

CHEMISTRY · JEE MAIN

Metallurgy

Chapter-wise previous year questions, with answer key

73

PYQS

2020–2023

PAPERS

5

TOPICS

Extraction of Fe, Cu, Zn, Al

Refining Methods

Reduction Methods

Concentration of Ores

Minerals and Ores

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap “Step-by-step solution” under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap “Step-by-step solution” under it.

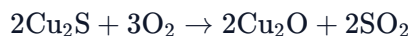
Practise this chapter online with instant answer checking: prepwisar.in/learn · No signup needed to browse

Extraction of Fe, Cu, Zn, Al · 20 PYQs

Q1 JEE Main 2023 · 11 Apr · Shift 1

In the extraction process of copper, the product obtained after carrying out the reactions

(i)



(ii)



is called

(A) Copper matte

(B) Blister copper

(C) Reduced copper

(D) Copper scrap

[Step-by-step solution ► prepwiser.in/questions/-10vvCJUs-](https://www.prepwiser.in/questions/-10vvCJUs-)

Q2 JEE Main 2023 · 8 Apr · Shift 2

In Hall - Heroult process, the following is used for reducing Al_2O_3 :-

(A) Magnesium

(B) CaF_2

(C) Graphite

(D) Na_3AlF_6

[Step-by-step solution ► prepwiser.in/questions/FZ_9DIHqJy](https://www.prepwiser.in/questions/FZ_9DIHqJy)

Q3 JEE Main 2023 · 8 Apr · Shift 1

Which of the following metals can be extracted through alkali leaching technique?

(A) Sn

(B) Cu

(C) Au

(D) Pb

[Step-by-step solution ► prepwiser.in/questions/Ih8FBgyKWP](https://www.prepwiser.in/questions/Ih8FBgyKWP)

Q4 JEE Main 2023 · 1 Feb · 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

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/WXvi268nh0](https://www.prepwiser.in/questions/WXvi268nh0)

Q5 JEE Main 2023 · 30 Jan · Shift 2

Given below are two statements:

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:

- (A) Statement I is correct but Statement II is incorrect
- (B) Statement I is incorrect but Statement II is correct
- (C) Both Statement I and Statement II are incorrect
- (D) Both Statement I and Statement II are correct

[Step-by-step solution ► prepwisser.in/questions/z-ddDtbNUZ](https://www.prepwisser.in/questions/z-ddDtbNUZ)

Q6 JEE Main 2023 · 30 Jan · Shift 1

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

- (A) remove FeO as FeSiO_3
- (B) remove calcium as CaSiO_3
- (C) decrease the temperature needed for roasting of Cu_2S
- (D) separate CuO as CuSiO_3

[Step-by-step solution ► prepwisser.in/questions/xovb2cRxk4](https://www.prepwisser.in/questions/xovb2cRxk4)

Q7 JEE Main 2023 · 25 Jan · Shift 1

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

- (A) $2\text{FeS} + 3\text{O}_2 \rightarrow 2\text{FeO} + 2\text{SO}_2$
- (B) $\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3$
- (C) $\text{CaO} + \text{SiO}_2 \rightarrow \text{CaSiO}_3$
- (D) $2\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$

[Step-by-step solution ► prepwisser.in/questions/p8U4DnBUxB](https://www.prepwisser.in/questions/p8U4DnBUxB)

Q8 JEE Main 2022 · 26 Jul · Shift 2

The metal that is not extracted from its sulfide ore is :

- (A) Aluminium
- (B) Iron
- (C) Lead
- (D) Zinc

[Step-by-step solution ► prepwisser.in/questions/_wbcl9YRQ7](https://www.prepwisser.in/questions/_wbcl9YRQ7)

Q9 JEE Main 2022 · 25 Jul · Shift 2

Given below are two statements.

Statement I : Pig iron is obtained by heating cast iron with scrap iron.

Statement II : Pig iron has a relatively lower carbon content than that of cast iron.

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

- (A) Both Statement I and Statement II are correct.
- (B) Both Statement I and Statement II are not correct.
- (C) Statement I is correct but Statement II is not correct.
- (D) Statement I is not correct but Statement II is correct.

[Step-by-step solution ► prepwisser.in/questions/cj6eSzzflv](https://www.prepwisser.in/questions/cj6eSzzflv)

Q10 JEE Main 2022 · 25 Jul · Shift 1

The compound(s) that is (are) removed as slag during the extraction of copper is :

- (A) CaO
- (B) FeO
- (C) Al_2O_3
- (D) ZnO
- (E) NiO

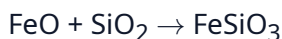
Choose the correct answer from the options given below:

- (A) (C), (D) only
- (B) (A), (B), (E) only
- (C) (A), (B) only
- (D) (B) only

[Step-by-step solution ► prepwisser.in/questions/JHpfsgh8i8](https://www.prepwisser.in/questions/JHpfsgh8i8)

Q11 JEE Main 2022 · 28 Jun · Shift 2

In the metallurgical extraction of copper, following reaction is used :



FeO and $FeSiO_3$ respectively are.

