# CHEMISTRY

# PHYSICAL, INORGANIC, AND ORGANIC CHEMISTRY

# METALLURGY

## Inorganic Chemistry Metallurgy

**1.** In purification of bauxite ore, it is mixed with coke and heated at $1800^{\circ}C$ in presence of

nitrogen, this is :

A. Hall's process

B. Serpeck's process

C. Baeyer's process

D. Electrolytic reduction.

**Answer: 2**

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**2.** Reducing agent of haematite in blast – furnace is

A. Coke in furnace

B. Coke in upper part and CO in lower part of furnace.

C. CO in most parts of furnace

D. CO in the furnace

**Answer: 3**

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**3.** $PbS \xrightarrow[\Delta]{\text{air}} X, \qquad X + PbS \rightarrow Pb + SO_2$

$'X'$ is

A. $PbO$

B. $PbO_2$

C. $PbO$ and $PbSO_4$

D. $PbO_2$ and $PbO$

**Answer: 3**

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**4.** In which of the following pairs, both the ores are oxides ?

A. Cuprite, Bauxite

B. Haematite, Cerrusite

C. Argentite, Cassiterite

D. Siderite, Zincite

**Answer: A**

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**5.** Which of the following statements is incorrect ?

A. calamine and siderite are carbonates

B. argentite and cuprite are oxides

C. zinc blende and pyrites are sulphides

D. malachite and azurite are ores of copper

**Answer: 5**

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**6.** Gravity separation methode is based upon :

A. preferential washing of ores and gangue particles.

B. difference in densities of ore particles and impurities.

C. differnece in chemical properties of ore particles and impurities

D. None of these

**Answer: 2**

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

A. gravity separation process

B. calcination process

C. leaching process

D. None of these

**Answer: 4**

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**8.** Which one of the following sulphide ores is concentrated by chemical leaching ?

A. Sphalerite

B. Argenitite

C. Galena

D. Copper pyrite

**Answer: 2**

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**9.** $NaCN$ 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 whhile no effect on $ZnS$.

B. $ZnS$ forms solubel complex $Na_2\left[Zn(CN)_4\right]$ while $PbS$ forms froth.

C. $PbS$ froms soluble complex $Na_2\left[Pb(CN)_4\right]$ while $ZnS$ forms froth.

D. $NaCN$ is never added in froth floatation process.

**Answer: 2**

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**10.** Which of the following process is related with the removal of sulphur by heating in the air ?

A. Smelting

B. Calcination

C. Annealing

D. Roasting

**Answer: 4**

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**11.** Consider the following statements . Roasting is carried out to :

$(i)$ convert sulphide to oxide and sulphate.

$(ii)$ to remove impurities of $CuS$ and $FeS$

present in the ore of tin stone $(SnO_2)$ as $CuSO_4$ and $FeSO_4$.

$(iii)$ melt the ore.

$(iv)$ remove arsenic and sulphur impurities.

of these statements.

A. $(i)$, $(ii)$ and $(iii)$ are correct

B. $(ii)$, $(iii)$ and $(iv)$ are correct.

C. $(i)$, $(ii)$ and $(iv)$ are correct.

D. $(i)$, $(ii)$, $(iii)$, $(iv)$ are correct.

**Answer: 3**

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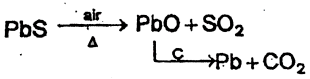
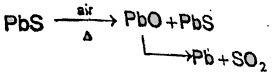
**12.** Main source of lead is galena $(PbS)$. It is converted to Pb by :




(B) :




Self – reduction process is :

A. A

B. B

C. both

D. none

**Answer: 2**

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**13.** The chemical composition of slag formed during the smelting process in the extraction of copper is :

A. $Cu_2O + FeO$

B. $FeSiO_3$

C. $FeO + Cu_2O$

D. $Cu_2S + FeO$

**Answer: 2**

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**14.** Pb and Sn are extracted from their chief ore by :

A. carbon reduction and self reductiion respectively.

B. self reduction and carbon reduction respectively.

C. electrolysis and self reduction respectively.

D. self reduction and electrolysis respectively.

**Answer: 2**

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**15.** Poling process :

A. reduces $SnO_2$ to $Sn$.

B. involves the liberation of reducing gases like hydrocarbons.

C. uses poles of freshely cut green wood

D. .all of the above are correct.

**Answer: 4**

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**16.** In the process of extraction of gold.

