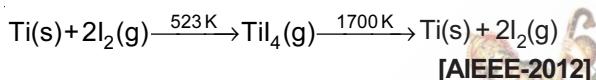


General Principles and Processes of Isolation of Elements

1. The non-aromatic compound among the following is
[AIEEE-2011]



2. Which method of purification is represented by the following equation?



- (1) Cupellation (2) Poling
(3) Van Arkel (4) Zone refining

3. In the context of the Hall-Heroult process for the extraction of Al, which of the following statement is false? [JEE (Main)-2015]

- (1) CO and CO_2 are produced in this process
 - (2) Al_2O_3 is mixed with CaF_2 which lowers the melting point of the mixture and brings conductivity
 - (3) Al^{3+} is reduced at the cathode to form Al
 - (4) Na_2AlF_6 serves as the electrolyte

4. Which one of the following ores is best concentrated by froth floatation method?

[JEE (Main)-2016]

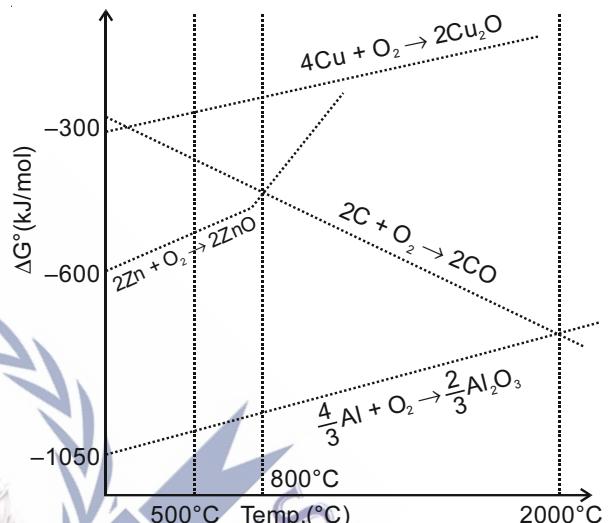
- (1) Siderite (2) Galena
(3) Malachite (4) Magnetite

5. The ore that contains both iron and copper is

[JEE (Main)-2019]

- (1) Copper pyrites (2) Dolomite
(3) Malachite (4) Azurite

6. The correct statement regarding the given Ellingham diagram is [JEE (Main)-2019]



- (1) At 800°C, Cu can be used for the extraction of Zn from ZnO
 - (2) At 500°C, coke can be used for the extraction of Zn from ZnO
 - (3) At 1400°C, Al can be used for the extraction of Zn from ZnO

7. Hall-Heroult's process is given by

[JEE (Main)-2019]

- (1) $\text{ZnO} + \text{C} \xrightarrow{\text{Coke, } 1673\text{K}} \text{Zn} + \text{CO}$
 - (2) $\text{Cr}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Cr}$
 - (3) $2\text{Al}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Al} + 3\text{CO}_2$
 - (4) $\text{Cu}^{2+}(\text{aq}) + \text{H}_2(\text{g}) \rightarrow \text{Cu}(\text{s}) + 2\text{H}^+(\text{a})$

8. Match the ores (column A) with the metals (column B):

(Column A)	(Column B)
Ores	Metals
Siderite	(a) Zinc
Kaolinite	(b) Copper
Malachite	(c) Iron
Calamine	(d) Aluminium

[JEE (Main)-2019]

