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# NEET GENERAL PRINCIPLES OF ISOLATION OF ELEMENTS — PYQS

**Max. Marks:** 96 **Questions:** 24

## Section A (MCQ) — 24 questions

**Q.1** The reaction that does NOT take place in blast furnace between 900 K to 1500 K temperature range during extraction of iron is : [NEET (UG) 2023]

(1) $FeO + CO \longrightarrow Fe + CO_2$
(2) $C + CO_2 \longrightarrow 2CO$
(3) $CaO + SiO_2 \longrightarrow CaSiO_3$
(4) $Fe_2O_3 + CO \longrightarrow 2FeO + CO_2$

Scan or tap for the full solution

**Q.2** Match **List - I** with **List - II**.

| List - I (Ores) | | List - II (Composition) | |
|---|---|---|---|
| a. | Haematite | i. | $Fe_3O_4$ |
| b. | Magnetite | ii. | $ZnCO_3$ |
| c. | Calamine | iii. | $Fe_2O_3$ |
| d. | Kaolinite | iv. | $[Al_2(OH)_4Si_2O_5]$ |

Choose the correct answer from the options given below: [NEET (UG) 2022]

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

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**Q.3** Which one of the following is not a calcination reaction? [NEET (UG) 2022 (Phase 2)]

(1) $CaCO_3 + 2HCl \xrightarrow{\Delta} CaCl_2 + H_2O + CO_2$
(2) $ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$
(3) $Fe_2O_3 . xH_2O \xrightarrow{\Delta} Fe_2O_3 + xH_2O$
(4) $CaCO_3 . MgCO_3 \xrightarrow{\Delta} CaO + MgO + 2CO_2$

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**Q.4** The maximum temperature that can be achieved in blast furnace is : [NEET (UG) 2021]

(1) Upto 5000 K (2) Upto 1200 K
(3) Upto 2200 K (4) Upto 1900 K

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**Q.5** Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature? [NEET (UG) 2021]

(1) Zone refining (2) Electrolysis
(3) Chromatography (4) Distillation

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**Q.6** Identify the correct statement from the following : [NEET (UG) 2020]

(1) Blister copper has blistered appearance due to evolution of $CO_2$
(2) Vapour phase refining is carried out for Nickel by Van Arkel method.
(3) Pig iron can be moulded into a variety of shapes.
(4) Wrought iron is impure iron with 4% carbon.

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**Q.7** Which one is malachite from the following? [NEET (UG) 2019]

(1) $Fe_3O_4$ (2) $CuCO_3 \cdot Cu(OH)_2$
(3) $CuFeS_2$ (4) $Cu(OH)_2$

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**Q.8** Considering Ellingham diagram, which of the following metals can be used to reduce alumina? [NEET 2018]

(1) Fe (2) Zn (3) Mg (4) Cu

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**Q.9** Extraction of gold and silver involves leaching with $CN^-$ ion. Silver is later recovered by [NEET 2017]

(1) distillation
(2) zone refining
(3) displacement with Zn
(4) liquation

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**Q.10** Match items of **Column I** with the items of **Column II** and assign the correct code : [NEET 2016 (Phase 1)]

| Column I | | Column II | |
|---|---|---|---|
| a. | Cyanide process | i. | Ultrapure Ge |
| b. | Froth floatation process | ii. | Dressing of ZnS |
| c. | Electrolytic reduction | iii. | Extraction of Al |
| d. | Zone refining | iv. | Extraction of Au |
| | | v. | Purification of Ni |

(1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(2) (a)-(iii), (b)-(iv), (c)-(v), (d)-(i)
(3) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
(4) (a)-(ii), (b)-(iii), (c)-(i), (d)-(v)

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**Q.11** In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with [AIPMT 2015]
(1) carbon monoxide (2) copper (I) sulphide
(3) sulphur dioxide (4) iron (II) sulphide

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**Q.12** "Metals are usually not found as nitrates in their ores." Out of the following two (I and II) reasons which is/are true for the above observation?
I. Metal nitrates are highly unstable.
II. Metal nitrates are highly soluble in water.
[AIPMT 2015 (Cancelled)]
(1) I is false but II is true.
(2) I is true but II is false.
(3) I and II are true.
(4) I and II are false

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**Q.13** The metal oxide which cannot be reduced to metal by carbon is [NEET 2013 (Karnataka)]
(1) $Al_2O_3$ (2) PbO (3) ZnO (4) $Fe_2O_3$

