CHEMISTRY

JEE MAIN AND ADVANCED

M0ck test 26

Example

1. A certain metal M occurs in four compounds namely A, B, C and D. A has 20% of M, B has 68% of M, C has 73% of M and D has 60% of M.

If metal M is extracted from A, B, C and D, it cost RS 35 per kg, RS 40 per kg, RS 100 per kg and RS 45 per kg respectively. Which mineral can be considered as an effective ore of M>

A. A

B. B

C. C

D. D

Answer: B

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2. The incorrect statement regarding forth floatation process is

A. It is based on the difference in gravities of ore and gangue

B. Uses cresols as forth stabilizers

C. Uses pine oil as forthing agent

D. Uses sodium ethyl xanthate, $C_2H_5OCS_2$ Na as collector

Answer: A

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3. Oxidation state of the metal in the minerals haematite and magnetite, respectively are

A. II, III in haematite and III in magnetite

B. II, III in haematite and II in magnetite

C. II in haematite and ll, III in magnetite

D. III in haematite and ll, III in magnetite

Answer: D

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4. Which of the following statement is incorrect?

(a) Cassiterite is not the ore of tin

(b) Metallurgy is a process of mixing of ore

(c). Concentration of chromite $(FeO.Cr_2O_3)$ is done by magnetic separation

(d) ZnS with depressant NaCN from $Na_2\left[Zn(CN)_4\right]$.

A. (a) & (b)

B. Only (a)

C. (b), C & (d)

D. C and (d)

Answer: A

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5. Leaching of an ore is done by

A. Hall's process

B. Serpeck's process

C. Cyanide process

D. Hall-Heroult process

Answer: C

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6. In the electrolytic reduction of pure Al_2O_3. Fluorspar (CaF_2) is added to

A. Reduce the melting temperature of the mixture

B. Improve the electrical conductivity of the melt

C. Reduce Al_2O_3

D. Both (1) and (2)

Answer: D

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7. During the electroytic refining of zinc, which of the following statement is true?

A. The impure metal is at the cathode

B. Graphite is at the anode

C. The metal ions get reduced at anode

D. Acidified zinc sulphate is the electrolyte

Answer: D

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8. In Mac-Arthur Forrest Cyanide method, silver is extracted from the solution of $Na\left[Ag(CN)_2\right]$ by the use of

A. Zn

B. Pt

C. Au

D. Pd

Answer: A

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9. In the extraction of copper, metal is formed in the Bessemer converter due to which of the following reaction?

A. $Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$

B. $Cu_2S \rightarrow 2Cu + S$

C. $Fe + Cu_2O \rightarrow 2Cu + FeO$

D. $2Cu_2O \rightarrow 4Cu + O_2$

Answer: A

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10. In the extraction of iron in the blast furnace, phosphorous separates as

A. Slag, $Ca_3(PO_4)_2$

B. Slag, $Mg_3(PO_4)_2$

C. Volatile, P_2O_5

D. Ca_3P_2

Answer: A

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11. Which metal is used for making dry cell ?

A. Fe

B. Al

C. Zn

D. Mg

Answer: C

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12. The process used in converting hydrated Alumina into anhydrous alumina is called

A. Roasting

B. Calcination

C. Smelting

D. Dressing

Answer: B

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13. Hydrometallurgy method is used for the extraction of which of the following metals?

A. Zn and Ag

B. Ag and Cu

C. Zn and Hg

D. Hg and Cu

Answer: B

14. Which of the following forms of iron has highest melting point ?

A. Pig iron

B. Cast iron

C. Steel

D. Wrought iron

Answer: D

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15. Consider the following reduction processes

:

(I) $Fe_2O_3 + C \rightarrow Fe$

(II) $Al_2O_3 + C \rightarrow Al$

(III) $Pbo + C \rightarrow Pb$

(IV) $Ca_3(PO_4)_2 + C + SiO_2 \rightarrow P$

The correct processe(s) is/ are

A. (I) and (III)

B. (I), (III) and (IV)

C. (II) and (III)

D. (I) and (IV)

Answer: B

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16. Which of the following statement is incorrect regarding Ellingham diagram?

A. It represents ΔG with temperature

B. It can be used for oxides, sulphides and chloride ores

C. It helps in predicting the feasibility of thermal reduction of an ore

D. A metal will reduce the oxide of other metals which lie below it in Ellingham diagram

Answer: D

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17. Which of the following statements is correct regarding the slag obtained during the extraction of a metal like copper or iron?

A. The slag is lighterand has higher melting point than the metal

B. The slag is lighter and has lower melting point than the metal

C. The slag is heavier and has higher melting point than the metal

D. The slag is heavier and has lower melting point than the metal

Answer: B

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18. Consider the following metallurgical processes :

(I) Heating impure metal with CO and

distilling the resulting volatile carbonyl $(b.\,p.\,43^{\circ}C)$ and finally decomposition at $150^{\circ} - 200^{\circ}C$ to get the pure metal.

(II) Heating the sulphide ore in air until a part is converted to oxide and then further heating in the absence of air to let the oxide react with unchanged metal sulphide.

(III) Electrolysis of the molten electrolyte containing approximately equal amounts of the metal chloride and NaCl to obtain the metal.

The processes used for obtaining magnesium , nickel and copper are respectively.