- (A) gangue and flux.
- (B) flux and slag.
- (C) slag and flux.
- (D) gangue and slag.

[Step-by-step solution ► prepwisser.in/questions/rtV-XZIWIS](https://www.prepwisser.in/questions/rtV-XZIWIS)

Q12 JEE Main 2022 · 25 Jun · Shift 1

Leaching of gold with dilute aqueous solution of NaCN in presence of oxygen gives complex [A], which on reaction with zinc forms the elemental gold and another complex [B]. [A] and [B], respectively are :

- (A) $[Au(CN)_4]^-$ and $[Zn(CN)_2(OH)_2]^{2-}$
- (B) $[Au(CN)_2]^-$ and $[Zn(OH)_4]^{2-}$
- (C) $[Au(CN)_2]^-$ and $[Zn(CN)_4]^{2-}$
- (D) $[Au(CN)_4]^{2-}$ and $[Zn(CN)_6]^{4-}$

[Step-by-step solution ► prepwisser.in/questions/D-nh7oW6bu](https://www.prepwisser.in/questions/D-nh7oW6bu)

Q13 JEE Main 2022 · 24 Jun · Shift 2

Which of the following chemical reactions represents Hall-Heroult Process?

- (A) $\text{Cr}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Cr}$
- (B) $2\text{Al}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Al} + 3\text{CO}_2$
- (C) $\text{FeO} + \text{CO} \rightarrow \text{Fe} + \text{CO}_2$
- (D) $2[\text{Au}(\text{CN})_2]^-_{(\text{aq})} + \text{Zn}(\text{s}) \rightarrow 2\text{Au}(\text{s}) + [\text{Zn}(\text{CN})_4]^{2-}$

Step-by-step solution ► [prepwiser.in/questions/IkHtUr0Bp7](https://www.prepwiser.in/questions/IkHtUr0Bp7)

Q14 JEE Main 2021 · 31 Aug · Shift 1

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

Assertion (A) : Aluminium is extracted from bauxite by the electrolysis of molten mixture of Al_2O_3 with cryolite.

Reason (R) : The oxidation state of Al in cryolite is +3.

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

- (A) (A) is true but (R) is false.
- (B) (A) is false but (R) is true.
- (C) Both (A) and (R) are correct and (R) is the correct explanation of (A)
- (D) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

Step-by-step solution ► [prepwiser.in/questions/VyedFPD7EM](https://www.prepwiser.in/questions/VyedFPD7EM)

Q15 JEE Main 2021 · 27 Jul · Shift 2

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

- (A) converts copper sulphide into copper silicate
- (B) converts iron oxide into iron silicate
- (C) reduces copper sulphide into metallic copper
- (D) reduces the melting point of the reaction mixture

Step-by-step solution ► [prepwiser.in/questions/-UnZtHH6Yp](https://www.prepwiser.in/questions/-UnZtHH6Yp)

Q16 JEE Main 2021 · 18 Mar · Shift 1

The chemical that is added to reduce the melting point of the reaction mixture during the extraction of aluminium is :

- | | |
|--------------|-------------|
| (A) Cryolite | (B) Bauxite |
| (C) Calamine | (D) Kaolite |

Step-by-step solution ► [prepwiser.in/questions/10-3FV_xIW](https://www.prepwiser.in/questions/10-3FV_xIW)

Q17 JEE Main 2021 · 16 Mar · Shift 1

Match List - I with List - II :

List - I	List - II
Industrial process	Application
(a) Haber's process	(i) HNO_3 synthesis
(b) Ostwald's process	(ii) Aluminium extraction
(c) Contact process	(iii) NH_3 synthesis
(d) Hal-Heroult process	(iv) H_2SO_4 synthesis

Choose the correct answer from the options given below :

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

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

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

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

[Step-by-step solution ► prepwiser.in/questions/KHxbRMisrK](https://www.prepwiser.in/questions/KHxbRMisrK)

Q18 JEE Main 2021 · 24 Feb · Shift 1

The major components in "Gun Metal" are :

(A) Al, Cu, Mg and Mn

(B) Cu, Ni and Fe

(C) Cu, Sn and Zn

(D) Cu, Zn and Ni

[Step-by-step solution ► prepwiser.in/questions/fdQz0jw6IP](https://www.prepwiser.in/questions/fdQz0jw6IP)

