QUESTION BANK ON

METALLURGY

ONLY ONE OPTION IS CORRECT.

Q.1 Formation of metallic copper from the sulphide ore in the normal thermo-metallurgical process essentially involves which one of the following reaction:

(A) $CuS + \frac{3}{2}O_2 \longrightarrow CuO + SO_2$; $CuO + C \longrightarrow Cu + CO$

(B) $CuS + \frac{3}{2}O_2 \longrightarrow CuO + SO_2$; $2CuO + CuS \longrightarrow 3Cu + SO_2$

(C) $CuS + 2O_2 \longrightarrow CuSO_4$; $CuSO_4 + CuS \longrightarrow 2Cu + 2SO_2$

(D) $CuS + \frac{3}{2}O_2 \longrightarrow CuO + SO_2$; $CuO + CO \longrightarrow Cu + CO_2$

Q.2 $Ag_2S + NaCN + Zn \longrightarrow Ag$
This method of extraction of Ag by complex formation and then its displacement is called:
(A) Parke's method (B) McArthur-Forest method
(C) Serpeck method (D) Hall's method

Q.3 Calcination is the process of heating the ore:
(A) in inert gas (B) in the presence of air
(C) in the absence of air (D) in the presence of CaO and MgO

Q.4 Which of the following does not contain Mg:
(A) magnetite (B) magnesite (C) asbestos (D) carnallite

Q.5 Match the method of concentration of the ore in column I with the ore in column II and select the correct alternate:

	I		**II**
X	magnetic separation	(a)	Ag_2S
Y	froth floation	(b)	$FeCr_2O_4$
Z	gravity separation	(c)	$Al_2(SiO_3)_3$

	X	**Y**	**Z**		**X**	**Y**	**Z**
(A)	(a)	(b)	(c)	(B)	(b)	(a)	(c)
(C)	(c)	(a)	(b)	(D)	(b)	(c)	(a)

Q.6 Bessemerisation is carried out for
I : Fe, II : Cu, III : Al, IV : silver
(A) I , II (B) II, III (C) III, IV (D) I, III

Q.7 Refining of silver is done by:
(A) liquation (B) poling (C) cupellation (D) van Arkel method

Q.8 These are following extraction process of silver but not:
(A) as a side product in electrolytic refining of copper
(B) Parke's process in which Zn is used to extract silver by solvent extraction from molten lead
(C) by reaction of silver sulphide with KCN and then reaction of soluble complex with Zn
(D) by heating $Na[Ag(CN)_2]$

Q.9 Blister Cu is about:
(A) 60% Cu (B) 90% Cu (C) 98% Cu (D) 100% Cu

Q.10 Which one of the following is not a method of concentration of metals?
(A) gravity separation (B) froth floating process
(C) electromagnetic separation (D) smelting

Q.11 In which of the following isolations no reducing agent is required:
(A) iron from haematite (B) aluminium from bauxite
(C) mercury from cinnabar (D) zinc from zinc blende

Q.12 Chemical leaching is useful in the concentration of:
(A) copper pyrites (B) bauxite (C) galena (D) cassiterite

Q.13 The element which could be extracted by electrolytic reduction of its oxide dissolved in a high temperature melt is:
(A) sodium (B) magnesium (C) fluorine (D) aluminium

Q.14 Consider the following statements:
Roasting is carried out to :
(i) convert sulphide to oxide and sulphate
(ii) remove water of hydration
(iii) melt the ore
(iv) remove arsenic and sulphur impurities
Of these statements:
(A) (i), (ii) and (iii) are correct (B) (i) and (iv) are correct
(C) (i), (ii) and (iv) are correct (D) (ii), (iii) and (iv) are correct

Q.15 Iron obtained from blast furance is:
(A) wrought iron (B) cast iron (C) pig iron (D) steel

Q.16 Which of the following is not an ore:
(A) malacite (B) calamine (C) stellite (D) cerussite

Q.17 Which one of the following statements is not correct:
(A) Nickel forms $Ni(CO)_4$
(B) All the transition metals form monometallic carbonyls
(C) Carbonyls are formed by transition metals
(D) Transition metals form complexes

Q.18 In the extraction of nickel by Mond process, the metal is obtained by:
(A) electrochemical reduction (B) thermal decomposition
(C) chemical reduction by aluminium (D) reduction by carbon

