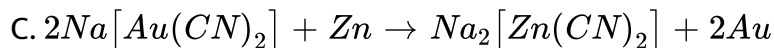
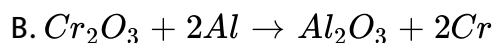
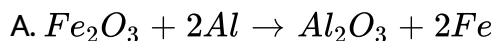
C. Cinnabar, cassiterite

D. Galena, cerrusite

Answer: B,D

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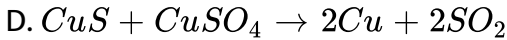
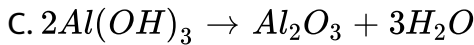
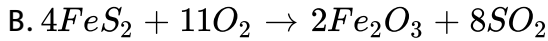
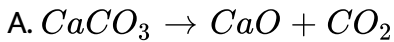
363. Which of the following reduction are actually employed in commercial extraction of metals?



Answer: B,C,D

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364. Which of the following reaction(s) occurs during calcination?



Answer: A,C



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365. Which of the following statements is/are correct?

A. Froth floatation can also be used for non sulphide ores having sulphide impurities, and the ore is recovered by using suitable activator.

B. In the leaching of  $\text{Ag}_2\text{S}$  with  $\text{NaCN}$ , a stream of air is also passed because of reversible nature of reaction between  $\text{Ag}_2\text{S}$  and  $\text{NaCN}$



C. In hydrometallurgy, Zn is used as an oxidizing agent in the purification of Ag from  $[Ag(CN)_2]^-$

D. Roasting can convert sulphide into oxide or sulphate and apart of sulphide may also act as a reducing agent

**Answer: A,B,D**

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**366.** Iron is not present in the form of sulphide in:

A. fool's gold

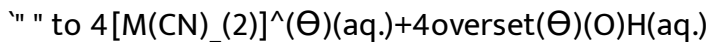
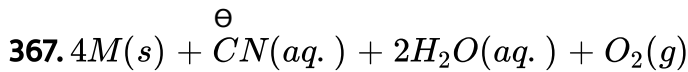
B. siderite

C. chalcopyrite

D. limonite

**Answer: B,D**

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A.  $O_2$  acts as oxidising agent

B.  $\overset{\ominus}{CN}$  acts as complex forming agent

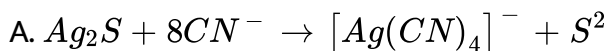
C.  $O_2$  and  $\overset{\ominus}{CN}$  both act as oxidising agent

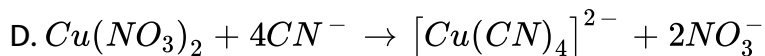
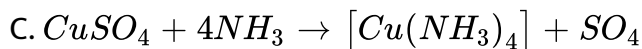
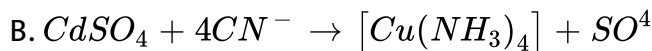
D.  $O_2$  and  $\overset{\ominus}{CN}$  both act as complex forming agent

Answer: A,B

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368. Select which complex formation reaction is/are incorrect for forward displacement:





**Answer: A,D**

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**369.** Select the correct statement when lower the position of a metal line in the Ellingham diagram

A. The greater is the stability of its oxide for example the line for Al (oxidation of Al) is found to be below that for Fe (formation of  $Fe_2O_3$ )

B. The greater the gap between any two lines the greater the effectiveness of reducing properties corresponding to the lower line's metal

C. The intersection of two lines implies an oxidation reduction equilibrium

D. At the point of intersection the free energy change for redox reaction is zero involving change for redox reaction is zero involving metal oxide and metal from that two lines.

**Answer: A,B,C,D**



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**370.** Select the correct statement for froth floatation method.

A. Collectors enhance non-wettability of mineral particles by water? =

B. Cresols, aniline are used as a froth stabiliser

C. The minerals particles becomes wet by oils while gangue particles by wate

D. Froth floatation method can also be used for non sulphide ore by using suitable activator

**Answer: A,B,C,D**

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**371.** The ore in which sulphide is absent.

A. cuprite

B. Argentite is an oxide ore of silver

C. pyrites

D. siderite

**Answer: A,D**

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**372.** Which one of the following is not true in electrolytic refining?

- A. Cathode is made up of impure metal
- B. Anode is made up impure metal
- C. Cathode is of impure metal and anode is of pure metal
- D. Both electrodes must be of pure metal

**Answer:** A,C,D

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**373.** Metal 'M' is a major component of many igneous minerals including mica and clays then M is:

- A. Al
- B. the third most abundant element in earth's crust
- C. the most abundant metal

D. the most abundant element

**Answer: A,B,C**



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**374.** Find the correct statement(s) given below.

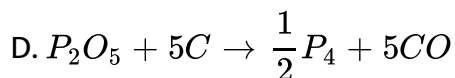
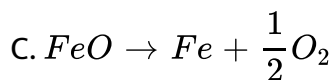
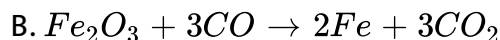
- A. In magnetic separation, non magnetic particles fall nearer to the magnetic roller
- B. Tea filtration is the good example of leaching process in everyday life.
- C. Magnetic particles fall nearer to the magnetic roller In magnetic separation method
- D. None of these

**Answer: B,C**



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375. Which of the following reaction(s) in blast furnace during extraction of iron?



Answer: A,B,D



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376. Pitch blende is not the source of:

A. Ra

B. U



C. Ga

D. Th

**Answer: A,C**

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**377.** Liquation is used to purify:

A. Pb

B. Sn

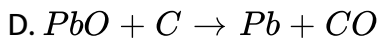
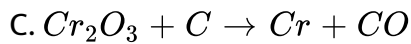
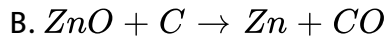
C. Bi

D. A,

**Answer: A,B,C**

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378. Of the following reduction process, correct are (for their commercial extraction):



Answer: A,B,D



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379. Which of the following are method of concentration of ore is metals?

A. gravity separation process

B. froth floatation

C. Magnetic separation

D. Smelting

**Answer: A,B,C**

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**380.** Which of the following options are observed during roasting?

A. Convert sulphide to oxide and sulphate

B. Remove water of hydration

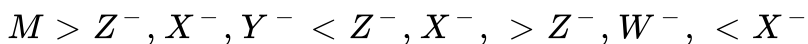
C. Melt the ore

D. Remove arsenic and sulphur impurities

**Answer: A,B,D**

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**381.** Which of the following electrolyte is used for electrorefining of metal M?



A. MX

B. MZ

C. MY

D. MW

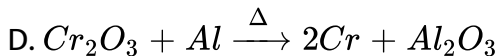
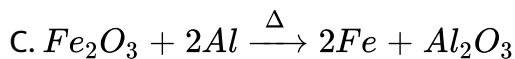
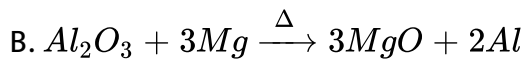
**Answer:** A,B,C,D



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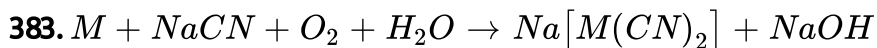
**382.** Which of the following reactions are example of termite reduction?

A. A thermic reaction may start if a ship having Al parts is hit by a missile



**Answer: A,C,D**

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Which of the following elements gets dissolved in samme manner in NaCN solution?

A. Ag

B. Cu

C. Au

D. Pt

**Answer: A,C**



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**384.** Which of the following statements are not correct?

- A. Copper is extracted by self reduction method.
- B. Cast iron is the purest form of iron.
- C. The concentra of malachite ore is  $\text{Cu}(\text{OH})_2 \cdot 2\text{CuCO}_3$
- D. Cupellation process is used for the refining of Ag and Au.

**Answer: B,C**



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**385.** Which of the following step of metallurgy requires oxygen?

- A. Calcination of dolomite
- B. Roasting of cinnabar

C. Zone of refining of Si

D. Leaching of gold by NaCN solution

**Answer: B,D**

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**386.** Which of the following ore do not contain iron (do not consider any impurity in ore)?

A. Pyrolusite

B. Magnetite

C. Chromite

D. Cassiterite

**Answer: A,D**

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**387.** Which of the following statements are correct both calcination and roasting?

- A. Both involve thermal decomposition.
- B. Product of both process are porous
- C. Impurities of organic compounds are removed in the forms of gas
- D. Ores used are of similar type in both process

**Answer: B,C**



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**388.** Which of the following statement are correct?

- A. The mineral  $KCl \cdot MgCl_2 \cdot 6H_2O$  is known as carnallite.
- B. The chemical composition of malachite is  $CuCO_3 \cdot MgCO_3$



C. In Bayer's process of purifying aluminium ore the concentration of ore is done with  $NaOH$ .

D. Silver and gold are extracted from its ore by the Mc-Arthur-Forest cyanide process.

**Answer: A,C,D**

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**389.** Which of the following minerals do/does not contain(s) copper?

A. Siderite

B. Malachite

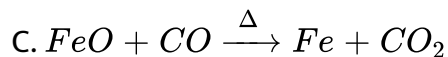
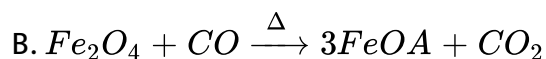
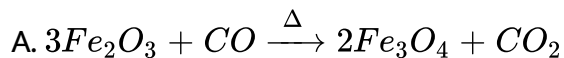
C. Limonite

D. Anglestite

**Answer: A,C,D**

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**390.** Which of the following are the steps/reactions involved in the extraction of iron?



D. Calcium silicate is produced as slag

**Answer: A,B,C,D**



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**391.** The metal which mainly occurs as oxide ore in nature is:

A. gold

B. lead

C. aluminium

D. magnesium

**Answer: B,C**

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**392.** On the basis of Ellingham diagram which of the following is/are correct?