- (1) (I) - (a); (II) - (b); (III) - (c); (IV) - (d)
 (2) (I) - (c); (II) - (d); (III) - (a); (IV) - (b)
 (3) (I) - (c); (II) - (d); (III) - (b); (IV) - (a)
 (4) (I) - (b); (II) - (c); (III) - (d); (IV) - (a)
9. The reaction that does NOT define calcination is
[JEE (Main)-2019]
- $\text{Fe}_2\text{O}_3 \cdot \text{xH}_2\text{O} \xrightarrow{\Delta} \text{Fe}_2\text{O}_3 + \text{xH}_2\text{O}$
 - $\text{CaCO}_3 \cdot \text{MgCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{MgO} + 2\text{CO}_2$
 - $\text{ZnCO}_3 \xrightarrow{\Delta} \text{ZnO} + \text{CO}_2$
 - $2\text{Cu}_2\text{S} + 3\text{O}_2 \xrightarrow{\Delta} 2\text{Cu}_2\text{O} + 2\text{SO}_2$
10. In the Hall-Heroult process, aluminium is formed at the cathode. The cathode is made out of
[JEE (Main)-2019]
- Carbon
 - Copper
 - Platinum
 - Pure aluminium
11. The pair that does NOT require calcination is
[JEE (Main)-2019]
- Fe_2O_3 and $\text{CaCO}_3 \cdot \text{MgCO}_3$
 - ZnCO_3 and CaO
 - ZnO and MgO
 - ZnO and $\text{Fe}_2\text{O}_3 \cdot \text{xH}_2\text{O}$
12. With respect to an ore, Ellingham diagram helps to predict the feasibility of its
[JEE (Main)-2019]
- Zone refining
 - Vapour phase refining
 - Thermal reduction
 - Electrolysis
13. The Mond process is used for the
[JEE (Main)-2019]
- Purification of Zr and Ti
 - Extraction of Mo
 - Purification of Ni
 - Extraction of Zn
14. The ore that contains the metal in the form of fluoride is
[JEE (Main)-2019]
- Malachite
 - Sphalerite
 - Magnetite
 - Cryolite
15. The one that is not a carbonate ore is
[JEE (Main)-2019]
- Bauxite
 - Calamine
 - Siderite
 - Malachite
16. Assertion : For the extraction of iron, haematite ore is used.
 Reason : Haematite is a carbonate ore of iron.
[JEE (Main)-2019]
- Only the reason is correct
 - Only the assertion is correct
 - Both the assertion and reason are correct and the reason is the correct explanation for the assertion
 - Both the assertion and reason are correct, but the reason is not the correct explanation for the assertion
17. The alloy used in the construction of aircrafts is :
[JEE (Main)-2019]
- Mg - Zn
 - Mg - Sn
 - Mg - Mn
 - Mg - Al
18. Match the refining methods (Column I) with metals (Column II).
- | Column I
(Refining methods) | Column II
(Metals) |
|--|-------------------------------------|
| (I) Liquation | (a) Zr |
| (II) Zone Refining | (b) Ni |
| (III) Mond Process | (c) Sn |
| (IV) Van Arkel Method | (d) Ga |
- [JEE (Main)-2019]**
- (I)-(c); (II)-(a); (III)-(b); (IV)-(d)
 - (I)-(b); (II)-(d); (III)-(a); (IV)-(c)
 - (I)-(c); (II)-(d); (III)-(b); (IV)-(a)
 - (I)-(b); (II)-(c); (III)-(d); (IV)-(a)
19. The correct statement is :
[JEE (Main)-2019]
- Zincite is a carbonate ore.
 - Zone refining process is used for the refining of titanium.
 - Aniline is a froth stabilizer.
 - Sodium cyanide cannot be used in the metallurgy of silver.

20. In chromatography, which of the following statements is INCORRECT for R_f ?

[JEE (Main)-2019]

- (1) The value of R_f cannot be more than one.
- (2) Higher R_f value means higher adsorption.
- (3) R_f value is dependent on the mobile phase.
- (4) R_f value depends on the type of chromatography.

21. The idea of froth floatation method came from a person X and this method is related to the process Y of ores. X and Y, respectively, are :

[JEE (Main)-2019]

- (1) Fisher woman and concentration
- (2) Washer woman and concentration
- (3) Washer man and reduction
- (4) Fisher man and reduction

22. The correct statement is [JEE (Main)-2019]

- (1) Pig iron is obtained from cast iron.
- (2) Leaching of bauxite using concentrated NaOH solution gives sodium aluminate and sodium silicate.
- (3) The blistered appearance of copper during the metallurgical process is due to the evolution of CO_2 .
- (4) The Hall-Heroult process is used for the production of aluminium and iron.

