



CHEMISTRY

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General Principles and Processes of Isolation of Elements

Example

1. The scientific and technological process used for isolation of the metal from its ores is

known as metallurgy. Name the method used for removing gangue from sulphide ores.



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2. The autoredution method is used in the metallurgy of

A. Al

B. Hg

C. Zn

D. Cr

Answer:



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3. Litharge is an ore of ____.



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4. Which reducing agent is employed to get copper from leached low grade copper ore?



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5. Nickel Is purified from Its

A. Iodide

B. Chloride

C. Hydride

D. Carbonyl

Answer:



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6. The process used for the extraction of sodium is

A. Baeyer's process

B. Down's process

C. Haber's process

D. Mond's process

Answer:



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7. Name the reducing agent In aluminothermic (thermite) process.



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8. Out of C and CO, which is a better reducing agent at 673K?



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9. Bell metal Is an alloy of

A. Fe,Cr

B. Cu,Ni

C. Cu,Sn

D. Cu,Zn

Answer:



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10. In electrolytic refining method_____ metal
act as anode.





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11. Out of C and CO, which is a better reducing agent for ZnO?



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12. Copper matte is charged into a silica lined converter in extraction of copper. What is the role of silicon lining here?



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13. The process of reducing a metal oxide with coke or any other reducing agent at high temperature is called _____



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14. _____ is a process in which ore is treated with suitable reagent which reacts with ore but not with the impurities.



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15. ____iron contains more percentage of carbon and other impurities like S, P, Si etc.



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16. Name the refining methods used for the preparation of extra pure Zirconium.



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17. Choose the correctly matched pair

A. Magnetite : Iron

B. Malachite : Zinc

C. Calamine : Silver

D.

Answer:



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18. Observe the relationship between the first two terms and fill in the blanks. Iron : Haematite Aluminium :_____.



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19. ____ is the purest form of Iron.



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20. Observe the relationship between first two terms and fill in the blanks. Titanium : van arkel process Nickel: _____



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21. Explain the following: Role of cryolite in metallurgy of aluminium.



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22. State the role of silica in the metallurgy of copper.



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23. a. 'The ore mixed with coke and limestone is introduced into the blast furnace. What is the purpose of adding limestone?



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24. Semiconductors having extra purity is widely used in the field of electronics and computers. Identify an element which is used in this field.



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25. Semiconductors having extra purity is widely used in the field of electronics and computers. Write a method to purify semiconductors.



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26. While adding the raw materials into Blast furnace for the extraction of Iron, it is forgotten to mix limestone with the charge. Predict the result of this mistake.



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27. While adding the raw materials into Blast furnace for the extraction of Iron, it is forgotten to mix limestone with the charge. Give reason for this result.



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28. Suggest suitable method for the following process. Benefication of sulphide ores.



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29. Suggest suitable method for the following process. Refining a metal of high degree of Purity.



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30. The value of $\Delta_r G$ for formation of Cr_2O_3 is $-540 kJ mol^{-1}$ and that of Al_2O_3 is $-827 kJ mol^{-1}$. Is the reduction of Cr_2O_3 possible with Al?



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31. How copper matte is converted into copper?



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32. While adding the raw materials into the reverberatory furnace for the extraction of copper, it is forgotten to mix sand. Predict the result of this mistake.



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33. Iron Is extracted from its oxide ores.Name two minerals of iron (Fe).



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34. Iron Is extracted from its oxide ores.Do you think that all minerals of Iron are used as ores of* iron ? Substantiate.



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35. Some raw data are given below: Iron tank, Carbon lining, Cryolite, Carbon blocks, electricity, alumina. Identify the metal whose metallurgy is associated here.



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36. Some raw data are given below: Iron tank, Carbon lining, Cryolite, Carbon blocks, electricity, alumina. Draw a neat labelled

diagram by using the above data and explain the extraction of that metal.



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37. Copper is extracted from copper pyrites, $CuFeS_2$. How is this ore concentrated?



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38. Copper is extracted from copper pyrites, $CuFeS_2$. What is matte? How is it formed?



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39. Describe how pure Al_2O_3 obtained from bauxite?



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40. A house wife gave some of her gold ornaments to a person for polishing. The person became happy. He conducted some chemical reactions and returned the polished

ornaments. Name the solvent used to dissolve gold.



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41. A house wife gave some of her gold ornaments to a person for polishing . The person became happy, He conducted some chemical reactions and returned the polished ornaments. [Hint: - The person became happy because he got some gold in the 'dissolved form'] a. Name the solvent used by the person

to dissolve gold. b. Explain the chemistry of the reaction: c. How the person has recovered the dissolved gold from the solution?



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42. A house wife gave some of her gold ornaments to a person for polishing . The person became happy, He conducted some chemical reactions and returned the polished ornaments. [Hint: - The person became happy because he got some gold in the 'dissolved

form] a. Name the solvent used by the person to dissolve gold. b. Explain the chemistry of the reaction: c. How the person has recovered the dissolved gold from the solution?



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43. Outline the principle of extraction of each of following: Chlorine from NaCl.



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44. Outline the principle of extraction of each of following: Silver from Ag_2S .



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45. Suggest methods for purification of the following: impure metals. Copper.



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46. Suggest methods for purification of the following impure metals. Silicon



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47. Suggest methods for purification of the following impure metals. Nickel



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48. Metals are extracted from their ores. Among the following which metal is extracted from bauxite :

A. zinc

B. Iron

C. Aluminium

D. Copper

Answer:



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49. Carbonate ores are usually subjected to calcination, while sulphide ores are subjected to roasting. Comment on the statement.