A. Entropy change for all metal oxides is roughly same.

B. Below the boiling point,  $T\Delta S$  factor is same irrespective of metal.

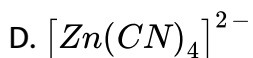
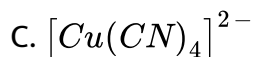
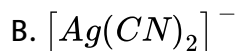
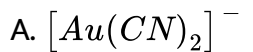
C. Above  $\Delta G = 0$  line, oxide decomposes into metal and oxygen.

D. If randomness increases the slope increases.

**Answer: B,C,D**

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**393.** Complexes formed in the cyanide process are:



**Answer: A,B,D**



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**394.** Roasting can be performed in:

A. blast furnace

B. reverberatory furnace

C. electric furnace

D. None of these

**Answer: A,B**

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**395.** In the manufacturing of metallic sodium by fused salt electrolysis method (Down's process), small amount of  $CaCl_2$  that added is known as auxillary electrolyte and is used to

- A. improve the electrical conductance
- B. decrease the metling point of electrolyte
- C. stabilise the metallic sodium
- D. increases the temperature of electrolysis

**Answer: A,B**

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**396.** Hoop's process of purification of aluminium involves formation of layers during electrolysis. It involves:

- A. the three layers have same density but different materials.
- B. the three layers have different densities.
- C. the upper layer is of pure aluminium which acts as a cathode.
- D. the bottom layer is of impure aluminium which acts as an anode and middle layer consists of cryolite and  $BaF_2$ .

**Answer: B,C,D**

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**397.** Metallurgical process of zinc involves roasting of zinc sulphide followed by reduction. Metallic zinc distills over as its volatile and impurities like Cu, Pd and Fe gets condensed. The crude metal obtained is called spelter, which may be purified by:

- A. electrolysis process
- B. fractional distillation
- C. poling
- D. heating with lime

**Answer: A,B**



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**398.** Common impurities present in bauxite are.....

- A. CuO
- B. ZnO
- C.  $Fe_2O_3$
- D.  $SiO_2$

**Answer: C,D**



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**399.** During extraction of copper, it is obtained in the form of molten matte. Which of the following is not true?

- A. Matte is further treated in Bessemer's converter
- B. Molten matte is electrolysed
- C. It is treated with a blast of air and sand
- D. It is dissolved in  $CuSiF_6$  and crystallised

**Answer: B,D**

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**400.** Which of the following employ downward movement of ore due to gravity?

- A. gravity separation process



B. froth floatation

C. Blast furnace

D. Bessemer's converter

**Answer: A,C**

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**401.** The correct statemetn are:

A. Generally the calcination and roasting is done blast furnace

B. The sandy and rcoky material associated with ore are called  
matrix.

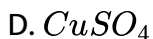
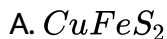
C. Froth floatation process is suitbale for sulphide ores.

D. Substance that reacts with gangue to form fusible mass is called  
slag.

**Answer: B,C**

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**402.** Upon heating with  $Cu_2S$  the reaction (s) that give copper metal is /are



**Answer: B,C,D**

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**403.** Copper is purified by electrolytic refining of bliter copper .The current statement about this process is (are):

- (i) impure  $Cu$  strip is used as cathode
- (ii) acidified aqueous  $CuSO_4$  is used as electrolyte
- (iii) pure  $Cu$  deposits at cathode
- (iv) impurities settle as anode mud

- A. Impure Cu strip is used as cathode.
- B. Acidified aqueous  $CuSO_4$  is used as electrolyte.
- C. Pure Cu deposits at cathode.
- D. Impurities settle as anode mud.

**Answer: B,C,D**



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**404.** Extraction of copper from copper pyrite ( $CuFeS_2$ ) involves

- A. crushing followed by concentration of the ore by froth floatation
- B. removal of iron as slag.

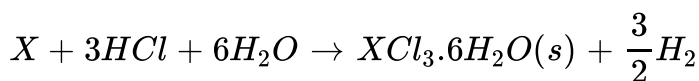
C. self reduction step to produce 'blister copper' following evolution of  $SO_2$

D. refining of blister copper by carbon reduction.

**Answer: A,B,C**

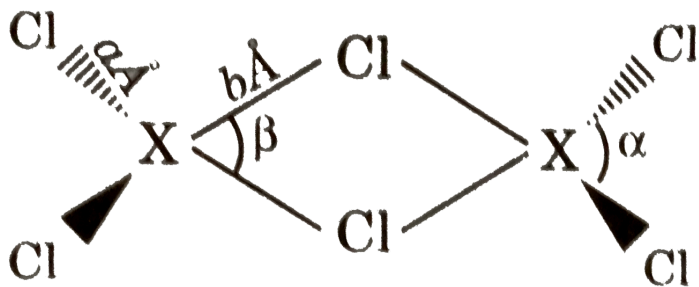
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**405.** An element (X) which is the most abundant metal in the earth's crust and the third most abundant element, is extracted by the electrolysis of its fused oxide in melted cryolite and fluorspar.  $XCl_3$  exists as  $(XCl_3)_n$  in crystalline state and is only dimeric ( $X_2Cl_6$ ) in fused state



Anhydrous  $XCl_3$  fumes in moist air and is very hygroscopic

Consider of the following is correct?



Which of the following is correct?

A.  $\alpha > \beta$  and  $b > a$

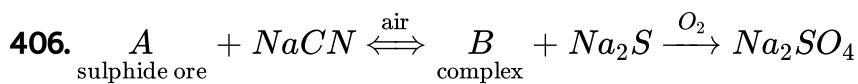
B.  $\beta > \alpha$  and  $b < a$

C.  $\alpha > \beta$  and  $a > b$

D.  $\alpha < \beta$  and  $b < a$

**Answer: A**

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then B is:

A. Paramagnetic and octahedral complex

B. Diamagnetic of central atom is 6

C. coordination of central atom is 6

D. Complex B is  $Na_2[Zn(CN)_3]$

**Answer: B**

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**407.** All minerals are not ore but all ores are minerals. The extraction of a particular metal depends upon several factors and overall it has to be convenient and economical. Following common steps are involved in extraction of metal from its prime ore:

(a) Pulverisation

(b) Concentration

(c) Calcination/Roasting

(d) Smelting and Reduction

(e) Purification of crude metal

Which of the following options is correct? State true and false

(P)  $Fe_2O_3$  can be reduced by coke as well as aluminium.

(Q) Red bauxite is concentrated by leaching method.

(R) Impure Zn is purified by either distillation or electrolytic refining method.

(S) Wrought iron is a purest form of iron.

A. TTTT

B. FTTF

C. FTFT

D. TFTF

**Answer: A**



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**408.** Copper is the most noble of the first row transition metals and occurs in small deposits in several countries. Ors 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.

Partial roasting of chalcopyrite produces

- A.  $Cu_2S$  and  $FeO$
- B.  $Cu_2O$  and  $FeO$
- C.  $CuS$  and  $Fe_2O_2$
- D.  $Cu_2O$  and  $Fe_2O_2$

**Answer: a**

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**409.** Copper is the most noble of the 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

- A. FeO
- B. FeS
- C.  $Fe_2O_3$
- D.  $FeSiO_3$

**Answer: d**

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**410.** Copper is the most noble of the 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.

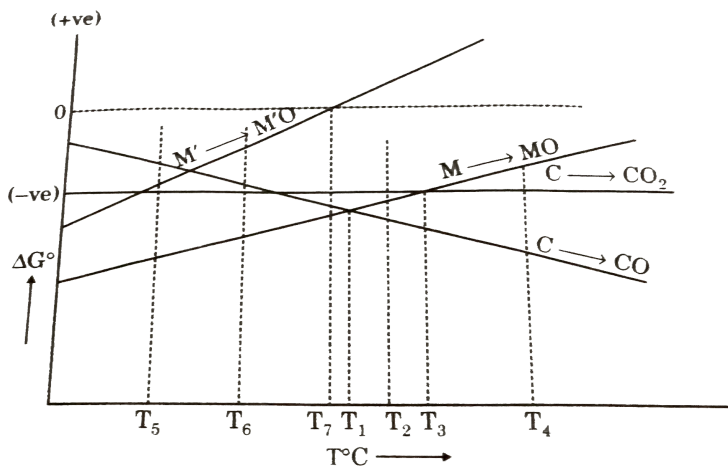
In self-reduction, the reducing species is

- A. S
- B.  $O^{2-}$
- C.  $S^{2-}$
- D.  $SO_2$

**Answer: c**

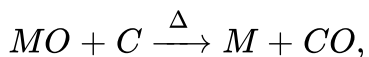


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411.

In the following chemical reaction:



At what temperature this reaction is most feasible?

A.  $T_3$

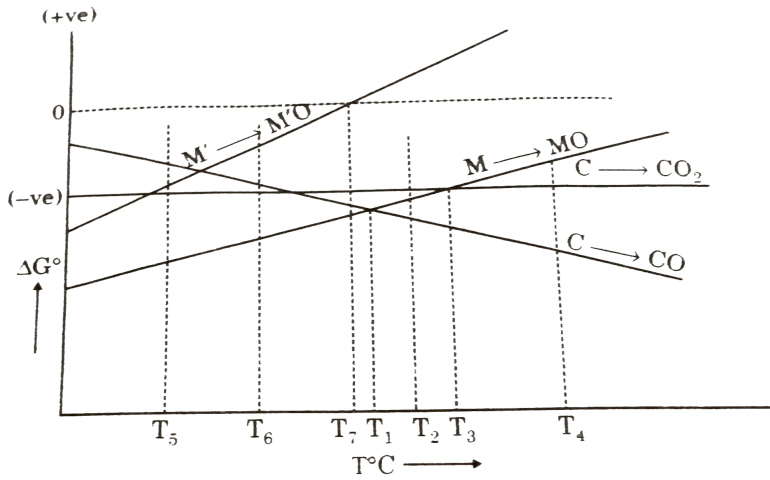
B.  $T_5$

C.  $T_6$

D.  $T_1$

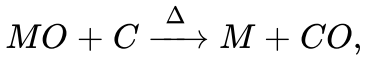
Answer: a

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412.

