NARAYANA EDUCATIONAL INSTITUTIONS

TOPIC: METALLURGY

1) The Metal extracted by leaching with cyanide is
1) Mg 2) Ag 3) Cu 4) Na

2) For which of the following ores froath flotation method is used for concentration
1) Haematite 2) Zinc blende 3) Magnetite 4) Carnalite

3) During the process of electrolytic refining of copper, some metals present at impurity settle as 'anode mud'. These are
1) Pb & Zn 2) Sn & Ag 3) Fe & Ni 4) Ag & Au

4) Which of the following beneficiation process is used for mineral $Al_2O_3.2H_2O$
1) Froath flotation 2) leaching 3) Liquation 4) Magnetic seperation

5) The metal that can't be obtained by electrolysis of an aqeous solution of its salt is
1) Cu 2) Cr 3) Ag 4) Ca

6) Which of the oxide groups among following can't be reduced by carbon
1) Fe_2O_3 ,Zno 2) Pbo, Fe_2O_4 3) Cu_2O , SnO_2 4) CaO, k_2O

7) Which of the following metal is not extracted by leaching
1) Al 2) Hg 3) Ag 4) Au

8) Which of the following pairs of metals is purified by VanArkel method
1) Ga & In 2) Ag & Au 3) Zr & Ti 4) Ni & Fe

9) With respect to are Ellingham diagram helps to predict the feasibility of it's
1) Zone refining 2) Thermal reduction
3) Electrolysis 4) Vapour phase refining

10) Which of the following factor is of no significant for roasting sulphide ores to the oxides and not subject the Sulphide Ores to Carbon reduction directly?
1) CO_2 is more volatile than CS_2
2) Metal sulphides are thermodynamically more stable than CS_2
3) CO_2 is thermodynamically more stable than CS_2
4) Metal sulphides are less stable than the corresponding oxides

11) The Correct statement is
1) Zone refining process is used for the refining of titanium
2) Zincite is a Carbon Ore
3) aniline is a froath stabilizer
4) Sodium cyanide can't be used in the metallurgy of Ag

12) Match the following

A) Sulphide ore	1) Silver
B) Mond's process	2) Iron
C) Cupellation	3) Carbonate Ore
D) Calcination	4) Froath flotation
E) Pyrometallurgy	5) Nickel

A, B, C, D, E	A, B, C, D, E	A, B, C, D, E	A, B, C, D, E
1) 4, 5, 1, 3 ,2	2) 4, 5, 2, 3, 1	3) 1, 2, 3, 4, 5	4) 5 ,4, 3, 2, 1

13) Match the following

A) Mond's process	1) Purification of Cu
B) VanArkcl Method	2) Purification of Zn
C) Cupellation	3) Purification of Ni
D) Distillation	4) Purification of Titanium

A, B, C, D	A, B, C, D	A, B, C, D	A, B, C, D
1) 1, 2, 3, 4	2) 2, 3, 4, 1	3) 3, 4, 1, 2	4) 4, 1, 2, 3

14) From the fallowing number of oxide ores is Carnalite, Bauxite, Magnetite, Pyroleusite, Haematite, Cuprite, Galena, Cassiterite----------

15) In the manufacture of iron from Haematite ore lime stone is added to acts as---

1) flux 2) slag 3) a reducing agent 4) an oxidising agent

16) Which of the following process involves smelting?

1) $ZnCO_3 \rightarrow ZnO + CO_2$ 2) $PbS + 3O_2 \rightarrow PbO + 2SO_2$

3) $Al_2O_3.2H_2O \rightarrow Al_2O_3 + 2H_2O$ 4) $Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$

17) Liquation, Poling, Calcination, Leaching, Cupellation, Zone refining, Levigation, Roasting.
How many of the following are refining methods……

18) From the Ellingham graphs on Carbon which of the following statement is false

1) CO_2 is more stable than CO at less than 983K

2) CO reduces Fe_2O_3 to Fe at less than 983K

3) CO is less stable than CO_2 at more than 983K

4) CO reduces Fe_2O_3 to Fe in the reduction zone of blast furnace

19) When a metal 'M' is treated with NaOH a white gelatinous precipitate 'X' is obtained which is soluble in excess of NaOH compound 'X' when heated strongly gives an oxide. Which is used in chromatography as an adsorbent. The metal 'M' is

1) Ca 2) Al 3) Fe 4) Zn

20) The method of zone refining of metal is based upon the Principe is ….

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

21) Consider the following statements
Roasting is carried out to
1) Convert sulphide into oxide
2) Melt the ore
3) Remove moisture water of hydration and expel organic matter
4) Remove sulphur and arsenic in the form of volatile oxide.