Q19 JEE Main 2020 · 2 Sep · Shift 2

Cast iron is used for the manufacture of :

(A) wrought iron, pig iron and steel

(B) wrought iron and pig iron

(C) wrought iron and steel

(D) pig iron, scrap iron and steel

[Step-by-step solution ► prepwiser.in/questions/-6L9hGBxPI](https://www.prepwiser.in/questions/-6L9hGBxPI)

Q20 JEE Main 2020 · 8 Jan · Shift 2

Among the reactions (a) - (d), the reaction(s) that does/do not occur in the blast furnace during the extraction of iron is/are :

(a) $CaO + SiO_2 \rightarrow CaSiO_3$

(b) $3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$

(c) $FeO + SiO_2 \rightarrow FeSiO_3$

(d) $FeO \rightarrow Fe + \frac{1}{2}O_2$

(A) (a) and (d)

(B) (c) and (d)

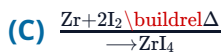
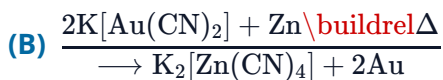
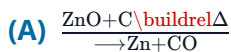
(C) (a)

(D) (d)

[Step-by-step solution ► prepwiser.in/questions/Sfq9-FcA-4](https://www.prepwiser.in/questions/Sfq9-FcA-4)

Q21 JEE Main 2023 · 29 Jan · Shift 1

The reaction representing the Mond process for metal refining is _____.



Step-by-step solution ► [prepwiser.in/questions/o4vwTRs26R](https://www.prepwiser.in/questions/o4vwTRs26R)

Q22 JEE Main 2022 · 29 Jul · Shift 2

In liquation process used for tin (Sn), the metal :

(A) is reacted with acid.

(B) is dissolved in water.

(C) is brought to molten form which is made to flow on a slope.

(D) is fused with NaOH

Step-by-step solution ► [prepwiser.in/questions/8pDaeI1q9I](https://www.prepwiser.in/questions/8pDaeI1q9I)

Q23 JEE Main 2022 · 27 Jul · Shift 1

Which of the following methods are not used to refine any metal?

A. Liquation

B. Calcination

C. Electrolysis

D. Leaching

E. Distillation

Choose the correct answer from the options given below:

(A) B and D only

(B) A, B, D and E only

(C) B, D and E only

(D) A, C and E only

Step-by-step solution ► [prepwiser.in/questions/dG61TDoCae](https://www.prepwiser.in/questions/dG61TDoCae)

Q24 JEE Main 2022 · 26 Jul · Shift 1

Refining using liquation method is the most suitable for metals with :

(A) Low melting point

(B) High boiling point

(C) High electrical conductivity

(D) Less tendency to be soluble in melts than impurities

Step-by-step solution ► [prepwiser.in/questions/swuxQKNMJo](https://www.prepwiser.in/questions/swuxQKNMJo)

Q25 JEE Main 2022 · 25 Jun · Shift 2

Given below are two statements.

Statement I : During electrolytic refining, blister copper deposits precious metals.

Statement II : In the process of obtaining pure copper by electrolysis method, copper blister is used to make the anode.

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

(A) Both Statement I and Statement II are true.

(B) Both Statement I and Statement II are false.

(C) Statement I is true but Statement II is false.

(D) Statement I is false but Statement II is true.

[Step-by-step solution ► prepwiser.in/questions/0f4T5y67v8](https://www.prepwiser.in/questions/0f4T5y67v8)

Q26 JEE Main 2021 · 31 Aug · Shift 2

In the electrolytic refining of blister copper, the total number of main impurities, from the following, removed as anode mud is _____

Pb, Sb, Se, Te, Ru, Ag, Au and Pt

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/ObvncBBSLx](https://www.prepwiser.in/questions/ObvncBBSLx)

Q27 JEE Main 2021 · 27 Aug · Shift 1

Which refining process is generally used in the purification of low melting metals?

(A) Chromatographic method

(B) Liquation

(C) Electrolysis

(D) Zone refining

[Step-by-step solution ► prepwiser.in/questions/1aGQymWyB_](https://www.prepwiser.in/questions/1aGQymWyB_)

Q28 JEE Main 2021 · 20 Jul · Shift 1

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

(A) Fe

(B) Zn

(C) Cu

(D) Ni

[Step-by-step solution ► prepwiser.in/questions/eACeTJkUaE](https://www.prepwiser.in/questions/eACeTJkUaE)

Match List - I with List - II :

List - I**List - II**

- (a) Mercury (i) Vapour phase refining
(b) Copper (ii) Distillation refining
(c) Silicon (iii) Electrolytic refining
(d) Nickel (iv) Zone refining

Choose the most appropriate answer from the option given below :

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

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

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

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

Step-by-step solution ► [prepwiser.in/questions/20X2DQsDA2](https://www.prepwiser.in/questions/20X2DQsDA2)

Match List - I with List - II.