In the following chemical reaction:



What is the decomposition temperature of  $M'O$ ?

A.  $T_2$

B.  $T_5$

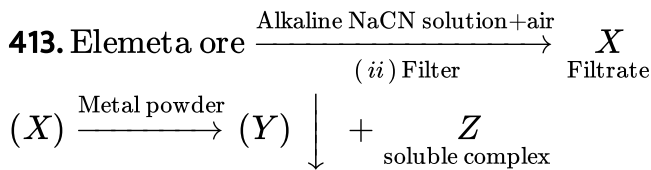
C.  $T_6$

D.  $T_7$

Answer: d



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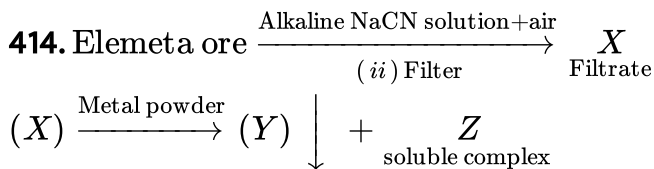
Which of the following elements is extracted by the above mentioned method?

- A. Al
- B. Ag
- C. Zn
- D. Pb

Answer: b



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Which of the following can be used to precipitate (Y) from the filtrate (X)?

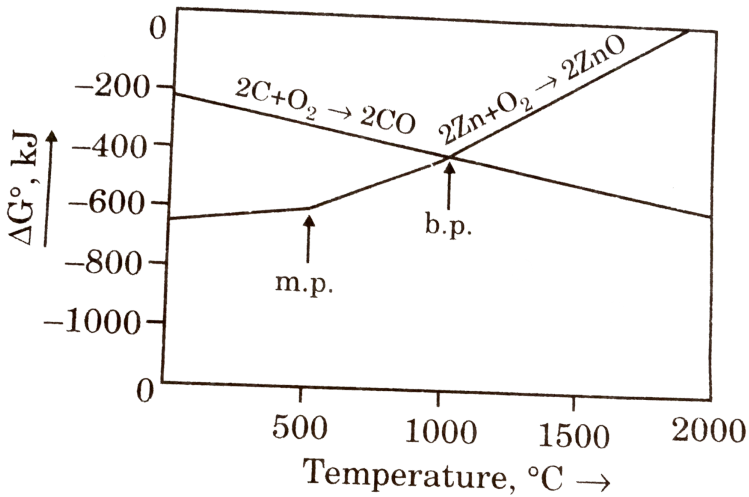
- A. Zn dust
- B. Al dust
- C. Pt dust
- D. Both a and b

**Answer: d**



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**415.** Question given below are based on the given diagram of extractive metallurgy.



The point noted by arrow are the melting and boiling points of the metals zinc and magnesium.  $\Delta G^\circ$  as a function of temperature for some reaction of extractive metallurgy.

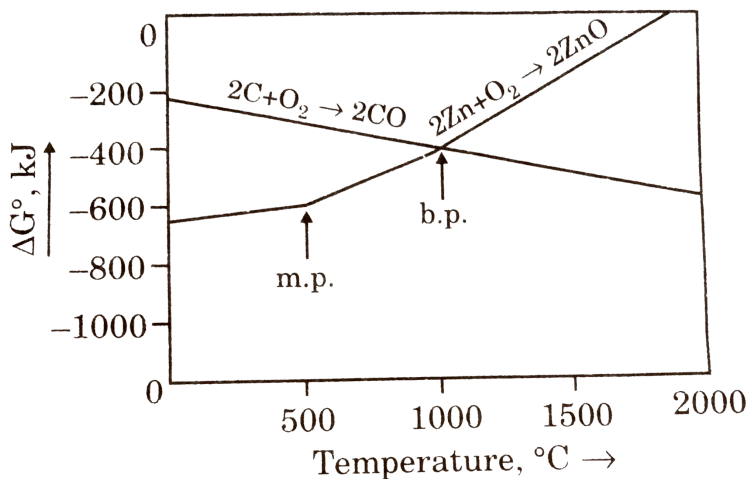
At what temperature, zinc and carbon have equal affinity for oxygen?

- A.  $1000^\circ C$
- B.  $1500^\circ C$
- C.  $500^\circ C$
- D.  $1200^\circ C$

**Answer: a**

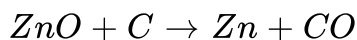


416. Question given below are based on the given diagram of extractive metallurgy.



The point noted by arrow are the melting and boiling points of the metals zinc and magnesium.  $\Delta G^\circ$  as a function of temperature for some reaction of extractive metallurgy.

At this temperature  $\Delta G^\circ$  of the reaction is:



A. -ve



B. +ve

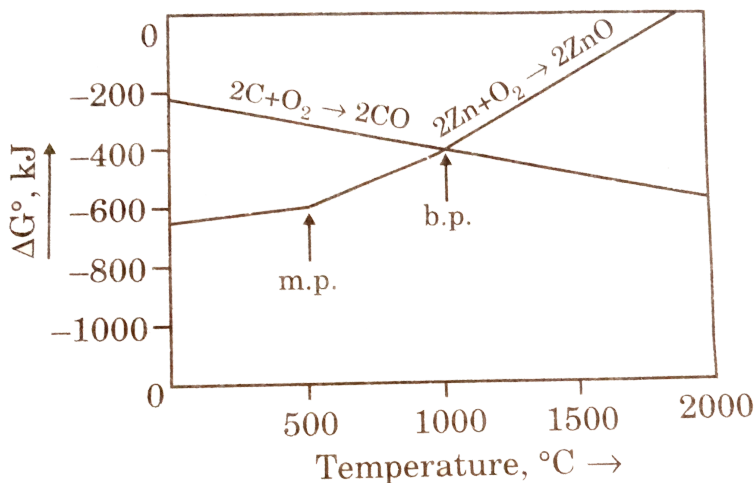
C. zero

D. nothing can be said

Answer: c

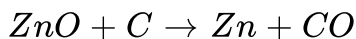
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417. Question given below are based on the given diagram of extractive metallurgy.



The point noted by arrow are the melting and boiling points of the metals zinc and magnesium.  $\Delta G^\circ$  as a function of temperature for some reaction of extractive metallurgy.

To make the following reduction process spontaneous, temperature should be:

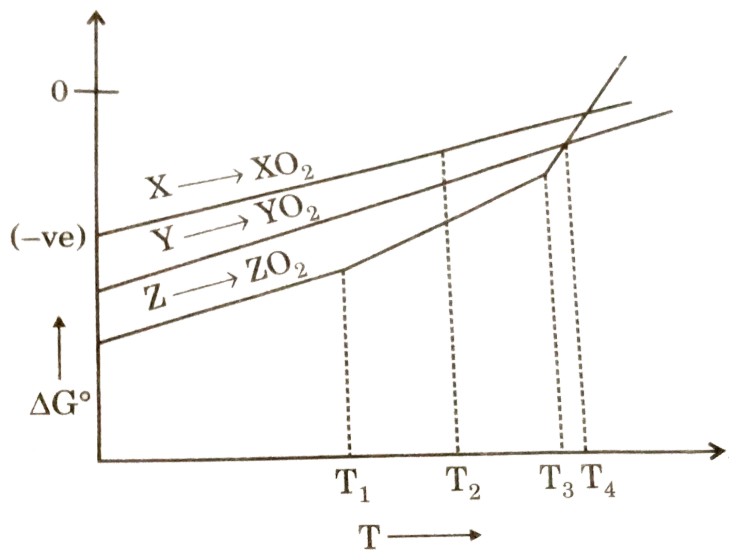


- A.  $< 1000^\circ \text{C}$
- B.  $> 1100^\circ \text{C}$
- C.  $> 500^\circ \text{C}$
- D.  $> 500^\circ \text{C}$  but  $< 1000^\circ \text{C}$

**Answer: b**



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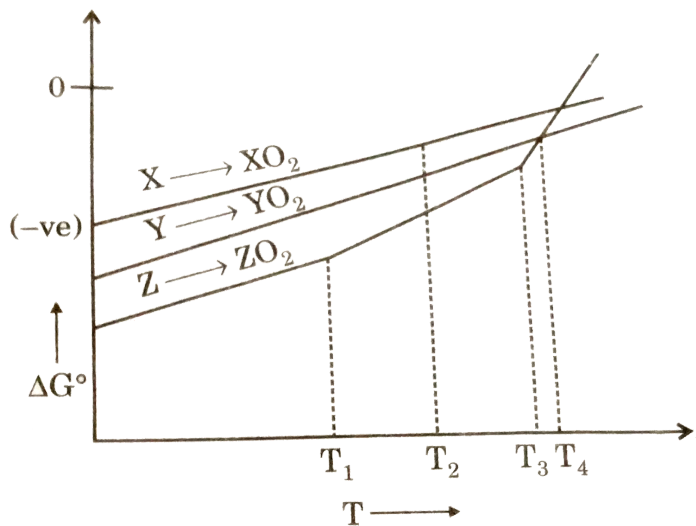
418.

Temperature  $T_1$  and  $T_3$  represents respectively: `

- A. melting point and boiling point of Z
- B. melting point and boiling point of  $ZO_2$
- C. melting point of Z and  $ZO_2$
- D. boiling point of Z and  $ZO_2$

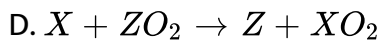
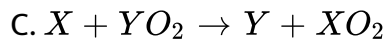
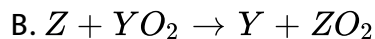
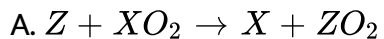
Answer: a

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419.

