Questions with Answer Keys

Q1 (20 July 2021 Shift 1)

The metal that can be purified economically by fractional distillation method is:

(1) Fe

(2) Zn

(3) Cu

(4) Ni

Q2 (20 July 2021 Shift 2)

Consider two chemical reactions (A) and (B) that take place during metallurgical process :

(A) $ZnCO_{3(s)} \xrightarrow{\Delta} ZnO_{(s)} + CO_{2(g)}$

(B) $2ZnS_{(s)} + 3O_{2(g)} \xrightarrow{\Delta} 2ZnO_{(s)} + 2SO_{2(g)}$

The correct option of names given to them respectively is :

(1) (A) is calcination and (B) is roasting

(2) Both (A) and (B) are producing same product so both are roasting

(3) Both (A) and (B) are producing same product so both are calcination

(4) (A) is roasting and (B) is calcination

Q3 (22 July 2021 Shift 1)

Sulphide ion is soft base and its ores are common for metals.

(a) Pb

(b) Al

(c) Ag

(d) Mg

Choose the correct answer from the options given below:

(1) (a) and (c) only

(2) (a) and (d) only

(3) (a) and (b) only

(4) (c) and (d) only

Q4 (25 July 2021 Shift 1)

In the leaching of alumina from bauxite, the ore

expected to leach out in the process by reacting with NaOH is :

(1) \mathrm{TiO}_{2}

(2) Fe_2O_3

(3) ZnO

(4) SiO_2

Q5 (25 July 2021 Shift 2)

Match List I with List II : (Both having metallurgical terms)

	List-I		List-II
(a)	Concentration of Ag ore	(i)	Reverberatory furnace
(b)	Blast furnace	(ii)	Pig iron
(c)	Blister copper	(iii)	Leaching with dilute NaCN solution
(d)	Froth floatation method	(iv)	Sulfide ores

Choose the correct answer from the options given below :

(1) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

(2) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(3) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)

(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

Q6 (27 July 2021 Shift 1)

The statement that is INCORRECT about Ellingham diagram is

(1) provides idea about the reaction rate.

(2) provides idea about free energy change.

(3) provides idea about changes in the phases during the reaction.

(4) provides idea about reduction of metal oxide.

Q7 (27 July 2021 Shift 2)

The addition of silica during the extraction of copper from its sulphide ore :-

(1) converts copper sulphide into copper silicate

(2) converts iron oxide into iron silicate

(3) reduces copper sulphide into metallic copper

(4) reduces the melting point of the reaction mixture

Questions with Answer Keys

Answer Key

Q1 (2) **Q2** (1) **Q3** (1) **Q4** (4)

Q5 (1) **Q6** (1) **Q7** (2)

Hints and Solutions

Q1

Zinc can be purified economically by fractional distillation.

Q2

(A) $\mathrm{ZnCO_3(\ S) \xrightarrow{\Delta} ZnO(s) + CO_2(\ g)}$

Heating in absence of oxygen in calcination.

(B) $\mathrm{2Zns(s) + 3O_2(\ g) \rightarrow 2ZnO(g) + 2SO_2(\ g)}$

heating in presence of oxygen in roasting

Hence (A) is calcination while (B) in roasting.

Q3

Pb and Ag commonly exist in the form of sulphide ore like PbS (galena) and $\mathrm{Ag_2\ S}$ (Argentite) 'Al' is mainly found in the form of oxide ore whereas 'Mg' is found in the form of halide ore.

Q4

In bauxite impurities of $\mathrm{Fe_2O_3}$, $\mathrm{TiO_2}$ and $\mathrm{SiO_2}$ are present, $\mathrm{Fe_2O_3}$ and $\mathrm{TiO_2}$ are basic oxides therefore does not reacts with or dissolve in NaOH whereas

$\mathrm{SiO_2}$ is acidic oxide it gets dissolve in NaOH, hence leach out

$\mathrm{SiO_2 + 2NaOH \rightarrow Na_2SiO_3(aq.) + H_2O}$

Q5

(a) Concentration of Ag is performed by leaching with dilute NaCN solution

(b) Pig iron is formed in blast furnace

(c) Blister Cu is produced in Bessemer converter

(d) Froth floatation method is used for sulphide ores.

Note : During extraction of Cu reverberatory furnace is involved.

Q6

Hints and Solutions

Ellingham diagram is a plot between ΔG° and T and does not give any information regarding rate of reaction

Q7

Silica is used to remove FeO impurity from the ore of copper

$$FeO + SiO_2 \rightarrow FeSiO_3$$

iron silicate

(Slag)