List - I**List - II**

- (a) Sodium Carbonate (i) Deacon
(b) Titanium (ii) Castner-Kellner
(c) Chlorine (iii) van-Arkel
(d) Sodium hydroxide (iv) Solvay

Choose the correct answer from the options given below :

(A) (a) → (iv), (b) → (iii), (c) → (i), (d) → (ii)

(B) (a) → (iv), (b) → (i), (c) → (ii), (d) → (iii)

(C) (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)

(D) (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

Step-by-step solution ► [prepwiser.in/questions/svjbHDeNRJ](https://www.prepwiser.in/questions/svjbHDeNRJ)

The method used for the purification of Indium is :

(A) zone refining

(B) vapour phase refining

(C) liquation

(D) van Arkel method

Step-by-step solution ► [prepwiser.in/questions/0_fUkQkw4h](https://www.prepwiser.in/questions/0_fUkQkw4h)

Q32 JEE Main 2020 · 6 Sep · Shift 2

The element that can be refined by distillation is :

- (A) gallium (B) nickel
(C) zinc (D) tin

[Step-by-step solution ► prepwiser.in/questions/dDKAPQkH9h](https://www.prepwiser.in/questions/dDKAPQkH9h)

Q33 JEE Main 2020 · 5 Sep · Shift 2

Boron and silicon of very high purity can be obtained through :

- (A) Liquation (B) Electrolytic refining
(C) Zone refining (D) Vapour phase refining

[Step-by-step solution ► prepwiser.in/questions/rnT3VJy8gf](https://www.prepwiser.in/questions/rnT3VJy8gf)

Q34 JEE Main 2020 · 7 Jan · Shift 1

The purest form of commercial iron is :

- (A) pig iron (B) wrought iron
(C) cast iron (D) scrap iron and pig iron

[Step-by-step solution ► prepwiser.in/questions/VZ5Wb0OmxE](https://www.prepwiser.in/questions/VZ5Wb0OmxE)

Q35 JEE Main 2020 · 7 Jan · Shift 2

The refining method used when the metal and the impurities have low and high melting temperatures, respectively, is :

- (A) liquation (B) vapour phase refining
(C) distillation (D) zone refining

[Step-by-step solution ► prepwiser.in/questions/ZWKRK5ctQu](https://www.prepwiser.in/questions/ZWKRK5ctQu)

Reduction Methods · 14 PYQs

Q36 JEE Main 2023 · 13 Apr · Shift 2

Given below are two statements related to Ellingham diagram:

Statement I : Ellingham diagrams can be constructed for formation of oxides, sulfides and halides of metals.

Statement II : It consists of plots of $\Delta_f H^0$ vs T for formation of oxides of elements.

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

- (A) Both Statement I and Statement II are correct
(B) Both Statement I and Statement II are incorrect
(C) Statement I is correct but Statement II is incorrect
(D) Statement I is incorrect but Statement II is correct

[Step-by-step solution ► prepwiser.in/questions/PnZ4QispE7](https://www.prepwiser.in/questions/PnZ4QispE7)

Q37 JEE Main 2023 · 12 Apr · Shift 1

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R
Assertion A : In the Ellingham diagram, a sharp change in slope of the line is observed for $\text{Mg} \rightarrow \text{MgO}$ at $\sim 1120^\circ\text{C}$

Reason R: There is a large change of entropy associated with the change of state

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

- (A) Both **A** and **R** are true and **R** is the correct explanation of **A**
- (B) **A** is false but **R** is true
- (C) Both **A** and **R** are true but **R** is NOT the correct explanation of **A**
- (D) **A** is true but **R** is false

[Step-by-step solution ► prepwisar.in/questions/v6OpiWI8ac](https://www.prepwisar.in/questions/v6OpiWI8ac)

Q38 JEE Main 2023 · 11 Apr · Shift 2

Given below are two statements :

Statement I : In the metallurgy process, sulphide ore is converted to oxide before reduction.

Statement II : Oxide ores in general are easier to reduce.