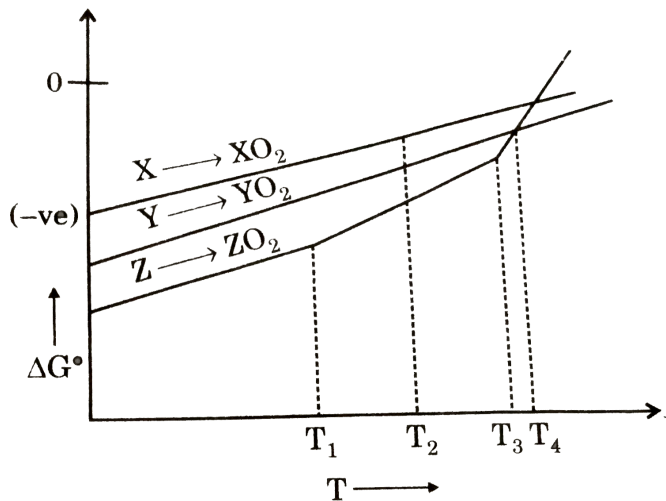
At  $T_2$  temperature, which of the following reaction is most feasible?



Answer: a



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420.

At  $T_4$  temperature, the  $\Delta G$  for the reaction  $Y + ZO_2 \rightarrow Z + YO_2$  is:

A.  $\Delta G = (+)$

B.  $\Delta G = (-)$

C.  $\Delta G = 0$

D. cannot be predicated

Answer: c

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**421.** Most metals are obtained from minerals. A mineral is obtained by mining and is a naturally occurring substance with a range of chemical composition.

Which of the following metal sulphide is reduced by self reduction?

A.  $Cu_2S$

B.  $PbS$

C.  $HgS$

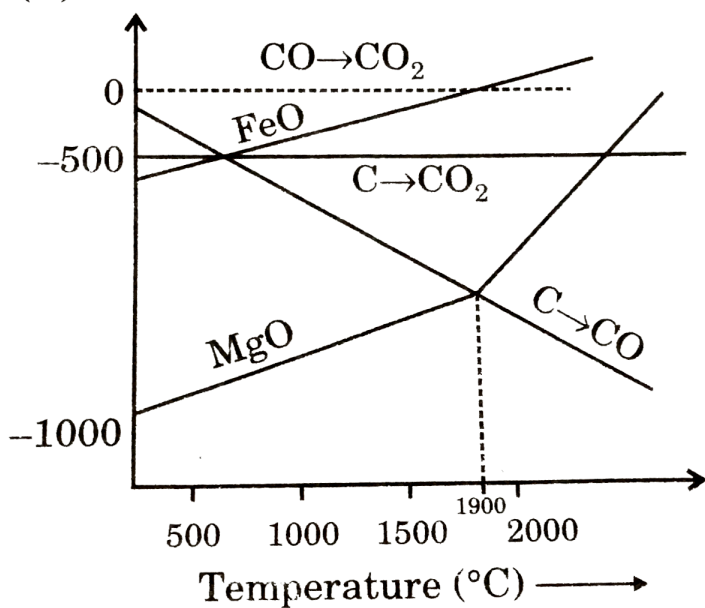
D. All are reduced by self reduction

**Answer: d**



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**422.** Most metals are obtained from minerals. A mineral is obtained by mining and is a naturally occurring substance with a range of chemical composition.



Using the Ellingham diagram, estimate the temperature at which MgO can be reduced to metal by carbon:

- A. Below  $1500^{\circ}\text{C}$
- B. Below  $1120^{\circ}\text{C}$
- C. Above  $1900^{\circ}\text{C}$
- D. Below  $1600^{\circ}\text{C}$

**Answer: c**

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**423.** Most metals are obtained from minerals. A mineral is obtained by mining and is a naturally occurring substance with a range of chemical composition.

Which of the following methods is based upon relative melting point of ore and impurity?

- A. Bessemerisation
- B. Amalgamation
- C. Liquation
- D. Distillation

**Answer: c**



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**424.** Some of the lower quality ores are mixed with Haematite for Fe extraction like Siderite, Limonite and Magnetic. Roasted ores are mixed



with coke and lime stone, finally heated in the blast furnace to get molten Fe.

Choose the correct statement regarding the roasting process here.

- A. It is illogical because there is no sulphide ore in extraction of Fe.
- B. Limonite is converted into magnetite during roasting
- C. FeO is converted into  $Fe_2O_3$
- D. None of these

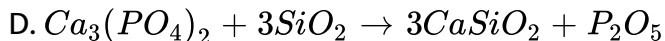
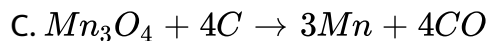
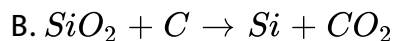
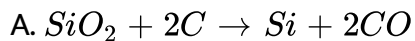
**Answer: c**



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**425.** Some of the lower quality ore are mixed with Haematite for Fe extraction like Siderate, Limonite and Magnetic. Roasted ore are mixed with coke and lime stone, finally heated in the blast furnace to get molten Fe.

Which of the following reaction is least favoured at the heath?

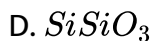
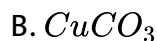


Answer: b

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**426.** Iron is extracted from its oxide in blast furnace. This is almost cylindrical furnace.

Which of the following slag is formed in extraction of Iron?



**Answer: c**



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**427.** Which of the following metal's ore is/are concentrated by leaching method?

A. Al

B. Ag

C. Au

D. All are concentrated by leaching

**Answer: d**



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**428.** Benefication of the ore can be done by different ways. It is increasing the concentration of ore by removing impurities, while

refining is the process by which concentration of metal is increased in the final product.

Which of the following compound will be reduced by carbon reduction?

A. Zn

B. Na

C. Cr

D. Mn

**Answer: a**



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**429.** Benefication of the ore can be done by different ways. It is increasing the concentration of ore by removing impurities, while refining is the process by which concentration of metal is increased in the final product.

The liqation process is applicable for:

A. for high melting metals

B. for low melting metals

C. A and B both

D. None of these

**Answer: b**

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**430.** Benefication of the ore can be done by different ways. It is increasing the concentration of ore by removing impurities, while refining is the process by which concentration of metal is increased in the final product.

What is the correct match for the name of the ore in column I and formula in column II?

A. Name of the ore    Formula  
(a) Zincite         $ZnSO_4 \cdot 7H_2O$

B. Name of the ore    Formula  
(a) Malachite green     $Cu(OH)_2 \cdot CuCO_3$

- |    | Name of the ore | Formula  |
|----|-----------------|----------|
| C. | (a)Anglesite    | $PbCO_3$ |
|    | Name of the ore | Formula  |
| D. | (a)Magnetite    | $MgCO_3$ |

**Answer: b**

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**431.** Benefication of the ore can be done by different ways. It is increasing the concentration of ore by removing impurities, while refining is the process by which concentration of metal is increased in the final product.

The phase principle to apply vapour phase refining is/are:

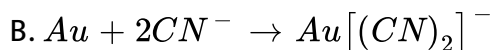
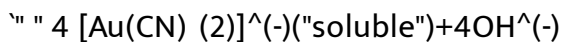
- A. The intermediate compound has to be volatile
- B. The intermediate compound has to be relatively thermally unstable.
- C. a and b both
- D. Neither a nor b

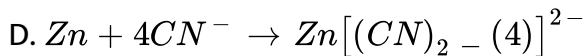
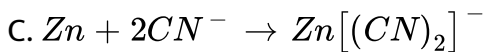
Answer: c

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**432.** Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution. During this process metallic gold is slowly converted to  $[Au(CN)_2]^-$ , which is soluble in water. After equilibrium has been reached, the aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to  $[Zn(CN)_4]^{2-}$ . Gold in nature is frequently alloyed with silver, which is also oxidised by aerated sodium cyanide solution.

The correct ionic reaction for the process are:





**Answer: a**



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**433.** Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution. During this process metallic gold is slowly converted to  $[Au(CN)_2]^-$ , which is soluble in water. After equilibrium has been reached, the aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to  $[Zn(CN)_4]^{2-}$ . Gold in nature is frequently alloyed with silver, which is also oxidised by aerated sodium cyanide solution. There have been several attempts to develop alternative gold extraction processes which could replace this one. This is due to:



- A. Sodium cyanide solutions corrode mining machinery.
- B. Sodium cyanide escapes into ground water and produces hydrogen cyanide which is toxic.
- C. Gold obtained by this process is not pure.
- D. The amount of gold in aluminosilicate rocks is very less.

**Answer: b**



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**434.** Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution. During this process metallic gold is slowly converted to  $[Au(CN)_2]^-$ , which is soluble in water. After equilibrium has been reached, the aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to

$[Zn(CN)_4]^{2-}$ . Gold in nature is frequently alloyed with silver. which is also oxidised by aerated sodium by aerated sodium cyanide solution

The process described in the passage represents:

- A. ore concentration
- B. pyrometallurgical extraction
- C. hydrometallurgical extraction
- D. purification of metal

**Answer: c**



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**435.** Amongst the various ores of a metal (M) (sulphide, carbonates, oxides, hydrated or hydrixides) two ores [X] and [Y] show the following reactivity?

(a) [X] on calcination gives a black solid (S), water and a colourless gas which produces milkiness when passed through lime water. But this

colourless gas does not decolorise acidified  $KMnO_4$ .

(b) [X] dissolved in dilute HCl. On reaction with KI gives a white precipitate (P) and iodine gas.

(c) [Y] on roasting at high temperature gives metal (M) and gas ( $G_1$ ) which turns starch iodate solution blue.