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50. The process involved in metallurgy are concentration of the ore, isolation of the metal from its concentrated ore and purification of the metal. Froth floatation method is an ore concentration

method. What is the principle behind the process ?



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51. What is the role of limestone (CaCO_3) in the extraction of iron?



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52. Mond's process is used for refining of Ni and Van Arkel method is used for refining Zr

(Zirconium). Write one similarity between these processes.



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53. Sulphide ores are concentrated by froth floatation process. Write the name or formulae of any two sulphide ores of copper.



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54. Explain the 'froth' floatation process'



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55. The scientific and technological process used for isolation of the metal from its ores is known as metallurgy. Name the method used for removing gangue from sulphide ores.



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56. The scientific and technological process used for Isolation of the metal from Its ores Is

known as metallurgy. Explain the above method.



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57. Give two examples for alloy



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58. Some metallic compounds /ores are given below $[ZnS, . Al_2O_3.2H_2O, Cu_2S]$ Make a table containing ores, concentration method

of the ore, name of the metal and one alloy of the metal.



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59. a. 'The ore mixed with coke and limestone is introduced into the blast furnace. What is the purpose of adding limestone?



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60. Concentrated ore of iron, coke and limestone are fed into a blast furnace from the top. Write down the reactions taking place at the higher temperature range in the blast furnace.



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61. Metals are extracted from their chief ore. Name the principal ore of Aluminium.



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62. Write the equations for the reactions taking place at the anode and the cathode during the extraction of aluminium by the electrolytic process.



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63. How do calcination and roasting differ from each other? Give an example for each.



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64. The concept of ΔG° of coupled reaction are used explain reductions in metallurgy. Explain the above statement.



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65. In the blast furnace for manufacturing iron, most of the reduction is carried out by CO rather than C (coke). How can you account for this?



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66. You are provided with samples of some impure metals such as titanium and nickel. Which method would you recommend for the purification of each of these metals?



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67. You are provided with samples of some impure,metals such as Titanium and Nickel.Briefly explain purification of each method.



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68. One of the steps in metallurgy is concentration of ores. Majority of the concentration techniques are physical in nature. But there is a chemical method of concentration of ores. Give a metal ore which can be concentrated by chemical methods.



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69. One of the steps in metallurgy is concentration of ores. Majority of the concentration techniques are physical in nature. But there is a chemical method of concentration of ores. Also explain the terms calcination and roasting.



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70. Suggest a condition under which magnesium could reduce alumina.





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71. Write down the reactions taking place in different zones in the blast furnace during the extraction of iron.



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72. Copper can be extracted by hydrometallurgy but not zinc. Explain.



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73. Outline the principles of refining of metals by the following methods. Zone refining.



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74. Outline the principles of refining of metals by the following methods. Electrolytic refining.



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75. Name the common elements present in the anode mud in electrolytic refining of copper. Why are they so present?



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76. What is the role of depressant in froth floatation process?



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77. What criterion is followed for the selection of the stationary phase in chromatography?



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78. How is 'cast iron ' different from 'pig iron'?



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79. Out of C and CO, which is a better reducing agent for ZnO?



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80. Predict conditions under which Al might be expected to reduce MgO



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81. What is the role of graphite rod in the electrometallurgy of aluminium?



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82. Give the general method used for the concentration of following ores: Bauxite ore.



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83. Give the general method used for the concentration of following ores: Zinc sulphide ore.



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84. Semiconductor of very high purity can be obtained by zone refining. Explain the principle behind zone refining.



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85. Explain the steps involved in the vapour phase refining of Ni and Zr



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86. Leaching is a process of concentration of ores. Explain the leaching of alumina from bauxite.



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87. Which of the following is the ore of zinc?

A. Bauxite

B. Magnetite

C. Malachite

D. Calamine

Answer:



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88. There are several methods for refining metals. Explain a method for refining Zirconium.



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89. Name two metals which can be refined by van-Arkel Method.



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90. Calcination and roasting are treatments in metallurgy before metal extraction. Differentiate calcination and roasting.



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91. The reduction of the metal oxide is easier if the metal formed is in liquid state, at the temperature of reduction. Give reason.



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92. All ores are minerals, but all minerals are not ores. Why?



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93. Carbonate ores are usually subjected to calcination, while sulphide ores are subjected to roasting. Comment on the statement.



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94. Write down the reason for adding limestone along with the concentrated ore of iron.



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95. Write down the reactions taking place at the higher temperature range in the blast furnace.



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96. Name the principal ore of aluminium.



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97. Write the equations for the reactions taking place at the anode and the cathode during the extraction of aluminium by the electrolytic process.



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98. The concept of ΔG° of coupled reaction are used explain reductions in metallurgy. Explain the above statement.



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99. In the blast furnace for manufacturing iron, most of the reduction is carried out by CO rather than C (coke). How can you account for this?



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100. Carbonate ore of iron is_____.



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101. Which technique utilizes the density difference between the ore and the impurity to concentrate the ore is

A. Magnetic separation

B. Levigation

C. Froth floatation

D. Leaching

Answer:



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102. Predict conditions under which Al might be expected to reduce MgO



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103. One of the steps in metallurgy is concentration of ores. Majority of the concentration techniques are physical in nature. Bauxite ore is purified by ____



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104. One of the steps in metallurgy is concentration of ores. Majority of the concentration techniques are physical in nature. _____ is the process of heating the concentrated ore strongly in the absence of air.



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105. What is the role of graphite rod in the electrometallurgy of aluminium? Explain





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106. Describe purification of Ni by Mond process.



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107. Write the process of the purification of Zirconium.



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108. Explain the term Liquation.



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