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

- (A) Both Statement I and Statement II are correct
- (B) Both Statement I and Statement II are incorrect
- (C) Statement I is correct but Statement II is incorrect
- (D) Statement I is incorrect but Statement II is correct

[Step-by-step solution ► prepwisar.in/questions/QQ7tVp7ham](https://www.prepwisar.in/questions/QQ7tVp7ham)

Q39 JEE Main 2023 · 1 Feb · 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

- (A) A is correct but R is not correct
- (B) Both A and R are correct but R is NOT the correct explanation of A
- (C) A is not correct but R is correct
- (D) Both A and R are correct and R is the correct explanation of A

[Step-by-step solution ► prepwisar.in/questions/6VavPAz7gC](https://www.prepwisar.in/questions/6VavPAz7gC)

Q40 JEE Main 2023 · 24 Jan · Shift 2

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

- | | |
|--------|--------|
| (A) Al | (B) Cu |
| (C) Ag | (D) Fe |

[Step-by-step solution ► prepwisar.in/questions/ucdoOHHs03](https://www.prepwisar.in/questions/ucdoOHHs03)

Q41 JEE Main 2022 · 28 Jun · Shift 1

Given are two statements one is labelled as Assertion A and other is labelled as Reason R.

Assertion A : Magnesium can reduce Al_2O_3 at a temperature below 1350°C , while above 1350°C , while above 1350°C aluminium can reduce MgO .

Reason R : The melting and boiling points of magnesium are lower than those of aluminium.

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

- (A) Both A and R are correct, and R is correct explanation of A.
- (B) Both A and R are correct, but R is NOT the correct explanation of A.
- (C) A is correct R is not correct.
- (D) A is not correct, R is correct.

[Step-by-step solution ► prepwisser.in/questions/Re2iTWp9zV](https://www.prepwisser.in/questions/Re2iTWp9zV)

Q42 JEE Main 2022 · 26 Jun · Shift 1

Given below are two statements :

Statement I : According to Ellingham diagram, any metal oxide with higher ΔG° is more stable than the one with lower ΔG° .

Statement II : The metal involved in the formation of oxide placed lower in the Ellingham diagram can reduce the oxide of a metal placed higher in the diagram.

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

- (A) Both Statement I and Statement II are correct.
- (B) Both Statement I and Statement II are incorrect.
- (C) Statement I is correct but Statement II is incorrect.
- (D) Statement I is incorrect but Statement II is correct.

[Step-by-step solution ► prepwisser.in/questions/J7ISsugNK7](https://www.prepwisser.in/questions/J7ISsugNK7)

Q43 JEE Main 2021 · 26 Aug · Shift 1

Given below are two statements :

Statement I : The choice of reducing agents for metals extraction can be made by using Ellingham diagram, a plot of ΔG vs temperature.

Statement II : The value of ΔS increases from left to right in Ellingham diagram.

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

- (A) Both Statement I and Statement II are true
- (B) Statement I is false but Statement II is true
- (C) Both Statement I and Statement II are false
- (D) Statement I is true but Statement II is false

[Step-by-step solution ► prepwisser.in/questions/cTF3xCSYIk](https://www.prepwisser.in/questions/cTF3xCSYIk)

Q44 JEE Main 2021 · 27 Jul · Shift 1

The statement is incorrect about Ellingham diagram is

- (A) provides idea about the reaction rate.
- (B) provides idea about free energy change.
- (C) provides idea about changes in the phases during the reaction.
- (D) provides idea about reduction of metal oxide.

[Step-by-step solution ► prepwiser.in/questions/7kDNZ2LvWS](https://www.prepwiser.in/questions/7kDNZ2LvWS)

Q45 JEE Main 2021 · 25 Jul · 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 :

- (A) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
- (B) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)
- (C) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)
- (D) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

[Step-by-step solution ► prepwiser.in/questions/ANiloYatbk](https://www.prepwiser.in/questions/ANiloYatbk)

Q46 JEE Main 2021 · 16 Mar · Shift 2

Which of the following reduction reaction CANNOT be carried out with coke?

- (A) $\text{ZnO} \rightarrow \text{Zn}$
- (B) $\text{Fe}_2\text{O}_3 \rightarrow \text{Fe}$
- (C) $\text{Cu}_2\text{O} \rightarrow \text{Cu}$
- (D) $\text{Al}_2\text{O}_3 \rightarrow \text{Al}$

[Step-by-step solution ► prepwiser.in/questions/RB0W_hrE2f](https://www.prepwiser.in/questions/RB0W_hrE2f)

Q47 JEE Main 2021 · 25 Feb · Shift 1

Ellingham diagram is a graphical representation of :

- (A) ΔG vs P
- (B) ΔG vs T
- (C) $(\Delta G - T\Delta S)$ vs T
- (D) ΔH vs T

[Step-by-step solution ► prepwiser.in/questions/AE339Tw9ao](https://www.prepwiser.in/questions/AE339Tw9ao)

Q48 JEE Main 2020 · 5 Sep · Shift 1

An Ellingham diagram provides information about :

- (A) the temperature dependence of the standard Gibbs energies of formation of some metal oxides
- (B) the pressure dependence of the standard electrode potentials of reduction reactions involved in the extraction of metals
- (C) the conditions of pH and potential under which a species is thermodynamically stable
- (D) the kinetics of the reduction process

Step-by-step solution ► [prepwiser.in/questions/Eu6XscXTN6](https://www.prepwiser.in/questions/Eu6XscXTN6)

Q49 JEE Main 2020 · 4 Sep · Shift 1

Among statements (a) - (d), the correct ones are

- (a) Lime stone is decomposed to CaO during the extraction of iron from its oxides.
- (b) In the extraction of silver, silver is extracted as an anionic complex.
- (c) Nickel is purified by Mond's process.
- (d) Zr and Ti are purified by Van Arkel method.