1) 1,3,4 are correct 2) 1,2,3 are correct 3) 2,3,4 are correct 4) 1,2,4 are correct

22) Poling process is Used

1) for removal of Cu_2O from Cu 2) For the removal of Al_2O_3 from Al

3) For the removal of Fe_2O_3 4) In all the above

23) Ore dressing for iron is done by

1) Froath flotation 2) Magnetic separation
3) Leaching 4) All of these

24) The incorrect statement is
1) Calamine and siderite are carbonates

2) Argentite and cuprite are carbonates
3) Zinc blende and Iron pyrities are sulphides
4) Malachite azurite are ores of copper
25) Cassiterite is an ore of
1) Mn 2) Ni 3) Sb 4) Sn

26) Pyroleusite is an
1) oxide ore 2) sulphide ore 3) carbide ore 4) not an ore
27) Which one of the following does not occur as sulphide ore?
1) Zn 2) Cr 3) Ag 4) Fe
28) Assertions & reason type
A: All minerals are ore
R: Ores are minerals from which metal can be extracted conveniently and economically
1) A & R are correct R is explanation of A
2) A & R correct R not explanation of A
3) If A is correct & R is wrong
4) If A is incorrect R is correct
29) Iron is….th most abundant element in the earth crust
30) What is the oxidation state of Iron in Haematite are--------

KEY:

1-10	2	2	4	2	4	4	2	3	2	1
11-20	3	1	3	6	1	4	4	3	2	1
21-30	1	1	2	2	4	1	2	4	4	3

HINTS:

1) Silver is extracted by leaching with cyanide $Ag_2s + 2NaCN \rightarrow Na[Ag(CN)_2]$

$$2Na[Ag(CN)_2 + Zn \rightarrow Na_2[Zn(CN)_4] + 2Ag$$

2) Froath flotation process is used to concentrate low grade sulphide ores zinc blende Zns
3) Se, Te, Ag, Au, Pt impurities settles as anode mud in refining of copper
4) $Al_2O_3.2H_2O \rightarrow Bauxite \rightarrow leaching$
5) Metals with less SRP (IA, IIA) an aqueous solution can't form (Ca with less SRP -2.87V)
6) Highly reactive metals like k & Ca can't be reduced by carbon. The oxides of less electro positive metals like Fe, Zn, Sn, Pb, Cu etc. are reduced by strongly heating them with coal or coke, in the blast furnace
7) Bauxite leached with NaOH, Ag & Au leached with NaCN but not Hg
8) VanArkl method is very useful for removing all the oxygen and nitrogen present in the form of impurities in metals like Zr and Ti
9) The E.D. indicates wheather a reaction feasible or not. It does not say about the kinetics of the reduction process
10) $2MO + C \rightarrow 2M + CO_2 \quad \Delta G = -ve$

$MS + C \rightarrow Noreaction \quad \Delta G = +ve$

Hence metal sulphides are more stable than the metal oxides
Eg: $Cu_2S + 2O_2 \rightarrow 2Cu_2O + SO_2$

↓

Due to more stable complete oxidation is not takes place and some amount of Cu_2S is left over ,which act as reducing agent ($Cu_2S + 2Cu_2O \rightarrow 6Cu + SO_2$)

$\mapsto$ Reducing agent

11) $Ti + I_2 \rightarrow TiI_4 \xrightarrow{\Delta} Ti$ (Van Arkel) Zincite is Zno, NaCN used in extraction of Ag

Ag + NaCN $\rightarrow$ Na[Ag $(CN)_6$]

$2Na[Ag(CN)_2 + Zn \rightarrow Na_2[Zn(CN)_4] + Ag$

12) Concept

13) Concept

14) 6, $Al_2O_3.2H_2O, Fe_3O_4, MnO_2, Fe_2O_3, CU_2O, SnO_2$ (Carnalie – Kcl.$MgCl_2.6H_2O$,Galena-PbS)

15) Concept

16) 1-Calicination, 2-Roasitng, 3-Leaching

17) 4-liquation, Poling, Cupellation, Zone refining, (Calcination, Roasting –Extraction of crude metal, leaching, levigation are concentration methods)

18) Lime act as a flux and coke as fuel and reducing agent

19) Al_2O_3 is used as an adsorbent in chromatography

$Al + NaOH \rightarrow Al(OH)_3 + OH^- \rightarrow [Al(OH)_4]^-$

$Al(OH)_3 \rightarrow Al_2O_3 + 3H_2O$

20) This method based on principle that impurities are more soluble in the melt than in the solid state of the metal.

21) Concept 1,3,4 are correct

22) Poling is useful for refining of the metals having its metal oxides as impurity.

23) Hematite having the magnetic ore particles are separated from non-magnetic gangue by this method.

24) Argentite - Ag_2S , Calamine – $ZnCO_3$, Siderite – $FeCO_3$, Cuprite – Cu_2O,Zincblende ZnS, Iron pyrites – FeS_2-,Malachite – $CuCO_3$. $Cu(OH)_2$, Azurite – $2CuCO_3$. $CU(OH)_2$

25) SnO_2

26) MnO_2

27) Cr-Chromite ($FeO.Cr_2O_3$)

28) Concept

29) 4th most abundant element

30) Fe_2O_3 -3

2x+3(-2) =0

2x=6; x=6/2=3