(d) [Y] on reaction with dilute HCl gives a white precipitate (MS) and another gas ( $G_1$ ) to precipitate colloidal sulphur in presence of moisture.

M,S[X],[Y] gives greenish blue flame.

The metal ore [X] and [Y] are respectively:

A. carbonate and sulphide ores

B. sulphide and carbonate ores

C. carbonate and hydroxide ores

D. carbonate and oxide ores

**Answer: a**



[View Text Solution](#)

**436.** Amongst the various ores of a metal (M) (sulphide, carbonates, oxides, hydrated or hydroxides) two ores [X] and [Y] show the following reactivity?

(a) [X] on calcination gives a black solid (S), water and a colourless gas which produces milkiness when passed through lime water. But this colourless gas does not decolorise acidified  $KMnO_4$ .

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(d) [Y] on reaction with dilute HCl gives a white precipitate (MS) and another gas ( $G_1$ ) to precipitate colloidal sulphur in presence of moisture.

M, S, [X], [Y] gives greenish blue flame.

Which of the following statements is correct about [Y]?

A. [Y] is converted to metal (M) by self reduction.

B. Carbon extract of [Y] gives yellow precipitate with suspension of



C. [Y] is copper glance or copper pyrite.

D. All of the above

**Answer: d**

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**437.** Amongst the various ores of a metal (M) (sulphide, carbonates, oxides, hydrated or hydrides) two ores [X] and [Y] show the following reactivity?

(a) [X] on calcination gives a black solid (S), water and a colourless gas which produces milkiness when passed through lime water. But this colourless gas does not decolorise acidified  $KMnO_4$ .

(b) [X] dissolved in dilute HCl. On reaction with KI gives a white precipitate(P) and iodine gas.

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which turns starch iodate solution blue.

(d) [Y] on reaction with dilute HCl gives a white precipitate (MS) and another gas ( $G_1$ ) to precipitate colloidal sulphur in presence of moisture.

M,S[X],[Y] gives greenish blue flame.

The gas ( $G_1$ ) can act as:

- A. oxidising agent
- B. reducing agent
- C. oxidising agent reducing agent
- D. fluxing agent

**Answer: c**



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**438.** Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated by sun light and is then treated

with milk of lime. Magnesium hydroxide obtained is reacted with dilute HCl and  $MgCl_2$  thus obtained is crystallised. The molten mixture containing anhydrous 35%  $MgCl_2$ , 50% NaCl and 15%  $CaCl_2$  is electrolysed when magnesium is discharged at cathode. NaCl and  $CaCl_2$  are added to lower the fusion temperature and to increase to the conductance. Mg electrolysed is protected from atmospheric oxidation by a blanket of inert gases.

Select the correct statement.

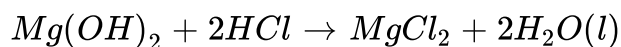
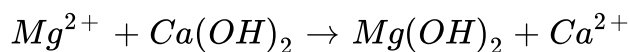
- A. Langbenite contains potassium and magnesium.
- B. Hydrated magnesium chloride is made anhydrous by heating in presence of dry HCl gas.
- C. Fused anhydrous carnallite on electrolysis liberates magnesium at cathode.
- D. All of the above

**Answer: d**

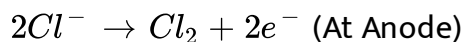
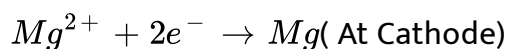


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**439.** Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated in sun-light and is then treated with slaked lime. Magnesium hydroxide is heated in a stream of HCl to give  $MgCl_2$  which is electrolysed 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.



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



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

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



B. 4

C. 2

D. 10

**Answer: a**



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**440.** Dow's process of extraction of Mg involves extraction of Mg from sea water. Sea water is concentrated by sun light and is then treated with milk of lime. Magnesium hydroxide obtained is reacted with dilute HCl and  $MgCl_2$  thus obtained is crystallised. The molten mixture containing anhydrous 35%  $MgCl_2$ , 50% NaCl and 15%  $CaCl_2$  is electrolysed when magnesium is discharged at cathode. 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.

Molten mixture of  $\text{NaCl}$  and  $\text{CaCl}_2$  is added to the molten  $\text{MgCl}_2$

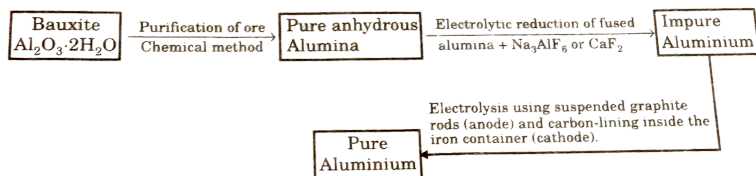
because:

- A. it increases the melting point of  $\text{MgCl}_2$ .
- B.  $\text{CaCl}_2$  acts as a dehydrating agent.
- C.  $\text{CaCl}_2 + \text{NaCl}$  lower the melting point of  $\text{MgCl}_2$ .
- D. none of these

Answer: c

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441. Following flow diagram represents the extraction of aluminium from bauxite,



The purpose of adding cryolite is:

A. to increase the electrical conductivity of pure aluminium

B. to lower the melting point of  $Al_2O_3$ .

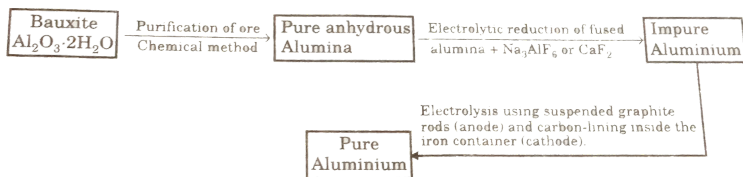
C. to remove the impurities of  $Al_2O_3$ .

D. to increase the aluminium percentage in the yield.

Answer: b

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442. Following flow diagram represents the extraction of aluminium from bauxite,



Coke powder is spreaded over the molten electrolyte to:

A. prevent the loss of heat by radiation from the surface.

B. prevent the corrosion of graphite anode.

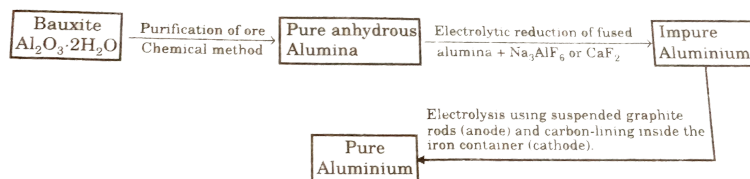
C. prevent oxidation of molten aluminium by air.

D. both a and c

Answer: d

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443. Following flow diagram represents the extraction of aluminium from bauxite,



Select the incorrect statement.

A. Bauxite is purified by Hall's Serpeck's and Bayer's process.

B. In the electrochemical process for aluminium extraction, a molten

of  $\text{Al}_2\text{O}_3$ ,  $\text{Na}_3\text{AlF}_6$  or  $\text{CaF}_2$  is used as electrolyte.

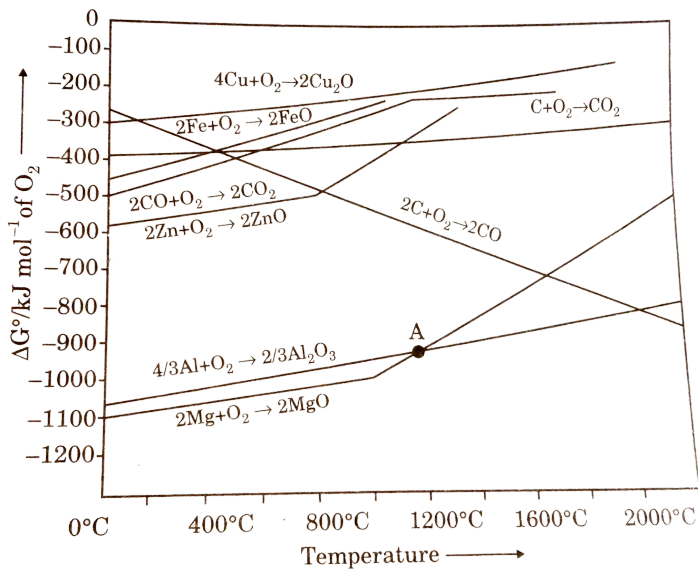
C. Hydrated alumina is converted to anhydrous alumina by calcination process.

D. None of these

Answer: d

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444. Read the following graph and answer the following question



At what approximately temperature, zinc and carbon have affinity for oxygen?