- (A) (a), (c) and (d) only
- (B) (c) and (d) only
- (C) (b), (c) and (d) only
- (D) (a), (b), (c) and (d)

Step-by-step solution ► [prepwiser.in/questions/dQvmk1JenT](https://www.prepwiser.in/questions/dQvmk1JenT)

Concentration of Ores · 13 PYQs

Q50 JEE Main 2023 · 15 Apr · Shift 1

Which one of the following is not an example of calcination?

- (A) $\text{CaCO}_3 \cdot \text{MgCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{MgO} + 2\text{CO}_2$
- (B) $2\text{PbS} + 3\text{O}_2 \xrightarrow{\Delta} 2\text{PbO} + 2\text{SO}_2$
- (C) $\text{CaCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{CO}_2$
- (D) $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O} \xrightarrow{\Delta} \text{Fe}_2\text{O}_3 + x\text{H}_2\text{O}$

Step-by-step solution ► [prepwiser.in/questions/6aLFP3UaXK](https://www.prepwiser.in/questions/6aLFP3UaXK)

Q51 JEE Main 2023 · 10 Apr · Shift 1

Which of the following is used as a stabilizer during the concentration of sulphide ores?

- (A) Cresols
- (B) Xanthates
- (C) Fatty acids
- (D) Pine oils

Step-by-step solution ► [prepwiser.in/questions/eYjBGZKmWR](https://www.prepwiser.in/questions/eYjBGZKmWR)

Q52 JEE Main 2023 · 31 Jan · 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 :

- (A) A and C only
- (B) C, D and E only
- (C) B, D and C only
- (D) B, D and E only

[Step-by-step solution ► prepwisser.in/questions/FIBI_Ak70i](https://www.prepwisser.in/questions/FIBI_Ak70i)

Q53 JEE Main 2023 · 25 Jan · Shift 2

Given below are two statements :

Statement I : In froth floatation method of 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 :

- (A) Statement I is true but Statement II is false
- (B) Statement I is false but Statement II is true
- (C) Both Statement I and Statement II are true
- (D) Both Statement I and Statement II are false

[Step-by-step solution ► prepwisser.in/questions/-h6hqs9G-Z](https://www.prepwisser.in/questions/-h6hqs9G-Z)

Q54 JEE Main 2022 · 28 Jul · Shift 1

Which of the reaction is suitable for concentrating ore by leaching process ?

- (A) $2\text{Cu}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{Cu}_2\text{O} + 2\text{SO}_2$
- (B) $\text{Fe}_3\text{O}_4 + \text{CO} \rightarrow 3\text{FeO} + \text{CO}_2$
- (C) $\text{Al}_2\text{O}_3 + 2\text{NaOH} + 3\text{H}_2\text{O} \rightarrow 2\text{Na}[\text{Al}(\text{OH})_4]$
- (D) $\text{Al}_2\text{O}_3 + 6\text{Mg} \rightarrow 6\text{MgO} + 4\text{Al}$

[Step-by-step solution ► prepwisser.in/questions/NGjZLErXMw](https://www.prepwisser.in/questions/NGjZLErXMw)

Q55 JEE Main 2022 · 29 Jun · Shift 1

In isolation of which one of the following metals from their ores, the use of cyanide salt is not commonly involved?

- (A) Zinc
- (B) Gold
- (C) Silver
- (D) Copper

[Step-by-step solution ► prepwisser.in/questions/bjjh6jjdKd](https://www.prepwisser.in/questions/bjjh6jjdKd)

Q56 JEE Main 2022 · 27 Jun · Shift 2

Statement I : Leaching of gold with cyanide ion in absence of air / O_2 leads to cyano complex of Au(III).

Statement II : Zinc is oxidized during the displacement reaction carried out for gold extraction.

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

- (A) Both Statement I and Statement II are correct.
- (B) Both Statement I and Statement II are incorrect.
- (C) Statement I is correct but Statement II is incorrect.
- (D) Statement I is incorrect but Statement II is correct.