Q.19 B_4C (boron carbide) is used except:
(A) to extract boron (B) as an abrasive for polishing
(C) for making bullet-proof clothing (D) for making diborane

Q.20 Boron can be obtained by various methods but not by:
(A) thermal decomposition of B_2H_6 (B) pyrolysis of Bl_3 (Van Arkel)
(C) reducing BCl_3 with H_2 (D) electrolysis of fused BCl_3

Q.21 The correct statements are :
(A) generally the calcination and roasting is done in blast furance
(B) the sandy and rocky materials associated with ore are called matrix
(C) froth floatation process is suitable for sulphide ores
(D) substance that reacts with gangue to form fusible mass is called slag

Q.22 When copper is purified by electrorefining process, noble metals like Ag and Au are found in
(A) cathode mud (B) electrolytic solution (C) anode mud (D) over cathode or anode

Q.23 Formation of $Ni(CO)_4$ and subsequent its decomposition into Ni and CO (recycled) makes basis of Mond's process

$$Ni + 4CO \xrightarrow{T_1} Ni(CO)_4 \xrightarrow{T_2} Ni + 4CO$$

T_1 and T_2 are:
(A) 100°C, 50°C (B) 50°C, 100°C (C) 50°C, 230°C (D) 230°C, 50°C

Q.24 Match column (I) (process) with column (II) (electrolyte)

	(I) (process)		(II) (electrolyte)
(i)	Downs cell	(W)	fused $MgCl_2$
(ii)	Dow sea water process	(X)	fused ($Al_2O_3 + Na_3AlF_6$)
(iii)	Hall-Heroult	(Y)	fused KHF_2
(iv)	Moissan	(Z)	fused (40% NaCl + 60% $CaCl_2$)

Choose the correct alternate:

	(i)	(ii)	(iii)	(iv)		(i)	(ii)	(iii)	(iv)
(A)	Z	W	X	Y	(B)	X	Y	Z	W
(C)	W	Z	X	Y	(D)	X	Z	W	Y

Question No. 25 to 28 are based on following reactions:

(I) $FeCr_2O_4 + NaOH + air \longrightarrow (A) + Fe_2O_3$

(II) $(A) + (B) \longrightarrow Na_2Cr_2O_7$

(III) $Na_2Cr_2O_7 + X \xrightarrow{\Delta} Cr_2O_3$

(IV) $Cr_2O_3 + Y \xrightarrow{\Delta} Cr$

Q.25 Compounds (A) and (B) are:
(A) Na_2CrO_4, H_2SO_4 (B) $Na_2Cr_2O_7$, HCl
(C) Na_2CrO_5, H_2SO_4 (D) $Na_4[Fe(OH)_6]$, H_2SO_4

Q.26 (X) and (Y) are:
(A) C and Al (B) Al and C (C) C in both (D) Al in both

Q.27 Na_2CrO_4 and Fe_2O_3 are separated by
(A) dissolving in conc. H_2SO_4 (B) dissolving in NH_3
(C) dissolving in H_2O (D) dissolving in dil. HCl

Q.28 High temperature (> 1000°C) electrolytic reduction is necessary for isolating
(A) Al (B) Cu (C) C (D) F_2

Q.29 In froth-floatation process, palm oil functions as
(A) activator (B) frother (C) collector (D) agitator

Q.30 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

Q.31 Zone refining is based on the principle of
(A) fractional distillation (B) fractional crystallisation
(C) partition coefficient (D) chromatographic separation

Q.32 Which of the following species is (are) desirable substance(s) in extraction of copper but not in extraction of iron?
(A) $CaSiO_3$ (B) $FeSiO_3$ (C) SiO_2 (D) coke

Q.33 Poling is employed in refining of
(A) iron (B) copper (C) tin (D) lead

Q.34 Which of the following reaction(s) do(es) not occur in Bessemer's converter?
(A) $2Cu_2S + 5O_2 \longrightarrow 2CuSO_4 + 2CuO$ (B) $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2\uparrow$
(C) $2CuFeS_2 + O_2 \longrightarrow Cu_2S + 2FeS + SO_2$ (D) $FeO + SiO_2 \longrightarrow FeSiO_3$

Q.35 Dow's process
(A) involves purification of copper (B) involves extraction of magnesium
(C) gives metal chloride as product (D) gives pure metal as product
(E) results in evolution of CO

