

## Metals

Questions  
Q1 - 24 June - Shift 1

Match List - I with List - II

	List - I		List - II
(A)	Sphalerite	(I)	FeCO <sub>3</sub>
(B)	Calamine	(II)	PbS
(C)	Galena	(III)	ZnCO <sub>3</sub>
(D)	Siderite	(IV)	ZnS

Space for your notes:

Choose the most appropriate answer from the options given below:

- (A) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)  
 (B) (A) - (IV), (B) - (I), (C) - (II), (D) - (III)  
 (C) (A) - (II), (B) - (III), (C) - (I), (D) - (IV)  
 (D) (A) - (III), (B) - (IV), (C) - (II), (D) - (I)

## Q2 - 24 June - 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)  $2[\text{Au}(\text{CN})_2]^-_{(\text{aq})} + \text{Zn}(\text{s}) \rightarrow 2\text{Au}(\text{s}) + [\text{Zn}(\text{CN})_4]^{2-}$

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## Q3 - 24 June - Shift 2

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

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## Metals

Questions  
Q4 - 25 June - 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)  $[\text{Au}(\text{CN})_4]^-$  and  $[\text{Zn}(\text{CN})_2(\text{OH})_2]^{2-}$
- (B)  $[\text{Au}(\text{CN})_2]^-$  and  $[\text{Zn}(\text{OH})_4]^{2-}$
- (C)  $[\text{Au}(\text{CN})_2]^-$  and  $[\text{Zn}(\text{CN})_4]^{2-}$
- (D)  $[\text{Au}(\text{CN})_4]^{2-}$  and  $[\text{Zn}(\text{CN})_6]^{4-}$

Space for your notes:

## Q5 - 25 June - 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 answer 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.

Space for your notes:

## Q6 - 26 June - Shift 1

## Metals

Given below are two statements :

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**Statement I** : According to the Ellingham diagram, any metal oxide with higher  $\Delta G^\circ$  is more stable than the one with lower  $\Delta G^\circ$ .

**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.

Q7 - 26 June - Shift 2

The role of depressants in Froth Flotation method\* is to

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- (1) selectively prevent one component of the ore from coming to the froth.
- (2) reduce the consumption of oil for froth formation.
- (3) stabilize the froth.
- (4) enhance non-wettability of the mineral particles.

Q8 - 27 June - Shift 1

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**Metals**

Match List-I with List-II

Space for your notes:

**List-I**

**List-II**

- |                               |                       |
|-------------------------------|-----------------------|
| (A) Concentration of gold ore | (I) Aniline           |
| (B) Leaching of alumina       | (II) NaOH             |
| (C) Froth stabiliser          | (III) SO <sub>2</sub> |
| (D) Blister copper            | (IV) NaCN             |

Choose the correct answer from the options given below.

- (A) (A) – (IV), (B) – (III), (C) – (II), (D) – (I)
- (B) (A) – (IV), (B) – (II), (C) – (I), (D) – (III)
- (C) (A) – (III), (B) – (II), (C) – (I), (D) – (IV)
- (D) (A) – (II), (B) – (IV), (C) – (III), (D) – (I)

**Q9 - 27 June - Shift 2**

## Metals

**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

**Q10 - 28 June - 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  $1350^\circ C$ , while above  $1350^\circ C$  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.

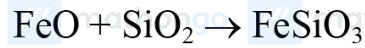
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**Metals**

**Questions**  
**Q11 - 28 June - Shift 2**

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



FeO and FeSiO<sub>3</sub> respectively are.

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

*Space for your notes:*

**Q12 - 29 June - 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

*Space for your notes:*

**Q13 - 29 June - Shift 2**

## Metals

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Match List I with List II.

Space for your notes:

List I Ore	List II Composition
A. Siderite	I. $\text{Fe CO}_3$
B. Malachite	II. $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$
C. Sphalerite	III. $\text{ZnS}$
D. Calamine	IV. $\text{ZnCO}_3$

Choose the correct answer from the options given

below:

- (A) A-I, B-II, C-III, D-IV  
(B) A-III, B-IV, C-II, D-I  
(C) A-IV, B-III, C-I, D-II  
(D) A-I, B-II, C-IV, D-III

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Questions

Answer Key

Q1 (A)

Q2 (B)

Q3 (3)

Q4 (C)

Q5 (A)

Q6 (D)

Q7 (A)

Q8 (B)

Q9 (D)

Q10 (B)

Q11 (D)

Q12 (D)

Q13 (A)

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**Metals**

**Hints and Solutions**

**Q1 (A)**

	List - I		List - II
(A)	Sphalerite	(IV)	ZnS
(B)	Calamine	(III)	ZnCO <sub>3</sub>
(C)	Galena	(II)	PbS
(D)	Siderite	(I)	FeCO <sub>3</sub>

**Q2 (B)**

Hall Heroult process is the major industrial process for extraction of aluminium.

**Q3 (3)**

(1) Baryte : BaSO<sub>4</sub>

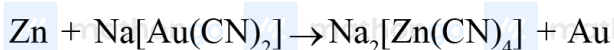
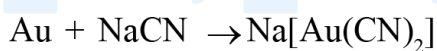
(2) Galena : PbS

(3) Zinc blende : ZnS

(4) Copper pyrite : CuFeS<sub>2</sub>

} sulphide (S<sup>2-</sup>)  
ores

**Q4 (C)**



**Q5 (A)**

In the electro-refining, impure metal (here blister copper) is used as an anode while precious metal like Au, Pt get deposited as anode mud.