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**Q.14** The Gibbs energy for the decomposition of $Al_2O_3$ at 500 °C is as follows

$$\frac{2}{3}Al_2O_3 \longrightarrow \frac{4}{3}Al + O_2$$

$\Delta_rG = +960$ kJ mol$^{-1}$
The potential difference needed for the electrolytic reduction of aluminium oxide ($Al_2O_3$) at 500 °C is at least [AIPMT 2012 (Mains)]
(1) 4.5 V (2) 3.0 V (3) 2.5 V (4) 5.0 V

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**Q.15** In the extraction of copper from its sulphide ore, the metal is finally obtained by the reduction of cuprous oxide with [AIPMT 2012 (Prelims)]
(1) carbon monoxide (2) copper (I) sulphide
(3) sulphur dioxide (4) iron (II) sulphide.

Scan or tap for the full solution

**Q.16** Aluminium is extracted from alumina ($Al_2O_3$) by electrolysis of a molten mixture of
[AIPMT 2012 (Prelims)]
(1) $Al_2O_3 + HF + NaAlF_4$
(2) $Al_2O_3 + CaF_2 + NaAlF_4$
(3) $Al_2O_3 + Na_3AlF_6 + CaF_2$
(4) $Al_2O_3 + KF + Na_3AlF_6$

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**Q.17** Which one of the following is a mineral of iron?
[AIPMT 2012 (Prelims)]
(1) Malachite (2) Cassiterite
(3) Pyrolusite (4) Magnetite

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**Q.18** The following reactions take place in the blast furnace in the preparation of impure iron. Identify the reaction pertaining to the formation of the slag.
[AIPMT 2011 (Mains)]
(1) $Fe_2O_{3(s)} + 3CO_{(g)} \longrightarrow 2Fe_{(l)} + 3CO_{2(g)}$
(2) $CaCO_{3(s)} \longrightarrow CaO_{(s)} + CO_{2(g)}$
(3) $CaO_{(s)} + SiO_{2(s)} \longrightarrow CaSiO_{3(s)}$
(4) $2C_{(s)} + O_{2(g)} \longrightarrow 2CO_{(g)}$

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**Q.19** Which of the following elements is present as the impurity to the maximum extent in pig iron?
[AIPMT 2011 (Prelims)]
(1) Manganese (2) Carbon
(3) Silicon (4) Phosphorus

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**Q.20** Which of the following pairs of metals is purified by van Arkel method? [AIPMT 2011 (Prelims)]
(1) Ga and In (2) Zr and Ti
(3) Ag and Au (4) Ni and Fe

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**Q.21** Sulphide ores of metals are usually concentrated by froth flotation process. Which one of the following sulphide ores offers an exception and is concentrated by chemical leaching? [AIPMT 2007]

(1) Galena (2) Copper pyrite
(3) Sphalerite (4) Argentite

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**Q.22** Which of the following statements about the advantage of roasting of sulphide ore before reduction is not true? [AIPMT 2007]

(1) The $\Delta_f G°$ of the sulphide is greater than those for $CS_2$ and $H_2S$.
(2) The $\Delta_f G°$ is negative for roasting of sulphide ore to oxide.
(3) Roasting of the sulphide to the oxide is thermodynamically feasible.
(4) Carbon and hydrogen are suitable reducing agents for metal sulphides.

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**Q.23** The mass of carbon anode consumed (giving only carbon dioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is (Atomic mass : Al = 27) [AIPMT 2005]

(1) 270 kg (2) 540 kg (3) 90 kg (4) 180 kg

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**Q.24** The method of zone refining of metals is based on the principle of [AIPMT 2003]

(1) greater mobility of the pure metal than that of the impurity
(2) higher melting point of the impurity than that of the pure metal
(3) greater noble character of the solid metal than that of the impurity
(4) greater solubility of the impurity in the molten state than in the solid

Scan or tap for the full solution

## ANSWER KEY

| Ques. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | **4** | **2** | **1** | **3** | **4** | **3** | **2** | **3** | **3** | **3** | **2** |
| Ques. | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| Ans. | **1** | **1** | **3** | **2** | **3** | **4** | **3** | **2** | **2** | **4** | **4** |
| Ques. | 23 | 24 | | | | | | | | | |
| Ans. | **3** | **4** | | | | | | | | | |