Q.36 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

Q.37 Carnallite does not contain
(A) K (B) Ca (C) Mg (D) Cl

Q.38 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

Q.39 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

Q.40 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

Q.41 Among the following statements, the incorrect one is
(A) calamine and siderite are carbonates (B) argentite and cuprite are oxide
(C) zinc blende and pyrites are sulphides (D) malachite and azurite are ores of copper

Q.42 In the commercial electrochemical process for aluminium extraction the electrolyte used is
(A) $Al(OH)_3$ in NaOH solution (B) an aqueous solution of $Al_2(SO_4)_3$
(C) a molten mixture of Al_2O_3 ,Na_3AlF_6 & CaF_2 (D) a molten mixture of AlO(OH) and $Al(OH)_3$

Q.43 Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I	**List-II**
(a) van Arkel method	1. Manufacture of caustic soda
(b) Solvay process	2. Purification of titanium
(c) Cupellation	3. Manufacture of Na_2CO_3
(d) Poling	4. Purification of copper
	5. Refining of silver

Codes:

	A	**B**	**C**	**D**		**A**	**B**	**C**	**D**
(A)	2	1	3	4	(B)	4	3	2	5
(C)	2	3	5	4	(D)	5	1	3	4

Q.44 Blister copper is refined by stirring molten impure metal with green logs of wood because such a wood liberates hydrocarbon gases (like CH_4). This process X is called _____ and the metal contains impurities of Y is _____.
(A) X = cupellation, Y = CuO_2 (B) X = polling, Y = Cu_2O
(C) X = polling, Y = CuO (D) X = cupellation, Y = CuO

Q.45 Select the correct statement :
(A) Magnetite is an ore of manganese (B) Pyrolusite is an ore of lead
(C) Siderite is carbonate ore of iron (D) FeS_2 is rolled gold

Q.46 Three most occuring elements into the earth crust are
(A) O, Si, Al (B) Si, O, Fe (C) Fe, Ca, Al (D) Si, O, N

Q.47 An ore containing the impurity of $FeCrO_4$ is concentrated by
(A) magnetic-separation (B) gravity separation
(C) froth-floatation method (D) electrostatic method

Q.48 A piece of steel is heated until redness and then plugged into cold water or oil. This treatment of iron makes it
(A) soft and malleable (B) hard but not brittle (C) more brittle (D) hard and brittle

Q.49 Give the correct order of initials **T** or **F** for following statements. Use **T** if statement is true and **F** if it is false.
(i) Cu metal is extracted from its sulphide ore by reduction of Cu_2O with FeS.
(ii) An ore of Tin containing $FeCrO_4$ is concentrated by magnetic separation method.
(iii) Auto reduction process is used in the extraction of Cu & Hg.
(iv) Cassiterite and Rutile are oxide ores of the metals.
(A) TFTT (B) TTFT (C) FTTT (D) FFFT

Q.50 In the extraction of aluminium
Process X : applied for red bauxite to remove iron oxide (chief impurity)
Process Y : (Serpeck's process) : applied for white bauxite to remove Z (chief impurity) then, process X and impurity Z are
(A) X = Hall and Heroult's process and Y = SiO_2
(B) X = Baeyer's process and Y = SiO_2
(C) X = Serpeck's process and Y = iron oxide
(D) X = Baeyer's process and Y = iron oxide

Q.51 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.

Q.52 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

Q.53 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

Q.54 Correct statements is:
(A) Black jack is ZnS
(B) Sulphide ores are concentrated by floatation method
(C) Parke's process is based on distribution principle
(D) All are correct

Q.55 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

Q.56 Match List–I with List–II

List–I (Property)		**List–II (Element/compound)**
I	Explosive	A: Cu
II	Self-reduction	B: Fe_3O_4
III	Magnetic material	C: $Cu(CH_3COO)_2.Cu(OH)_2$
IV	Verdigris	D: $Pb(NO_3)_2$

(A) I–A, II–B, III–C, IV-D (B) I–D, II–A, III–B, IV–C
(C) I–D, II–B, III–A, IV–C (D) I–C, II–A, III–B, IV–D

Q.57 A 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

Q.58 The process, which does not use a catalyst is
(A) Contact process (B) Thermite process (C) Ostwald's process (D) Haber's process