23. The purest form of commercial iron is

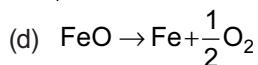
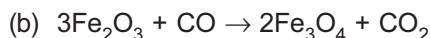
[JEE (Main)-2020]

- (1) Scrap iron and pig iron
- (2) Cast iron
- (3) Wrought iron
- (4) Pig iron

24. The refining method used when the metal and the impurities have low and high melting temperatures, respectively, is [JEE (Main)-2020]

- (1) Zone refining
- (2) Vapour phase refining
- (3) Liquation
- (4) Distillation

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



[JEE (Main)-2020]

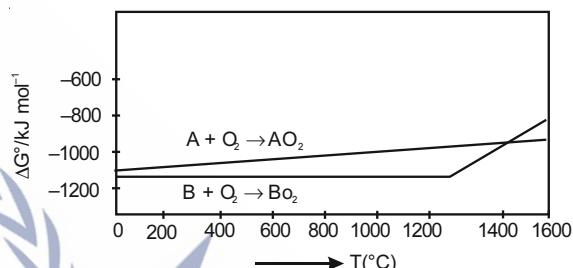
- (1) (c) and (d)

- (2) (d)

- (3) (a)

- (4) (a) and (d)

26. According to the following diagram, A reduces BO_2 when the temperature is



[JEE (Main)-2020]

- (1) $> 1400^\circ\text{C}$
- (2) $> 1200^\circ\text{C}$ but $< 1400^\circ\text{C}$
- (3) $< 1200^\circ\text{C}$
- (4) $< 1400^\circ\text{C}$

27. Cast iron is used for the manufacture of

[JEE (Main)-2020]

- (1) Wrought iron, pig iron and steel
- (2) Pig iron, scrap iron and steel
- (3) Wrought iron and pig iron
- (4) Wrought iron and steel

28. 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.

[JEE (Main)-2020]

- (1) (a), (c) and (d) only
- (2) (c) and (d) only
- (3) (b), (c) and (d) only
- (4) (a), (b), (c) and (d)

29. The processes of calcination and roasting in metallurgical industries, respectively, can lead to

[JEE (Main)-2020]

- (1) Global warming and photochemical smog
- (2) Photochemical smog and ozone layer depletion
- (3) Photochemical smog and global warming
- (4) Global warming and acid rain

30. The Crystal Field Stabilization Energy

(CFSE) of $[\text{CoF}_3(\text{H}_2\text{O})_3]$ ($\Delta_0 < P$) is

[JEE (Main)-2020]

- (1) $-0.8 \Delta_0$
- (2) $-0.8 \Delta_0 + 2P$
- (3) $-0.4 \Delta_0$
- (4) $-0.4 \Delta_0 + P$

31. An Ellingham diagram provides information about

[JEE (Main)-2020]

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

32. The incorrect statement is [JEE (Main)-2020]

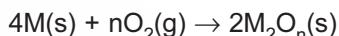
- (1) Bronze is an alloy of copper and tin
- (2) Cast iron is used to manufacture wrought iron
- (3) German silver is an alloy of zinc, copper and nickel
- (4) Brass is an alloy of copper and nickel

33. Mischmetal is an alloy consisting mainly of

[JEE (Main)-2020]

- (1) Lanthanoid and actinoid metals
- (2) Actinoid and transition metals
- (3) Lanthanoid metals
- (4) Actinoid metals

34. For a reaction,



the free energy change is plotted as a function of temperature. The temperature below which the oxide is stable could be inferred from the plot as the point at which

[JEE (Main)-2020]

- (1) The free energy change shows a change from negative to positive value
- (2) The slope changes from positive to negative
- (3) The slope changes from negative to positive
- (4) The slope changes from positive to zero

35. The element that can be refined by distillation is

[JEE (Main)-2020]

- | | |
|-------------|------------|
| (1) Gallium | (2) Nickel |
| (3) Zinc | (4) Tin |