Roasted gold ore

$$+CN^- + H_2O \xrightarrow{O_2} [X] + OH^-$$

$[X] + Zn \rightarrow [Y] + Au$

Identify the complexes $[X]$ and $[Y]$.

A.

$$X = \left[Au(CN)_2\right]^-, Y = \left[Zn(CN)_4\right]^{2-}$$

B.

$$X = \left[Au(CN)_4\right]^{3-}, Y = \left[Zn(CN)_4\right]^{2-}$$

C.

$$X = \left[Au(CN)_2\right]^-, Y = \left[Zn(CN)_5\right]^{4-}$$

D.

$$X = \left[Au(CN)_4\right]^-, Y = \left[Zn(CN)_4\right]^{2-}$$

**Answer: 1**

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**17.** In electrorefining, the impure metal is made _____.

A. anode

B. cathode

C. eletrolytic – tank

D. none

**Answer: A**

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**18.** which of the following electronts is present as the impurity to the maximum extent in the pig iron?

A. Maganese

B. Carbon

C. Silicon

D. Phosphorus

**Answer: 2**

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**19.** 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 process

**Answer: 1**

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**20.** Which metal is extracted using a hyddrometallurgical process involving complexation ?

A. Mg

B. Au

C. Sn

D. Zn

**Answer: 2**

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**21.** Bessemer converter is used for

Atomic nos,

$Mn = 25, Fe = 26, Co = 27, Ni = 28$

A. steel

B. wrought iron

C. pig iron

D. cast iron

**Answer: 1**

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

A. silicon

B. germanium

C. gallium

D. all the above

**Answer: D**

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**23.** On the basis of ellingham diagram which of the following is not correct ?

A. Entropy change for all oxides is roughly same.

B. Below the boiling point, $'T\Delta S'$ factor decomposes into metal & oxygen.

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

D. If randomness increases the slope increases.

**Answer: 1**

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

A. $TiCl_2 + 2Mg \rightarrow Ti + 2MgCl_2$ :

Kroll

B. $Ni(CO)_4 \rightarrow Ni + 4CO$ : Mond

C. $Ag_2CO_3 \rightarrow 2Ag + CO_2 + \frac{1}{2}O_2$ :

Van Arkel

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

**Answer: 3**

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**25.** Select 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: 4**

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**26.** Consider the following metallurgical processes:

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

$(II)$ 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.

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

The processes used for obtaining magnesium , nickel and copper are respectively.

A. $(I)$, $(II)$ and $(III)$

B. $(II)$, $(III)$ and $(I)$

C. $(III)$, $(I)$ and $(II)$

D. $(II)$, $(I)$ and $(III)$

**Answer: 3**

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**27.** Native silver metel froms a water solube, complesx with a dilute aqueous wsolution of $NaCN$ in the presence of

A. nitrogen

B. oxygen

C. carbon dioxide

D. argon

**Answer: B**

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**28.** Which of the following is not correctly matched with respect to the processes involved in the extractive metallurgy of the respective metal ?

A. $Al_2O_3.2H_2O \rightarrow Al$: Leaching, precipitation, calcination and electrolytic reduction (molten state).

B. $Ag_2S \rightarrow Ag$: Leaching and displacement method.

C. $PbS \rightarrow Pb$: Froth flotation process, roasting and self reduction.

D. $KCl.\ MgCl_2.6H_2O \rightarrow Mg$:

Dehydration by simple heating electrolytic reduction in aqueous phase.

**Answer: 4**

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

A. reduction

B. oxidation

C. reduction followed by oxidation

D. oxidation followed by reduction.

**Answer: 3**

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**30.** Which of the followed statement is incorrect ?

A. Cassiterite is an oxide ore of tin.

B. Tin metal is obtained by the carbon reduction of black tin ( purified ore of tin ).

C. In the extraction of lead from galena, the roasting and self – reduction are carried out in the same furnace at different temperature.