**Q6 (D)**

Metal oxide with lower  $\Delta G^\circ$  is more stable  
Statement II is correct

**Q7 (A)**

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refer NCERT (Page No. 154)

Q8 (B)

Gold is concentrated by cyanidation

Leaching of alumina is done by NaOH

Froth stabiliser is aniline

Blister copper has condensed  $\text{SO}_2$  on the surface

Q9 (D)

Statement-1 : wrong,  $\text{Au}^+$  is correct, not  $\text{Au}^{+3}$

Statement-2 : correct

Q10 (B)

From Ellingham diagram given in NCERT, it can be seen that Mg, MgO line crosses Al,  $\text{Al}_2\text{O}_3$  line

after  $1350^\circ\text{C}$  hence assertion is true.

Yes, Mg have lower MP and BP than aluminium

but it does not explain the above fact.

Q11 (D)

$\text{FeO} = \text{Gangue}$

$\text{FeSiO}_3 = \text{Slag}$

Q12 (D)

For ZnS, KCN is used as depressant.

For Gold and silver  $\Rightarrow$  leaching [Cyanide process]

Q13 (A)

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Metals

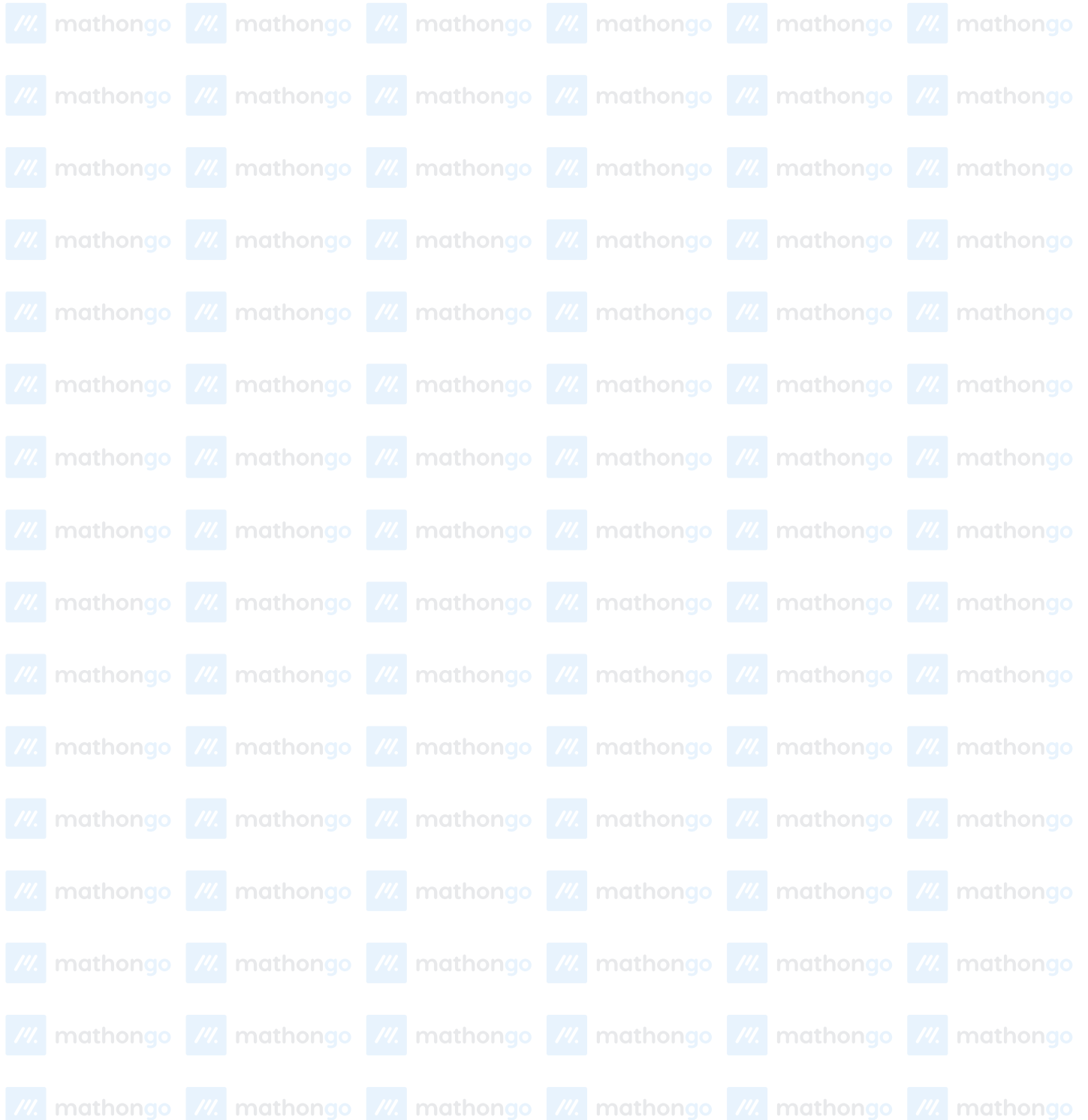
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Siderite –  $\text{FeCO}_3$

Malachite –  $\text{CuCO}_3 \cdot \text{Cu(OH)}_2$

Calamine –  $\text{ZnCO}_3$

Sphalerite –  $\text{ZnS}$



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