A. (I), (II), (III)

B. (II), (III), (I)

C. (I), (III), (II)

D. (II), (I), (III)

Answer: D

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19. Which one of the following given d-block elements has the lowest atomic radii?

A. Cu

B. Ti

C. Sc

D. Co

Answer: D

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20. Which of the following set has all the ions coloured ?

A. $Cu^{2+}, Fe^{2+}, Co^{2+}$

B. $Cu^{2+}, Sc^{3+}, Mg^{2+}$

C. $Al^{3+}, Zn^{2+}, Co^{2+}$

D. $Fe^{3+}, Sc^{3+}, Ni^{2+}$

Answer: A

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21. The electronic configuration of one of the coinage metals is

A. 2, 8, 1

B. 2, 8, 18. 2

C. 2, 8, 18, 1

D. 2, 8, 18

Answer: C

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22. In which compound does vanadium has an oxidation number of +4 ?

A. NH_4VO_2

B. VO_2^+

C. VSO_4

D. $VOSO_4$

Answer: D

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23. Transition metals and their compounds show catalytic properties because

A. They have comparatively small size

B. The can adopt multiple oxidation states and can from complexes

C. They have high ionisation enthalpy

D. They are coloured

Answer: B

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24. The common transition metals in brass and bronze is

A. Cu

B. Al

C. Sn

D. Cr

Answer: A

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25. Which group elements of first transition series has the highest paramagnetism in elemental form of +1 O.S, +2 O.S. and +3 O.S. (O.S.= Oxidation state) respectively ?

A. Group 6, Group 7, Group 7, Group 8

B. Group7, Group 6, Group 5, Group 8

C. Group 8, Group 9, Group10, Group 11

D. Group 3, Group 4, Group 5, Group 6

Answer: A

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26. The product formed by the fusion of MnO_2 with KHO in the presence of an oxidising agent, KNO_3 is

A. K_2MnO_4

B. $KMnO_4$

C. Mn_2O_3

D. K_3MnO_4

Answer: A

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27. The number of equivalent Cr-O bonds in CrO_4^{2-} is

A. 1

B. 2

C. 3

D. 4

Answer: D

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28. Actinoid contraction is more than lanthanoid contraction because

A. Energy of 4 f and 5f orbitals are same

B. 5 f orbitals are more diffused as compared to 4 f orbitals

C. Actinoids show greater range of oxidation states than lanthanoids

D. Actinoids are highly reactive

Answer: B

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29. CrO_3 dissolves in aqueous NaOh to give

A. CrO_4^{2-}

B. $Cr(OH)_2$

C. $Cr_2O_7^{2-}$

D. $Cr(OH)_3$

Answer: A

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30. Which of the following can be oxidised by acidified $K_2Cr_2O_7$?

A. Nitrate ions

B. Sulphite ions

C. Ferric ions

D. Borate ions

Answer: B

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31. The most common oxidation state exhibited by all lanthanoids is

A. $+1$

B. $+2$

C. $+3$

D. $+4$

Answer: C

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32. The paramagnetic lanthanoid ion among the following is

A. Ce^{4+}

B. Yb^{2+}

C. Lu^{3+}

D. Sm^{2+}

Answer: D

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33. The nature of CrO and Cr_2O_3 is respectively

A. Basic, Amphoteric

B. Basic, Basic

C. Amphoteric, Acidic

D. Acidic, Basic

Answer: A

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34. Identify the incorrect statement with respect to $KMnO_4$

A. Dark purple in colour

B. It is decolourised by oils

C. Paramagnetic in nature

D. The anion has tetrahedral structure

Answer: C

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35. Consider the following statements

(I) Zr^{4+} and Hf^{4+} have almost same ionic radii

(II) Lanthanoids liberate H_2 when treated with dilute acids.

(III) The ionic radii of trivalent lanthanoids steadily increase with increase in atomic number.

The correct statement(s) is/ are

A. I ,II

B. I , III

C. Only II

D. I, II, III

Answer: A

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36. The reddish brown gas produced by heating KCl with solid $K_2Cr_2O_7$ and conc. H_2SO_4 is

A. CrO_2Cl_2

B. Cl_2

C. CrO_3

D. H_2CrO_4

Answer: A

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37. Chromate ion, CrO_4^{2-} is

A. Diamagnetic, orange in colour

B. Paramagnetic, yellow in colour

C. Diamagnetic, yellow in colour

D. Paramagnetic, orange in colour

Answer: C

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38. When $KMnO_4$ reacts with l^- in a slightly alkaline and acidic medium, the respective products obtained are

A. $Mn^{2+} + lO_3^- \; MnO_2^+ l_2$

B. $MnO_2 + l_2Mn^{2+} + lO_3^-$

C. $MnO_2 + lO_3^- Mn^{2+} + l_2$

D. $Mn^{2+} + l_2MnO_2 + lO_3^-$

Answer: C

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39. Which of the following characteristic is not the point of similarity between lanthanoids and actinoids?

A. Both are strongly reducing in nature

B. Both have stable oxidation state of +3

C. Both have same tendency towards complex formation

D. Both are electropositive in nature

Answer: C

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40. When chromite ore $(FeCr_2O_4)$ is heated with sodium carbonate in free access of air

A. No gaseous product is formed

B. Iron (II) oxide is obtained

C. A water insoluble product which is dark brown in colour is formed

D. A water soluble product which is red in colour is obtained

Answer: C

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