Q.59 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

Q.60 % of silver in 'german silver' is
(A) 0 (B) 80 (C) 90 (D) 10

Q.61 Modern method of steel manufacturing is
(A) open hearth process (B) L.D. Process (C) Bessemerisation (D) Cupellation

Q.62 When an impurity in a metal has greater affinity for oxygen and is more easily oxidises than the metal itself. Then, the metal is refined by
(A) cupellation (B) zone-refining (C) distillation (D) electrolytic process

Q.63 The chemical process of manufacturing of steel from its ore haematite involves
(A) oxidation (B) reduction followed by oxidation
(C) oxidation followed by reduction (D) oxidation followed by decomposition and reduction

Q.64 "Fool's gold" is
(A) iron pyrites (B) horn silver (C) copper pyrites (D) bronze

Q.65 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 flourspar (B) cryolite and alum (C) alum and flourspar (D) flourspar and bauxite

Q.66 For extraction of sodium from NaCl, the electrolytic mixture NaCl + Na_3AlF_6 + $CaCl_2$ is used. During extraction process, only sodium is deposited on cathode but K and Ca do not because
(A) Na is more reactive than K and Ca
(B) Na is less reactive than K and Ca
(C) NaCl is less stable than Na_3AlF_6 and $CaCl_2$
(D) the discharge potential of Na^+ is less than that of K^+ and Ca^{2+} ions.

Q.67 A solution of Na_2SO_4 in water is electrolysed using inert electrodes. The products at cathode and anode are respectively
(A) O_2 ; H_2 (B) O_2 ; Na (C) H_2 ; O_2 (D) O_2 ; SO_2

Q.68 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.

Q.69 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

Q.70 The beneficiation of the sulphide ores is usually done by
(A) Electrolysis (B) Smelting process
(C) Metal displacement method (D) Froth flotation method

Q.71 In the alumino thermite process, Al acts as
(A) An oxidising agent (B) A flux (C) A reducing agent (D) A solder

Q.72 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) electrorefining

Q.73 Carbon cannot be used in the reduction of Al_2O_3 because :
(A) it is an expensive proposition
(B) the enthalpy of formation of CO_2 is more than that of Al_2O_3
(C) pure carbon is not easily available
(D) the enthalpy of formation of Al_2O_3 is too high.

Q.74 Froth floatation process for concentration of ores is an illustration of the practical application of:
(A) Adsorption (B) Absorption (C) Coagulation (D) Sedimentation

Q.75 Which process of purification is represented by the following equation :

$$Ti\ (Impure) + 2I_2 \xrightarrow{250^\circ C} TiI_4 \xrightarrow{1400^\circ C} Ti\ (Pure) + 2I_2$$

(A) Cupellation (B) Poling (C) Van-Arkel Process (D) Zone refining

Q.76 Mercury is purified by:
(A) Passing through dilute HNO_3 (B) Distillation
(C) Distribution (D) Vapour phase refining

Q.77 Which of the following ore and metal are correctly matched:

	Ore	**Metal**
(A)	Carnallite	Zinc
(B)	Calamine	Titanium
(C)	Ilmenite	Magnesium
(D)	Chalcopyrite	Copper

Q.78 Which of the following metal is correctly matched with its ore:

	Metal	**Ore**
(A)	Zinc	Calamine
(B)	Tin	Azurite
(C)	Magnesium	Cassiterite
(D)	Silver	Ilmenite

Q.79 Which of the following employ(s) thermal decomposition of volatile iodide compounds?
(A) Thermite process (B) Hall's process (C) Van-Arkel's process (D) Mond's process

Q.80 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

Q.81 Railway wagon axles are made by heating iron rods embedded in charcoal powder. This process is known as:
(A) Sherardising (B) Annealing (C) Tempering (D) Case hardening

Q.82 In the extraction of copper from its sulphide are the metal is formed by the reduction of Cu_2O with:
(A) FeS (B) CO (C) Cu_2S (D) SO_2

Q.83 Carnallite on electrolysis gives:
(A) Ca and Cl_2 (B) Na and CO_2 (C) Al and Cl_2 (D) Mg and Cl_2

Q.84 Among the following statemetns, the incorrect one is:
(A) Calamine and siderite are carbonates (B) Argentite and cuperite are oxides
(C) Zinc blende and iron pyrites are sulphides (D) Malachite and azurite are ores of copper

