Q1 - 24 January - Shift 1

Match List I with List II.

LIST I		LIST II	
A.	Reverberatory furnace	I.	Pig Iron
B.	Electrolytic cell	II.	Aluminum
C.	Blast furnace	III.	Silicon
D.	Zone Refining furnace	IV.	Copper

(1) A – IV, B – II, C – I, D – III
(2) A – I, B – IV, C – II, D – III
(3) A – I, B – III, C – II, D – IV
(4) A – III, B – IV, C – I, D – II

Space for your notes:

Q2 - 24 January - Shift 2

The metal which is extracted by oxidation and subsequent reduction from its ore is :

(1) Al (2) Ag
(3) Cu (4) Fe

Space for your notes:

Q3 - 25 January - Shift 1

Which one of the following reactions does not occur during extraction of copper ?

(1) $2Cu_2S + 3O_2 \rightarrow 2Cu_2O + 2SO_2$

(2) $2FeS + 3O_2 \rightarrow 2FeO + 2SO_2$
(3) $CaO + SiO_2 \rightarrow CaSiO_3$
(4) $FeO + SiO_2 \rightarrow FeSiO_3$

Space for your notes:

Q4 - 25 January - Shift 2

Given below are two statements :-

Statement I :- In froth floatation method a rotating paddle agitates the mixture to drive air out of it.

Statement II :- Iron pyrites are generally avoided for extraction of iron due to environmental reasons.

In the light of the above statements, choose the correct answer from the options given below :-

(1) Both Statement I and Statement II are true

(2) Statement I is false but Statement II is true

(3) Statement I is true but Statement II is false

(4) Both Statement I and Statement II are false

Space for your notes:

Q5 - 29 January - Shift 1

The reaction representing the Mond process for metal refining is _____

(1) $Ni + 4CO \xrightarrow{\Delta} Ni(CO)_4$

(2) $2K[Au(CN)_2] + Zn \xrightarrow{\Delta} K_2[Zn(CN)_4] + 2Au$

(3) $Zr + 2I_2 \xrightarrow{\Delta} ZrI_4$

(4) $ZnO + C \xrightarrow{\Delta} Zn + CO$

Space for your notes:

Q6 - 29 January - Shift 2

The major component of which of the following ore is sulphide based mineral?

(1) Calamine (2) Siderite

(3) Sphalerite (4) Malachite

Space for your notes:

Q7 - 30 January - Shift 1

In the extraction of copper, its sulphide ore is heated in a reverberatory furnace after mixing with silica to :

(1) separate CuO as $CuSiO_3$

(2) remove calcium as $CaSiO_3$

(3) decrease the temperature needed for roasting of Cu_2S

(4) remove FeO as $FeSiO_3$

Space for your notes:

Q8 - 30 January - Shift 2

Statement I: During Electrolytic refining, the pure metal is made to act as anode and its impure metallic form is used as cathode.

Statement II: During the Hall-Heroult electrolysis process, purified Al_2O_3 is mixed with Na_3AlF_6 to lower the melting point of the mixture.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

(1) Statement I is incorrect but Statement II is correct

(2) Both Statement I and Statement II are incorrect

(3) Statement I is correct but Statement II is incorrect

(4) Both Statement I and Statement II are correct

Space for your notes:

Q9 - 31 January - Shift 1

The methods NOT involved in concentration of ore are

(A) Liquation
(B) Leaching
(C) Electrolysis
(D) Hydraulic washing
(E) Froth floatation

Choose the correct answer from the options given below :

(1) B, D and C only
(2) C, D and E only
(3) A and C only
(4) B, D and E only

Space for your notes:

Q10 - 31 January - Shift 2

Which one of the following statements is incorrect ?

(1) Boron and Indium can be purified by zone refining method.
(2) Van- Arkel method is used to purify tungsten.
(3) Cast iron is obtained by melting pig iron with scrap iron and coke using hot air blast.
(4) The malleable iron is prepared from cast iron by oxidising impurities in a reverberatory furnace.

Space for your notes:

Q11 - 01 February - Shift 1

Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A: In an Ellingham diagram, the oxidation of carbon to carbon monoxide shows a negative slope with respect to temperature.

Reason R: CO tends to get decomposed at higher temperature.

In the light of the above statements, choose the correct answer from the options given below

(1) Both A and R are correct and R is the correct explanation of A

(2) A is not correct but R is correct

(3) Both A and R are correct but R is NOT the correct explanation of A

(4) A is correct but R is not correct

Space for your notes:

Q12 - 01 February - Shift 2

Among following compounds, the number of those present in copper matte is_____.

A. $CuCO_3$

B. Cu_2S

C. Cu_2O

D. FeO

Space for your notes:

Answer Key

(As per Official NTA Key released on 2 Feb)

Q1 (1)	**Q2** (2)	**Q3** (3)	**Q4** (2)
Q5 (1)	**Q6** (3)	**Q7** (4)	**Q8** (1)
Q9 (3)	**Q10** (2)	**Q11** (4)	**Q12** (3)

Q1 (1)

Reverberatory furnace: Used for roasting of Copper.

Electrolytic cell : For reactive metal : Al

Blast furnace : Hematite to Pig Iron

Zone Refining furnace: For semiconductors : Si

Q2 (2)

Ag.

$$4Ag + 8CN^- + O_2 + 2H_2O \rightarrow 4[Ag(CN)_2]^- + 4OH^-$$

$$2[Ag(CN)_2]^{-1} + Zn \rightarrow 2Ag\downarrow + [Zn(CN)_4]^{-2}$$

Q3 (3)

$$CuFeS_2 + O_2 \xrightarrow{\text{Partial roasting}}$$

$$Cu_2S + FeO + SO_2 + \underset{\text{very small}}{FeS} + \underset{\text{very small}}{Cu_2O}$$

$$Cu_2S + O_2 \rightarrow Cu_2O + SO_2$$

$$FeS + O_2 \rightarrow FeO + SO_2$$

$$FeO + SiO_2 \rightarrow FeSiO_3$$

No formation of calcium silicate ($CaSiO_3$) in extraction of Cu.

Q4 (2)

In froth floatation method a rotating paddle draws in air and stirs the pulp.

Q5 (1)

Mond's process uses:

Q6 (3)

Calamine : $ZnCO_3$

Siderite : $FeCO_3$

Sphalerite : ZnS

Malachite : $CuCO_3.Cu(OH)_2$

Q7 (4)

The copper ore contains iron, it is mixed with silica before heating in reverberatory furnace. FeO slags off as $FeSiO_3$.

$$FeO + SiO_2 \longrightarrow FeSiO_3$$

Q8 (1)

In Electrolytic refining, the pure metal is used as cathode and impure metal is used as anode.

Na_3AlF_6 is added during electrolysis of Al_2O_3 to lower the melting point and increase conductivity.

Q9 (3)

Methods involved in concentration of one are

(i) Hydraulic Washing

(ii) Froth Flotation

(iii) Magnetic Separation

Q10 (2)

Van – Arkel process is used for purification of Ti, Zr, Hf and B.

Q11 (4)

$2C(s) + O_2(g) \rightarrow 2CO(g)$

$\Delta_r S^o$ is +ve, $\Delta_r G^o = \Delta_r H^o - T\Delta_r S^o$; thus slope is negative

As temperature increases $\Delta_r G^o$ becomes more negative thus it has lower tendency to get decomposed.

Q12 (3)

FeS and Cu_2S, present in copper matte