D. Reducing agent of haematite in blast – furnace is coke in upper part and CO in lower part of furnace.

**Answer: 4**

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**31.** The element which is recovered from electrolyte process is :

A. iron

B. lead

C. aluminium

D. zinc

**Answer: 3**

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**32.** Blister copper is

A. pure copper

B. ore of copper

C. alloy of copper

D. impure copper

**Answer: 4**

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

A. Hoope's process

B. Hall's process

C. Serpeck's process

D. Baeyer's process

**Answer: 1**

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**34.** Forth floatation process for the concentration of sulphide ores is an illustration of the practical application of :

A. adsorption

B. absorption

C. sedimentation

D. coagulation

**Answer: 1**

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

$(i)$ In gold schmidt thermite process aluminium acts as a reducing agent.

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

$(iv)$ Red Bauxite is purified by Serpeck's process.

A. T T T F

B. T F F T

C. F T T T

D. T F T F

**Answer: 4**

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**36.** Thermite is a mixture of :

A. Fe powder and $Al_2O_3$

B. Al powder and $Fe_2O_3$

C. Cu powder and $Fe_2O_3$

D. Zn powder and $Cr_2O_3$

**Answer: B**

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**37.** Calcium is extracted by the electrolysis of :

A. Fused mixture of $CaCl_2$ and $CaF_2$

B. $CaCl_2$ fused salt solution

C. fused mixture of $CaCl_2$ and $NaF$

D. $Ca_3(PO_4)_2$ fused salt solution

**Answer: 1**

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**38.** 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. All of these

**Answer: 1**

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**39.** Match List I with List II and select the correct answer using the code given below the lists :

| List-1 | List – $II$ |
|---|---|
| $(a)$ Argentile | (1) Halide ore of magnesium |
| $(b)$ Cuprite | (2) Carbonate ore of iron |
| $(c)$ Siderite | (3) Oxide ore of copper |
| $(d)$ Camallite | (4) Sulphide ore of silver |

Code :

A.

| (a) | (b) | (c) | (d) |
|---|---|---|---|
| 4 | 3 | 2 | 1 |

B.

| (a) | (b) | (c) | (d) |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

C.

| (a) | (b) | (c) | (d) |
|---|---|---|---|
| 2 | 3 | 4 | 1 |

D.

| (a) | (b) | (c) | (d) |
|---|---|---|---|
| 3 | 4 | 1 | 2 |

**Answer: 1**

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**40.** Match List I with List II and select the correct answer using the code given below the lists :

| | List-1 | | List – $II$ |
|---|---|---|---|
| $I$ | Bauxite | $(a)$ | Lead |
| $II$ | Camallite | $(b)$ | Copper |
| $III$ | Malachite | $(c)$ | Magnesium |
| $IV$ | Galena | $(d)$ | Hall Process |

Code :

A.

| $I$ | $II$ | $III$ | $IV$ |
|---|---|---|---|
| $a$ | $b$ | $c$ | $d$ |

B.

| $I$ | $II$ | $III$ | $IV$ |
|---|---|---|---|
| $d$ | $c$ | $b$ | $a$ |

C.

| $I$ | $II$ | $III$ | $IV$ |
|---|---|---|---|
| $b$ | $a$ | $d$ | $c$ |

D.

| $I$ | $II$ | $III$ | $IV$ |
|---|---|---|---|
| $d$ | $b$ | $c$ | $a$ |

**Answer: 2**

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**41.** Which of the following statements is incorrect ?

A. In Hall – Heroult process, the electrolyte used is a molten mixture of alumina, sodium hydroxide and cryolite

B. Lead is extracted from its chief ore by both carbon reduction and self reduction.

C. Zinc is extracted from its chief ore by carbon reduction.

D. Extraction of gold involves the leaching of ore with cyanide solution followed by reduction with zinc.

**Answer: 1**

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**42.** On hanting a mixture of $Cu_2O$ and $Cu_2S$, we get :

A. $CuCO_2$

B. $Cu + SO_3$

C. $CuO + CuS$

D. $Cu_2SO_3$

**Answer: 1**

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