INDIAN SCHOOL MUSCAT
CHEMISTRY IIT -JEE
General principles & processes of isolation

1. The formula of carnallite is :
   a) $LiAl(Si_2O_5)_2$
   b) $KCl.MgCl_2.6H_2O$
   c) $K_2O.Al_2O_3.6SiO_2$
   d) $KCl.MgCl_2.2H_2O$
2. An ore containing the impurity of $FeCr_2O4$ is concentrated by
   a) magnetic-separation
   b) gravity separation
   c) froth-floatation method
   d) electrostatic method
3. Silica is added to roasted copper ores during extraction in order to remove
   a) cuprous sulphide
   b) ferrous oxide
   c) ferrous sulphide
   d) cuprous oxide
4. Among the following statements, the incorrect one is
   a) calamine and siderite are carbonate ores
   b) argentite and cuprite are oxide ores
   c) zinc blende and pyrites are sulphide ores
   d) malachite and azurite are ores of copper
5. Collectors are the substances which help in attachment of an ore particle to air bubble in froth. A popular collector used industrially is
   a) sodium ethyl xanthate
   b) sodium xenate
   c) sodium pyrophosphate
   d) sodium nitroprusside
6. Zone refining is based on the principle of
   a) fractional distillation
   b) fractional crystallisation
   c) partition coefficient
   d) chromatographic separation
7. In the cyanide process involving extraction of silver, zinc is used industrially as a(an)
   a) oxidising agent

b) reducing agent
c) solvent
d) solvating agent

8. During initial treatment, preferential wetting of ore by oil and gangue by water takes place in
   a) Levigation (gravity separation)
   b) Froth floatation
   c) Leaching
   d) Bessemerisation
9. Addition of high proportions of manganese makes steel useful in making rails of railroads, because manganese
   a) gives hardness to steel
   b) helps the formation of oxides of iron
   c) can remove oxygen and sulphur
   d) can show highest oxidation state of +7
10. Which of the following statement(s) is / are incorrect?
   a) Liquation is applied when the metal has low melting point than that of impurities.
   b) Presence of carbon in steel makes it hard due to formation of Fe_3C called cementite.
   c) Less reactive metals like Hg, Pb and Cu are obtained by auto reduction of their sulphide or oxide ores.
   d) Amalgamation method of purification cannot be applied for Au and Ag.
11. Si and Ge used for semiconductors are required to be of high purity and hence purified by
   a) zone-refining
   b) electrorefining
   c) Van-Arkel's process
   d) cupellation process
12. In electrorefining of metals anode and cathode are taken as thick slab of impure metal and a strip of pure-metal respectively while the electrolyte is solution of a complex metal salt. This method cannot be applied for the refining of
   a) Copper
   b) Sodium
   c) Aluminium
   d) Zinc and Silver
13. The metal for which, its property of formation of volatile complex is taken in account for its extraction is
   a) Cobalt
   b) Nickel

c) Vanadium
d) Iron

14. metal has a high concentration into the earth crust and whose oxides cannot be reduced by carbon. The most suitable method for the extraction of such metal is
    a) Alumino thermite process
    b) Electrolysis process
    c) Van-Arkel's process
    d) Cupellation
15. The process, which does not use a catalyst is
    a) Contact process
    b) Thermite process
    c) Ostwald's process
    d) Haber's process
16. Refractory materials are generally used in furnaces because
    a) they are chemically inert
    b) they can withstand high temperature
    c) they do not contain impurities
    d) they decrease melting point of ore
17. % of silver in 'german silver' is
    a) 0
    b) 80
    c) 90
    d) 10
18. Modern method of steel manufacturing is
    a) open hearth process
    b) L.D. Process
    c) Bessemerisation
    d) Cupellation
19. Fool's gold" is
    a) iron pyrites
    b) horn silver
    c) copper pyrites
    d) bronze
20. During electrolytic reduction of alumina, two auxiliary electrolytes X and Y are added to increase the electrical conductance and lower the temperature of melt in order to making fused mixture very conducting. X and Y are
    a) cryolite and fluorspar
    b) cryolite and alum

c) alum and fluorspar
d) fluorspar and bauxite

21. Which of the following statements is correct regarding the slag formation during the extraction of a metal like copper or iron.
    a) The slag is lighter and lower melting than the metal
    b) The slag is heavier and lower melting than the metal
    c) The slag is lighter and higher melting than the metal
    d) The slag is heavier and higher melting than the metal.
22. Among the following groups of oxides, the group containing oxides that cannot be reduced by C to give the respective metal is
    a) CaO and K_2O
    b) Fe_2O_3 and ZnO
    c) Cu_2O and SnO_2
    d) PbO and Pb_3O_4
23. In the alumino thermite process, Al acts as
    a) An oxidising agent
    b) A flux
    c) A reducing agent
    d) A solder
24. Froth floatation process for concentration of ores is an illustration of the practical application of:
    a) Adsorption
    b) Absorption
    c) Coagulation
    d) Sedimentation
25. Mercury is purified by:
    a) Passing through dilute HNO_3
    b) Distillation
    c) Distribution
    d) Vapour phase refining
26. The method of zone refining of metals is based on the principle of:
    a) Greater mobility of the pure metal than that of impurity.
    b) Higher melting point of the impurity than that of the pure metal.
    c) Greater noble character of the solid metal than that of the impurity
    d) Greater solubility of the impurity in the molten state than in the solid
27. The extraction of copper from its sulphide ore the metal is formed by the reduction of Cu_2O with:
    a) FeS
    b) CO