A.  $1000^{\circ}C$

B.  $1500^{\circ}C$

C.  $500^{\circ}C$

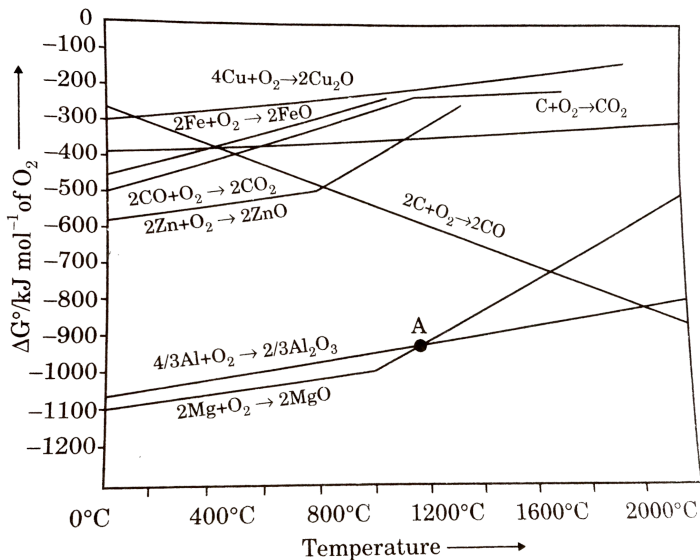
D.  $1200^{\circ}C$

**Answer: a**



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445. Read the following graph and answer the following question

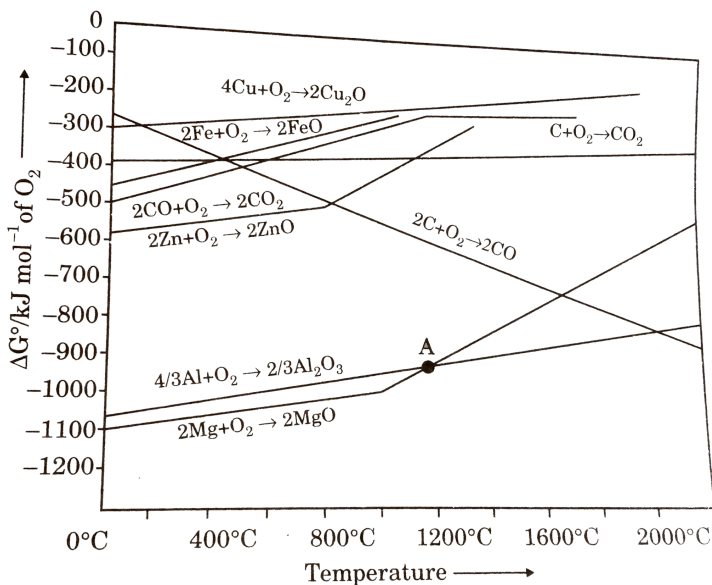


To make the following reduction process spontaneous, temperature should be:

- A.  $< 1000^\circ\text{C}$
- B.  $< 1000^\circ\text{C}$
- C.  $< 500^\circ\text{C}$
- D.  $> 500^\circ\text{C}$  but  $< 1000^\circ\text{C}$

Answer: b

446. Read the following graph and answer the following question



Which of the following statement is true?

447. The first stage in the conversion of iron ore to steel is the carbon reduction in blast furnace, which accounts for the largest tonnage of



any metal produced by man. In it the iron ore is reduced by CO/coke while limestone is removed by sand or clay as slag. The molten iron is run off to be cast into moulds of the required shape or into ingots ("pigs") for further processing.

Select the correct for the % of carbon in different form in iron.



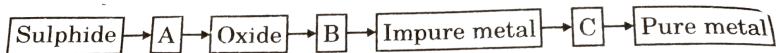
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**448.** The first stage in the conversion of iron ore to steel is the carbon reduction in blast furnace, which accounts for the largest tonnage of any metal produced by man. In it the iron ore is reduced by CO/coke while limestone is removed by sand or clay as slag. The molten iron is run off to be cast into moulds of the required shape or into ingots ("pigs") for further processing.

Select incorrect option:



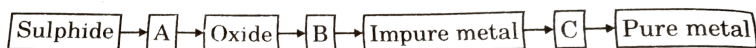
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449.

Step C (refining) involved in purification of Pb metal:

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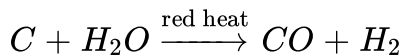


450.

Which of the following metals are obtained by auto reduction method?

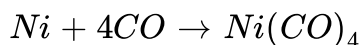
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451. At high temperature carbon reacts with water to produce a mixture of carbon monoxide, CO and hydrogen,  $H_2$ .



CO is separated from  $H_2$  and then used to separate nickel from cobalt

by forming a volatile compound, nickel tetracarbonyl,  $Ni(CO)_4$

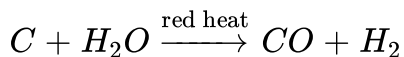


How many moles of  $Ni(CO)_4$  could be obtained from the CO produced by the reaction of 75g of carbon? Assume 100% reaction and 100% recovery in both steps.

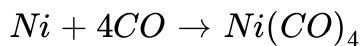


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**452.** At high temperature carbon reacts with water to produce a mixture of carbon monoxide, CO and hydrogen,  $H_2$ .



CO is separated from  $H_2$  and then used to separate nickel from cobalt by forming a volatile compound, nickel tetracarbonyl,  $Ni(CO)_4$



Formation of volatile  $Ni(CO)_4$  and its subsequent heating give Ni.

Process is called:

- A. self reduction
- B. van arkel process
- C. electrochemical refining

D. mond's proces

Answer: d

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453. Match the following columns

Column-I		Column-II	
(a)	Zincite	(p)	Zinc ore
(b)	Argentite	(q)	Sulphide ore
(c)	Pyrolusite	(r)	Oxide ore
(d)	Sphalerite	(s)	Silver ore
		(t)	Manganese ore

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Column-I		Column-II	
(a)	$\text{Cu}_2\text{S} + \text{CuO} \longrightarrow ?$	(p)	Crude metal is obtained
(b)	$\text{Cu}_2\text{S} + \text{CuSO}_4 \longrightarrow ?$	(q)	Sulphide acts as reducing agent

454.

ItBRgt

(c)	$\text{Cu}_2\text{S} + \text{Cu}_2\text{O} \longrightarrow ?$	(r)	Smelting is involved in the extraction of metal.
(d)	$\text{PbSO}_4 + \text{PbS} \longrightarrow ?$	(s)	$\text{SO}_2$ is formed as by product.
		(t)	Self-reduction is involved.

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455. Match the following columns

Column-I (Ore)		Column-II (Properties)	
(a)	Calamine	(p)	Concentrate by froth floatation method
(b)	Carnalite	(q)	Ore of Mg
(c)	Epsom salt	(r)	Ore of Zn
(d)	Galena	(s)	Ore of Pb
		(t)	Carbonate ore

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456. Match the following columns

Column-I		Column-II	
(a)	Self reduction	(p)	Lead
(b)	Carbon reduction	(q)	Silver
(c)	Complex formation and displacement by metal	(r)	Copper
(d)	Decomposition of iodide	(s)	Boron

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457. Match the following columns

Column-I		Column-II	
(a)	$\text{PbS} \longrightarrow \text{PbO}$	(p)	Roasting
(b)	$\text{CaCO}_3 \longrightarrow \text{CaO}$	(q)	Calcination
(c)	$\text{ZnS} \longrightarrow \text{Zn}$	(r)	Carbon reduction
(d)	$\text{Cu}_2\text{S} \longrightarrow \text{Cu}$	(s)	Self reduction

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458. Match the following columns

Column-I		Column-II	
(a)	Cyanide process	(p)	Ultra pure Ge
(b)	Froth floatation process	(q)	Pine oil
(c)	Electrolytic reduction	(r)	Extraction of Al
(d)	Zone refining	(s)	Extraction of Au

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459. Match the following columns

Column-I		Column-II	
(a)	Limonite	(p)	Carbonate ore
(b)	Argentite	(q)	Halide ore
(c)	Carnallite	(r)	Sulphide ore
(d)	Calamine	(s)	Oxide ore

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460. Match the following columns

Column-I		Column-II	
(A)	Leaching	(p)	Copper pyrite
(B)	Calcination	(q)	Siderite
(C)	Froth floatation	(r)	Bauxite
(D)	Magnetic separation	(s)	Chromite

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461. Match the following columns

Column-I		Column-II	
(A)	Self reduction	(p)	Copper from copper glance
(B)	Carbon and carbon monoxide reduction	(q)	Silver from argentite
(c)	Electrolytic reduction in fused state	(r)	Aluminium
(D)	Complex formation and displacement by metal	(s)	Chromite

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462. Match the following columns

Column-I		Column-II	
(a)	Cuprite	(p)	Sulphate ore
(b)	Cerussite	(q)	Carbonate ore
(c)	Carnallite	(r)	Oxide ore
(d)	Epsomite	(s)	Chloride ore



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463. Match the following columns

Column-I		Column-II	
(a)	Haematite	(p)	Slag formation during roasting/smelting and bessemerisation.
(b)	Copper pyrites	(q)	Reduction by carbon monoxide/carbon at different temperatures.
(c)	Carnallite	(r)	Electrolytic reduction
(d)	Bauxite	(s)	Calcination



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464. Match the following columns

Column-I (Metal)		Column-II (Process)	
(a)	Tin (from cassiterite)	(p)	Roasting
(b)	Zinc (from zinc blende)	(q)	Carbon reduction
(c)	Silver (from native ore)	(r)	Leaching
(d)	Lead (from galena)	(s)	Magnetic separation

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Column-I		Column-II	
(a)	Chalcopyrites	(p)	Self-reduction
(b)	Galena	(q)	Sulphurised ore
(c)	Argentite	(r)	Carbon reduction
(d)	Malachite	(s)	Leaching followed by displacement method
		(t)	Acidic flux

465.

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Column-I		Column-II	
(a)	Slag formation	(p)	Extraction of copper from copper pyrites.
(b)	Froth-floatation	(q)	Extraction of aluminium from bauxite.
(c)	Leaching	(r)	Extraction of iron from haematite.
(d)	Roasting	(s)	Extraction of tin from cassiterite.
		(t)	Extraction of lead from galena.

466.



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467. Match the following columns

Column-I	Column-II	Column-III
(a) Carnallite	(p) Sulphide ore	(w) Cyanide process
(b) Argentite	(q) Oxide ore	(x) Carbon reduction
(c) Siderite	(r) Halide ore	(y) Self-reduction
(d) Cerrusite	(s) Carbonate ore	(z) Electrolytic reduction



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Column-I		Column-II	
(a)	Hall-Heroult process	(p)	Molten $\text{Al}_2\text{O}_3 + \text{Na}_2\text{AlF}_6$ electrolysis
(b)	Dow's sea water process	(q)	Molten $\text{MgCl}_2 + \text{CaCl}_2 + \text{NaCl}$ electrolysis
(c)	Hoope's process	(r)	Molten impure aluminium + fluorides of $\text{Na}^+$ , $\text{Ba}^{2+}$ and $\text{Al}^{3+}$ electrolysis
(d)	Mc-Arthur Forrest process	(s)	Complex formation and displacement method

468.