Step-by-step solution ► [prepwiser.in/questions/IILMEXhft](https://www.prepwiser.in/questions/IILMEXhft)

Q57 JEE Main 2022 · 26 Jun · Shift 2

The role of depressants in 'Froth Flotation method' is to

- (A) selectively prevent one component of the ore from coming to the froth.
- (B) reduce the consumption of oil for froth formation.
- (C) stabilize the froth.
- (D) enhance non-wettability of the mineral particles.

Step-by-step solution ► [prepwiser.in/questions/YQ2-AazXXE](https://www.prepwiser.in/questions/YQ2-AazXXE)

Q58 JEE Main 2021 · 25 Jul · Shift 1

In the leaching of alumina from bauxite, the ore expected to leach out in the process by reacting with NaOH is :

- (A) TiO_2
- (B) Fe_2O_3
- (C) ZnO
- (D) SiO_2

Step-by-step solution ► [prepwiser.in/questions/QuZBRHaksr](https://www.prepwiser.in/questions/QuZBRHaksr)

Q59 JEE Main 2021 · 22 Jul · Shift 2

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

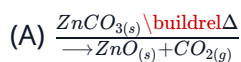
(a) Pb (b) Al (c) Ag (d) Mg

- (A) (a) and (c) only
- (B) (a) and (d) only
- (C) (a) and (b) only
- (D) (c) and (d) only

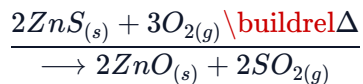
Step-by-step solution ► [prepwiser.in/questions/KlCyRWkfQ4](https://www.prepwiser.in/questions/KlCyRWkfQ4)

Q60 JEE Main 2021 · 20 Jul · Shift 2

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



(B)



The correct option of names given to them respectively is :

- (A) (A) is calcination and (B) is roasting
- (B) Both (A) and (B) are producing same product so both are roasting
- (C) Both (A) and (B) are producing same product so both are calcination
- (D) (A) is roasting and (B) is calcination

[Step-by-step solution ► prepwiser.in/questions/dcWg2cz9Yn](https://www.prepwiser.in/questions/dcWg2cz9Yn)

Q61 JEE Main 2021 · 16 Mar · Shift 1

The process that involves the removal of sulphur from the ores is :

- (A) Roasting
- (B) Smelting
- (C) Leaching
- (D) Refining

[Step-by-step solution ► prepwiser.in/questions/NGkQv1WYd8](https://www.prepwiser.in/questions/NGkQv1WYd8)

Q62 JEE Main 2021 · 24 Feb · Shift 1

Which of the following ore is concentrated using group 1 cyanide salt ?

- (A) Sphalerite
- (B) Malachite
- (C) Siderite
- (D) Calamine

[Step-by-step solution ► prepwiser.in/questions/5xwIRkjLk9](https://www.prepwiser.in/questions/5xwIRkjLk9)

Minerals and Ores · 11 PYQs

Q63 JEE Main 2023 · 29 Jan · Shift 2

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

- (A) Sphalerite
- (B) Siderite
- (C) Malachite
- (D) Calamine

[Step-by-step solution ► prepwiser.in/questions/EF64U849tj](https://www.prepwiser.in/questions/EF64U849tj)

Q64 JEE Main 2022 · 29 Jul · Shift 1

In metallurgy the term "gangue" is used for :

- (A) Contamination of undesired earthy materials.
- (B) Contamination of metals, other than desired metal.
- (C) Minerals which are naturally occurring in pure form
- (D) Magnetic impurities in an ore.

Step-by-step solution ► [prepwiser.in/questions/ZR0OwpotWs](https://www.prepwiser.in/questions/ZR0OwpotWs)

Q65 JEE Main 2022 · 27 Jul · Shift 2

Among the following ores Bauxite, Siderite, Cuprite, Calamine, Haematite, Kaolinite, Malachite, Magnetite, Sphalerite, Limonite, Cryolite, the number of principal ores of iron is _____.

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/bkhje77eEx](https://www.prepwiser.in/questions/bkhje77eEx)

Q66 JEE Main 2022 · 24 Jun · Shift 2

(a) Baryte, (b) Galena, (c) Zinc blende and (d) Copper pyrites. How many of these minerals are sulphide based?

Numerical answer — enter the value.