c) Cu_2S
d) SO_2

28. Bauxite is leached with :
a) KCl
b) NaCN
c) NaOH
d) Na_2SO_4

29. Froth floatation process used for the concentration of sulphide ore :
a) is based on the difference in wettability of different minerals.
b) uses Xanthates and fatty acids as collector.
c) usesNaCN as depressant in the mixture of ZnS and PbS when ZnS forms soluble complex and PbS forms froth.
d) All are correct statements

30. The slag consists of molten impurities, generally, in the form of :
a) metal carbonate
b) metal silicate
c) metal oxide
d) metal nitrate

31. The reason, for floating of ore particles in concentration by froth floatation process is that :
a) they are light
b) they are insoluble
c) they are charged
d) they are hydrophobic

32. The process of the isolation of a metal by dissolving the ore in a suitable chemical reagent followed by
precipitation of the metal by a more electropositive metal is called :
a) hydrometallurgy
b) electrometallurgy
c) zone refining
d) electro-refining

33. Choose the correct option using the code regarding roasting process.
I. It is the process of heating the ore in air in a reverberatory furnace to obtain the oxide.
II. It is an exothermic process.
III. It is used for the concentration of sulphide ore.
IV. It removes easily oxidisable volatile impurities present in the concentrated ore.
a) I, II and III

b) I, II and IV
c) I, III and IV
d) I, II, III and IV

34. In the metallurgy of iron, the upper layer obtained in the bottom of blast furnace mainly contains :
a) $CaSiO_3$
b) spongy iron
c) Fe_2O_3
d) $FeSiO_3$

35. Ellingham diagram represents :
a) change of ΔG with temperature.
b) change of ΔH with temperature.
c) change of ΔG with pressure.
d) change of $(\Delta G - T\Delta S)$ with temperature

36. Which one of the following reactions occurs during smelting in the reduction zone at lower temperature (in iron metallurgy) ?
a) $CaO + SiO_2 \rightarrow CaSiO_3$ (slag)
b) $Fe_2O_3 + 3C \rightarrow 2Fe + CO$
c) $3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$
d) $CO_2 + C \rightarrow 2CO$

37. Which method is not correctly matched for refining of crude metals ?
a) Distillation : zinc and mercury
b) Liquation : tin
c) Van Arkel : titatnium
d) Mond process : lead

38. Which of the following metals may be present in the anode mud during electrorefining of copper?
I. Gold ;
II. Iron,
III. Silver ;
IV. Magnesium

a) I&II
b) II&IV
c) I&III
d) III&IV

39. Which one of the following processes involves the principle of fractional crystallisation for the refining of impure metals ?

a) Parke's process
b) Mond's process
c) Van Arkel process
d) Zone refining

40. Poling process is used for the :
    a) reduction of CuO to Cu in impure copper
    b) purification of silver
    c) reduction of Al_2O_3 to Al
    d) none

41. Metal(s) which does/do not form amalgam is/are
    a) Fe
    b) Pt
    c) Zn
    d) Au

42. Which of the following is(are) sulphide ores?
    a) Bauxite
    b) Galena
    c) Anglesite
    d) Copper glance

43. Amphoteric nature of aluminium is employed in which of the following process for extraction of aluminium?
    a) Baeyer's process
    b) Hall's process
    c) Serpek's process
    d) Dow's process

44. Which of the following are true for electrolytic extraction of aluminium
    a) cathode material contains graphite
    b) anode material contains graphite
    c) cathode reacts away forming CO_2
    d) anode reacts away forming CO_2

45. Which of the following alloys contain copperas a constituent in them
    a) Bronze
    b) Bell metal
    c) Invar
    d) German silver

46. Native silver metal forms a water soluble complex with a dilute aqueous solution of NaCN in presence of
    a) N_2
    b) O_2
    c) CO_2

d) Ar

47. Which of the following element is present as the impurities to the maximum extent in pig iron
    a) P
    b) Mn
    c) C
    d) Si

48. When compared ΔG^0 for the formation of Al_2O_3,The ΔG^0 for the formation of Cr_2O_3 is
    a) Same
    b) Unpredicted
    c) Higher
    d) lower

49. Identify the alloy containing a non metal as a constituent
    a) Steel
    b) Bell metal
    c) Bronze
    d) Invar

50. In self reduction the reducing species is
    a) S
    b) O^{2-}
    c) S^{2-}
    d) SO_2

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