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469. Match the following columns

Column-I		Column-II	
(a)	Limonite, Cuprite	(p)	Sulphate ore
(b)	Calamine, Cerussite	(q)	Carbonate ore
(c)	Pyragyrite, Zinc blende	(r)	Oxide ore
(d)	Anglesite, Langbeinite	(s)	Sulphide ore

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470. Match the following columns

Column-I (Reactions)		Column-II (Processes)	
(a)	$4\text{Au} + 8\text{NaCN} + 2\text{H}_2\text{O} + \text{O}_2 \xrightarrow{\Delta} 4\text{Na}[\text{Au}(\text{CN})_2] + 4\text{NaOH}$	(p)	Leaching
(b)	$\text{CuFeS}_2 + 2\text{H}_2\text{SO}_4 \xrightarrow{\Delta} \text{CuSO}_4 + \text{FeSO}_4 + 2\text{H}_2\text{S}$	(q)	Smelting
(c)	$\text{CaO} + \text{SiO}_2 \xrightarrow{\Delta} \text{CaSiO}_3$	(r)	Hydrometallurgy
(d)	$\text{MgCl}_2 \cdot 6\text{H}_2\text{O} \xrightarrow{\Delta} \text{MgCl}_2 + 6\text{H}_2\text{O}$	(s)	Calcination

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471. Match the following columns

Column-I (Reaction)		Column-II (Processes)	
(a)	$\text{FeO} + \text{SiO}_2 \longrightarrow \text{FeSiO}_3$	(p)	Calcination
(b)	$3\text{Mn}_3\text{O}_4 + 8\text{Al} \xrightarrow{\Delta} 4\text{Al}_2\text{O}_3 + 9\text{Mn}$	(q)	Displacement method
(c)	$\text{Cu}_2\text{S} + 2\text{Cu}_2\text{O} \xrightarrow{\Delta} 6\text{Cu} + \text{SO}_2$	(r)	Smelting
(d)	$2\text{Al}(\text{OH})_3 \xrightarrow{\Delta} \text{Al}_2\text{O}_3 + 3\text{H}_2\text{O}$	(s)	Thermite process
(e)	$2\text{Na}[\text{Ag}(\text{CN})_2] + \text{Zn} \xrightarrow{\Delta} \text{Na}_2[\text{Zn}(\text{CN})_4] + 2\text{Ag}$	(t)	Bessemerisation

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472. Match the following columns

Column-I		Column-II	
(a)	Poling	(p)	Titanium
(b)	Cupellation	(q)	Copper
(c)	Liquation	(r)	Silver
(d)	Van Arkel method	(s)	Tin

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473. Match the following columns

Column-I		Column-II	
(a)	Pb	(p)	Bessemerisation
(b)	Cu	(q)	Roasting
(c)	Zn	(r)	Pyrometallurgy
(d)	Fe (pig iron)	(s)	Self-reduction method

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474. Match the following columns

<b>Column-I (Metals)</b>		<b>Column-II (Ores)</b>	
(a)	Tin	(p)	Calamine
(b)	Zinc	(q)	Cassiterite
(c)	Iron	(r)	Cerrusite
(d)	Lead	(s)	Siderite

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475. Match the following columns

<b>Column-I (Ore)</b>		<b>Column-II (Metal)</b>	
(a)	Carnallite	(p)	Zinc
(b)	Calamine	(q)	Titanium
(c)	Ilmenite	(r)	Magnesium
(d)	Chalcopyrite	(s)	Copper

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Column-I		Column-II	
(a)	Fe(from oxide ore)	(p)	Roasting
(b)	Cu(from sulphide ore)	(q)	Self reduction
(c)	Pb (from sulphide ore)	(r)	CO act as principle reducing agent
(d)	Al(from oxide ore)	(s)	Amphoteric nature is used during leaching
		(t)	Smelting

476.



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477. Match the following columns

Column-I (Metal)		Column-II	
(a)	Aluminium	(p)	Blast furnace
(b)	Iron	(q)	Mond's process
(c)	Nickel	(r)	Bayer's process
(d)	Copper	(s)	Cyanide process
		(t)	Froth floatation



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478. Match the following columns

Column-I (Metals)		Column-II (Ores)	
(a)	Tin	(p)	Calamine
(b)	Zinc	(q)	Cassiterite
(c)	Titanium	(r)	Cerrusite
(d)	Lead	(s)	Rutile

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Column-I (Ore)		Column-II (Metal in Ore)	
(a)	Ilmenite	(p)	Iron

479.

(b)	Dolomite	(q)	Magnesium
(c)	Carnallite	(r)	Potassium
(d)	Chromite	(s)	Titanium

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480. Match the following columns

Column-I (Conversion processes)		Column-II (Involves which of the following operation/s)	
(a)	Auriferous rock $\longrightarrow$ Au	(p)	Roasting (separately)
(b)	Haemetite containing siderite and magnetite $\longrightarrow$ Fe	(q)	Smelting
(c)	Bauxite $\longrightarrow$ Al	(r)	Leaching
(d)	Galena $\longrightarrow$ Pb (by self reduction)	(s)	Electrolytic reduction
		(t)	Froth floatation

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481. Match the following columns

Column-I		Column-II	
(a)	$C + CO_2 \longrightarrow CO_2$	(p)	$\approx 1000^\circ C$
(b)	$FeO + CO \longrightarrow Fe + CO_2$	(q)	$\approx 800^\circ C$
(c)	$CaO + SiO_2 \longrightarrow CaSiO_3$	(r)	$\approx 1800^\circ C$
(d)	$Fe_3O_4 + 4CO \longrightarrow 3Fe + 4CO_2$	(s)	$\approx 400^\circ C$

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482. Match the following columns

Column-I		Column-II	
(a)	Bessemerisation	(p)	Ti
(b)	Van Arkel method	(q)	Cast iron
(c)	Carbon reduction	(r)	Sn
(d)	Cupellation	(s)	Ag

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483. Match the following columns

Column-I		Column-II	
(a)	Cr	(p)	Sapphire
(b)	Co	(q)	Ruby
(c)	Al	(r)	Haemoglobin
(d)	Fe	(s)	Corundum

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484. Match the following columns

Column-I (Metal)		Column-II (Procedure of extraction)	
(a)	Iron	(p)	Carbon reduction method
(b)	Lead (high grade ore)	(q)	Self reduction
(c)	Copper (low grade ore)	(r)	Thermite process
(d)	Chromium	(s)	Hydrometallurgical process

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485. Match the following columns

Column-I		Column-II (Process involved to get conversion given in the column-I)	
(a)	$\text{Cu}_2\text{S} \longrightarrow \text{Cu}_2\text{O}$	(p)	Roasting
(b)	$\text{CaCO}_3 \longrightarrow \text{CaO}$	(q)	Calcination
(c)	$\text{ZnS} \longrightarrow \text{Zn}$	(r)	Carbon reduction
(d)	$\text{PbS} \longrightarrow \text{Pb}$	(s)	Self reduction

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486. Match the following columns

Column-I (Metals)		Column-II (Method used for refining)	
(a)	Iron and copper	(p)	Poling
(b)	Zirconium and titanium	(q)	Bessemerisation
(c)	Lead and tin	(r)	Van-Arkel
(d)	Copper and tin	(s)	Liquation

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487. Match the following columns

Column-I		Column-II	
(a)	Concentration method based on the amphoteric nature of ore.	(p)	Pig iron
(b)	Extraction of Al from molten alumina	(q)	Hall-Heroult process
(c)	Obtained from blast furnace	(r)	Baeyer's process

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488. Match the Column-I to Column-II :

Column-I		Column-II	
(a)	Colemanite	(p)	Carbonate and hydroxide ore
(b)	Chalcocite	(q)	Halide ore
(c)	Fluorspar	(r)	Sulphide ore
(d)	Azurite	(s)	Oxide ore

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489. Match the following columns

Column-I (Process)		Column-II (Metal)	
(a)	Bessemerisation	(p)	Pb
(b)	Electrolytic reduction/refining method	(q)	Cu
(c)	Carbon reduction	(r)	Zn
(d)	Cupellation	(s)	Mg
		(t)	Ag

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Column-I (Chemical change during metallurgy) (Here, M may represent any metal for any option)		Column-II (Purpose in metallurgy of specified metal)	
(a)	$M_2O_3 + C + \text{Electrical energy} \longrightarrow M + CO/CO_2$	(p)	Purification of copper
(b)	$(M + Co + Fe) + CO \xrightarrow[50^\circ C]{\Delta}$ $Fe(s) + Co(s) + \left[ \begin{array}{c} \text{vapours of} \\ \text{carbonyl} \\ \text{complex of M} \end{array} \right]$	(q)	Beneficiation of bauxite
(c)	$(Fe_2O_3, M_2O_3)(s) + OH^-_{(aq)} \longrightarrow Fe_2O_3(s) + [M(OH_4)]^- \text{ sol.}$	(r)	Extraction of metal from alumina
(d)	$(Fe, M, Ag, Au) + \text{Electrolytic oxidation} \xrightarrow[\text{of metal (M) salt}]{\text{in aq solution}}$ $Fe^{+2}_{aq} + M^{+2}_{aq} + Ag(s) + Au(s)$	(s)	Separation of nickel from impurities

490.