Step-by-step solution ► [prepwiser.in/questions/FLh2wJajni](https://www.prepwiser.in/questions/FLh2wJajni)

Q67 JEE Main 2021 · 1 Sep · Shift 2

Calamine and Malachite, respectively, are the ores of :

- | | |
|--------------------------|------------------------|
| (A) Nickel and Aluminium | (B) Zinc and Copper |
| (C) Copper and Iron | (D) Aluminium and Zinc |

Step-by-step solution ► [prepwiser.in/questions/XXG081RUFY](https://www.prepwiser.in/questions/XXG081RUFY)

Q68 JEE Main 2021 · 27 Aug · Shift 2

Match List-I with List-II :

List - I (Name of ore/mineral)	List - II (Chemical formula)
(a) Calamine	(i) ZnS
(b) Malachite	(ii) $FeCO_3$
(c) Siderite	(iii) $ZnCO_3$
(d) Sphalerite	(iv) $CuCO_3 \cdot Cu(OH)_2$

Choose the most appropriate answer from the options given below :

- | | |
|--|--|
| (A) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i) | (B) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii) |
| (C) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii) | (D) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i) |

Step-by-step solution ► [prepwiser.in/questions/FpRw39QTbW](https://www.prepwiser.in/questions/FpRw39QTbW)

Given below are two statements :

Statement I : Sphalerite is a sulphide ore of zinc and copper glance is a sulphide ore of copper.

Statement II : It is possible to separate two sulphide ores by adjusting proportion of oil to water or by using 'depressants' in a froth flotation method.

Choose the most appropriate answer from the options given below :

- (A) Statement I is true but Statement II is false.
- (B) Both Statement I and Statement II are true.
- (C) Statement I is false but Statement II is true.
- (D) Both Statement I and Statement II are false.

[Step-by-step solution ► prepwiser.in/questions/kbvLabFJAI](https://www.prepwiser.in/questions/kbvLabFJAI)

Match List - I with List - II :

List - I		List - II	
(a)	Haematite	(i)	$Al_2O_3 \cdot xH_2O$
(b)	Bauxite	(ii)	Fe_2O_3
(c)	Magnetite	(iii)	$CuCO_3 \cdot Cu(OH)_2$
(d)	Malachite	(iv)	Fe_3O_4

Choose the correct answer from the options given below :

- (A) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)
- (B) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
- (C) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)
- (D) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

[Step-by-step solution ► prepwiser.in/questions/cs5QZl6UfL](https://www.prepwiser.in/questions/cs5QZl6UfL)

Match List - I with List - II.

List - I List - II

- | | |
|---------------|----------|
| (a) Siderite | (i) Cu |
| (b) Calamine | (ii) Ca |
| (c) Malachite | (iii) Fe |
| (d) Cryolite | (iv) Al |
| | (v) Zn |

Choose the correct answer from the options given below :

(A) (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

(B) (a) → (iii), (b) → (i), (c) → (v), (d) → (ii)

(C) (a) → (i), (b) → (ii), (c) → (v), (d) → (iii)

(D) (a) → (iii), (b) → (v), (c) → (i), (d) → (iv)

[Step-by-step solution ► prepwiser.in/questions/-ZYxmv7Pbw](https://www.prepwiser.in/questions/-ZYxmv7Pbw)

Match List - I with List - II.

List - I (Ore) List - II (Element Present)

- | | |
|-----------------|----------------|
| (a) Kernite | (i) Tin |
| (b) Cassiterite | (ii) Boron |
| (c) Calamine | (iii) Fluorine |
| (d) Cryolite | (iv) Zinc |

Choose the most appropriate answer from the options given below :

(A) (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

(B) (a) → (iii), (b) → (i), (c) → (ii), (d) → (iv)

(C) (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)

(D) (a) → (ii), (b) → (iv), (c) → (i), (d) → (iii)

[Step-by-step solution ► prepwiser.in/questions/oS7bOGKSQ6](https://www.prepwiser.in/questions/oS7bOGKSQ6)

Math List - I with List - II.

List I (Metal)	List II (Ores)
(a) Aluminium	(i) Siderite
(b) Iron	(ii) Calamine
(c) Copper	(iii) Kaolinite
(d) Zinc	(iv) Malachite

Choose the correct answer from the options given below :

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

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

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

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

Step-by-step solution ► [prepwiser.in/questions/nfTbnCjILO](https://www.prepwiser.in/questions/nfTbnCjILO)

Answer key — Metallurgy

Numbers match the question numbers above. For full working, open the solution link under each question.

1	B	2	C	3	C	4	1	5	B	6	A	7	C	8	A
9	B	10	D	11	D	12	C	13	B	14	D	15	B	16	A
17	B	18	C	19	C	20	B	21	D	22	C	23	A	24	A
25	A	26	6	27	B	28	B	29	A	30	A	31	A	32	C
33	C	34	B	35	A	36	C	37	A	38	A	39	A	40	C
41	B	42	D	43	D	44	A	45	A	46	D	47	B	48	A
49	D	50	B	51	A	52	A	53	B	54	C	55	D	56	D
57	A	58	D	59	A	60	A	61	A	62	A	63	A	64	A
65	4	66	3	67	B	68	A	69	B	70	B	71	D	72	C
73	C														

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