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491. Match the following columns

Column-I		Column-II	
(a)	Smithsonite	(p)	Iron
(b)	Carnallite	(q)	Copper
(c)	Azurite	(r)	Magnesium
(d)	Limonite	(s)	Zinc



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492. Match the following columns

Column-I		Column-II	
(a)	Zinc from $ZnCO_3$	(p)	Calcination
(b)	Lead from $PbS$	(q)	Removal of iron
(c)	Cu from $CuFeS_2$	(r)	Froth floatation process
(d)	Tin from cassiterite	(s)	Poling

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493. Match the following columns

Column-I (Process)		Column-II (Electrolyte)	
(a)	Down's cell	(p)	Fused $MgCl_2$
(b)	Dow's sea water process	(q)	Fused ( $Al_2O_3 + Na_3AlF_6 + CaF_2$ )
(c)	Hall-Heroult	(r)	Fused (40% $NaCl + 60\% CaCl_2$ )
		(s)	( $AlN + C + N_2$ )

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494. Match the following columns

Column-I (Property)		Column-II (Element/compound)	
(a)	Explosive	(p)	Cu
(b)	Self-reduction	(q)	$\text{Fe}_3\text{O}_4$
(c)	Ferrimagnetic material	(r)	$\text{Cu}(\text{CH}_3\text{COO})_2 \cdot \text{Cu}(\text{OH})_2$
(d)	Verdigris	(s)	$\text{Pb}(\text{NO}_3)_2$

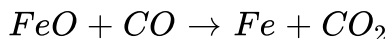
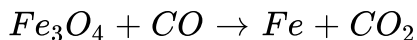
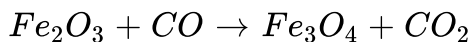
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495. Match the following columns

Column-I		Column-II	
(a)	Blistered Cu	(p)	Aluminium
(b)	Blast furnace	(q)	$2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \rightarrow 6\text{Cu} + \text{SO}_2$
(c)	Reverberatory furnace	(r)	Iron
(d)	Hall-Heroult process	(s)	$\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3$
		(t)	$2\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$

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**496.** In order to obtain metal from its oxide through Blast furnace process, the following reactions are involved.



If the % yield of the first, second and third reactions are 80% and 60% ,50% respectively then calculate mass of iron (in gm) which will be obtained if 16g of  $Fe_2O_3$  is reacted with excess of CO.

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**497.** The number of correctly matched pairs are:

- (a) Van Arkel method-Zirconium
- (b) Mond's process-Titanium
- (c) Froth floatation method-Cerussite
- (d) Poling process-Copper
- (f) Amalgamation-Gold

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**498.** In order to concentrate galena (which contains ZnS as impurity) by froth floatation process, sodium cyanide is used as department. NaCN dissolves ZnS due to formation of water soluble complex (A).

Find wxyz,

Where w=corrdition number of central metal ion in complex ion of (A)

x=number of unpaired electrons in (A)

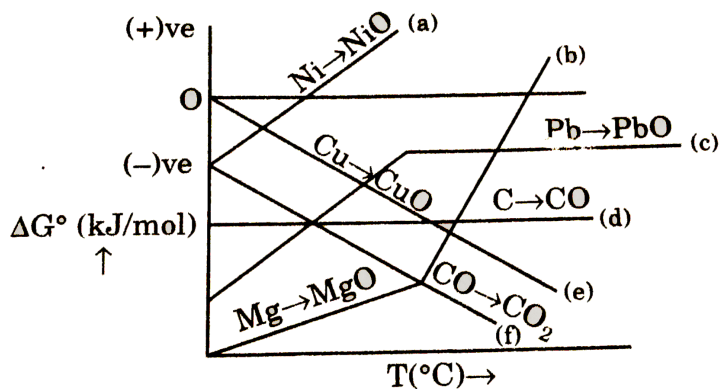
y=total number of possible linkage isomers of (A) including (A)

z=maximum number of atoms in a single plane in the complex ion of (A).

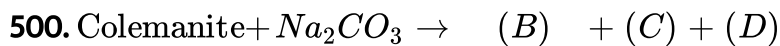


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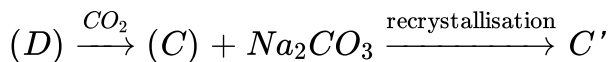
**499.** Find the number of curves which are wrongly presented in the Elingham diagan.



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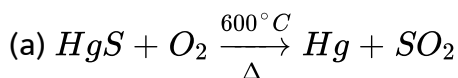
White ppt.

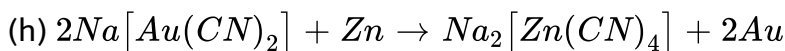
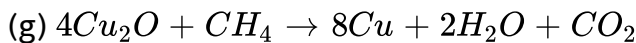
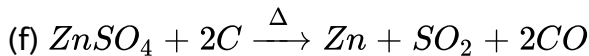
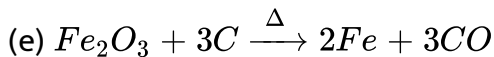
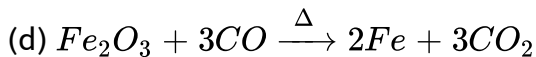
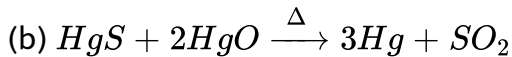


C' has only 8 water molecules of crystallisation. Number of  $sp^3$  hybridised atoms in compound C'.

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501. Find the total number of feasible reactions which would yield free metal.



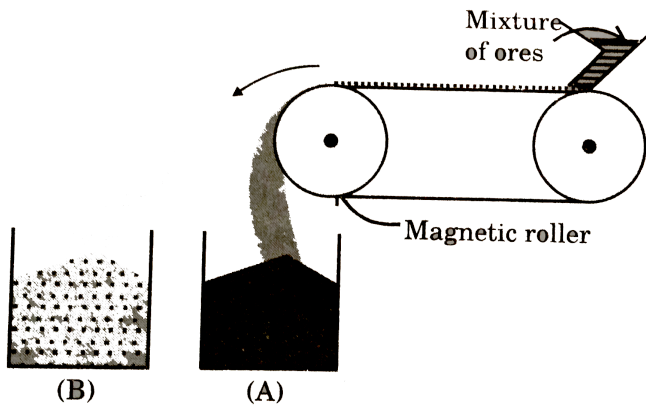


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**502.** The total number of ore of Cu from the following are .....

Atacamite, Sphalertie, Ruby copper, Chalcanthite, Fool's gold,  
Chalcopyrite, Angelsite, Baryte, Chalcocite, Zincite.

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503.

If mixture of ores contain Cassiterite, Zinc blende, Argentite, Haematite,  $FeWO_4$  Chromite, Dolomite, Find the number of ores which is/are collected in container(B).

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504. The number of sulphide ores which are reduced by self redction to produce their respective crude metals are:

$ZnS$ ,  $Cu_2S$ ,  $PbS$ ,  $FeS_2$ ,  $HgS$

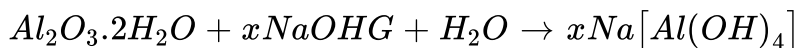
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**505.** Find the number of ores which can be concentrated by magnetic separation method.

$Fe_2O_3$ ,  $Fe_3O_4$ ,  $FeCO_3$ ,  $FeS_2$ ,  $CuFeS_2$ ,  $Cu_2O$ ,  $ZnS$ ,  $ZnCO_3$ ,  $ZnO$

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**506.** Balance the following reaction:



What is the value of x?

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**507.** How many different compounds are present in carnallite?

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**508.** Among the following number of compound that would required electrolysis process for their extraction is/are :

$Al_2O_3$ .  $MgCl_2$ .  $Fe_2O_3$ .

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**509.** Among the following total number of possible metals present in anode mud, which is obtained by electrolytic refining of copper.

Fe, Ag, Au, Pt, Pb, Zn

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**510.** Among the following total number of possible metals present in anode mud, which is obtained by electrolytic refining of copper.

Fe, Ag, Au, Pt, Pb, Zn

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**511.** Find the number of ores, which can be concentrated by magnetic separation method.

Galena, Copper pyrites, Haematite, Siderite

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**512.** Find the number of impurities which deposit as anode mud in the electrorefining of copper.

Antimony, Selenium, Tellurium, Silver, Gold, Platinum

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**513.** How many of the following minerals containing Mg?

Magnesite, Carnallite, Epsom salt, Siderite

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**514.** The total number of carbonate ores among the following is .

(i)Argenitie (ii)Calamine (iii)Malachite (iv)Siderite (v)Galena  
(vi)Magnetite (vii)Dolomite (viii)Cassiterite (ix)Bauxite

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**515.** Find the total number of ores in which roasting process is used in metallurgy of corresponding metal: galena, haematite, calamine, zinc blende, cinnabar, horn silver, lime stone

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**516.** Find the total number of step in the following used during the extraction of spelter from zinc blende:

Poling, Electrorefining, Roasting, Froth floatation method, Smelting, Magnetic separation.

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**517.** Find out the number of minerals given below which contain iron as Fe(II).

Haematite, Magnetite, Limonite, Siderite, Chromite, Wolframite

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**518.** Amongst the following ores, the total number of oxide ores are:

Siderite, Magnetite, Haematite, Malachite, Zincite, Cuprite

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**519.** How many of the following ores contain Silver?

Hornsilver, Cerrusite, Chalcopyrite, Galena, Anglesite, Argentite

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**520.** How many of the ores from the following are the ore of Pb?

Cerussite, Malachite green, Galena, Epsom salt, Anglesite, Rutile,  
Siderite

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**521.** How many of the following metals is extracted by self reduction process?

Pb,Au,Mg,Sn,Fe,Al,Ag,Hg,Na,Zn,Cu,Ca

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**522.** How many of the given consequences are in general the result of roasting and/or calcination of concentrated ores?

(a) Removal of moisture

(b) Reduction of metal oxides into metal

(c) Removal of volatile impurities as elemental vapour or volatile oxides

(d) Conversion of concentrated ores into corresponding oxides

(e) Melting of concentrated ores

(f) Ores become porous



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