Q.85 Match List I and II and select the correct answer using the codes given below the lists:

	List I		**List II**
I.	Cyanide process	(1)	Ultrapure Ge
II.	Floatation process	(2)	Dressing of HgS
III.	Electrolytic reduction	(3)	Extraction of Al
IV.	Zone refining	(4)	Extraction of Au

(A) I–(3), II–(1), III–(4), IV–(2) (B) I–(4), II–(2), III–(3), IV–(1)
(C) I–(3), II–(2), III–(4), IV–(1) (D) I–(4), II–(1), III–(3), IV–(2)

Q.86 Match **Column-I** with **Column-II** and select the correct answer using the codes given below .

	Column-I (Metals)		**Column-II (Method used for refining)**
(i)	Iron & copper	(P)	Poling
(ii)	Zirconium & Titanium	(Q)	Bessemerisation
(iii)	Lead & Tin	(R)	Van-Arkel
(iv)	Copper & Tin	(S)	Liquation

	(i)	(ii)	(iii)	(iv)
(A)	P	S	R	Q
(B)	Q	S	R	P
(C)	P	R	S	Q
(D)	Q	R	S	P

Question No. 87 to 100

Questions given below consist of two statements each printed as Assertion (A) and Reason (R); while answering these questions you are required to choose any one of the following four responses:
(A) if both (A) and (R) are true and (R) is the correct explanation of (A)
(B) if both (A) and (R) are true but (R) is not correct explanation of (A)
(C) if (A) is true but (R) is false
(D) if (A) is false and (R) is true

Q.87 **Assertion :** Sulphide ores are concentrated by froth floatation process.
Reason : Pine oil acts as a frothing agent in froth floatation process.

Q.88 **Assertion :** Platinum and gold occur in native state in nature.
Reason : Platinum and gold are noble metals.

Q.89 **Assertion :** Wolframite impurities are separated from cassiterite by electromagnetic separation.
Reason : Cassiterite being magnetic is attacted by the magnet and forms a separate heap.

Q.90 **Assertion :** In smelting, roasted ore is heated with powdered coke in presence of a flux.
Reason : Oxides are reduced to metals by C or CO. Impurities are removed as slag.

Q.91 **Assertion :** Al is used as a reducing agent in aluminothermy.
Reason : Al has a lower melting point than Fe, Cr and Mn.

Q.92 **Assertion :** Lead, tin and bismuth are purified by liquation method.
Reason : Lead, tin and bismuth have low m.p. as compared to impurities.

Q.93 **Assertion :** Wolframite impurity is separated from SnO_2 by magnetic separation
Reason : Tin stone is ferromagnetic, therefore attracted by magnet.

Q.94 **Assertion :** Titanium is purified by Van-Arkel method.
Reason : Ti reacts with I_2 to form TiI_4 which decomposes at 1700 K to give pure Ti.

Q.95 **Assertion :** CuO can be reduced by C, H_2 as well as CO
Reason : CuO is basic oxide.

Q.96 **Assertion :** Alkali metals can not be prepared by the electrolysis of their chlorides in aqueous solution
Reason : Reduction potentials of alkali metals cations is much lower than that of H^+.

Q.97 **Assertion :** Magnesium can be prepared by the electrolysis of aq. $MgCl_2$.
Reason : The reduction potential of Mg^{2+} is much lower than that of H^+.

Q.98 **Assertion :** Titanium can be purified by Van-Arkel process.
Reason : TiI_4 is a volatile, stable compound.

Q.99 **Assertion :** Magnesia and quick lime are used as basic flux.
Reason : MgO and CaO can withstand very high temperatures.

Q.100 **Assertion :** Nickel is purified `by the thermal decomposition of nickel tetracarbonyl.
Reason : Nickel is a transitional element.

ONE OR MORE THAN ONE OPTION MAY BE CORRECT

Q.1 Hoop's process of purification of aluminium involves formation of layers during electrolysis. It involves
(A) the three layers have same densities but different materials.
(B) the three layers have different densities
(C) the upper layer is of pure aluminium which acts as a cathode
(D) the bottom layer is of impure aluminium which acts as an anode and middle layer consists of cryolite and BaF_2.

Q.2 Metallurgical process of zinc involves roasting of zinc sulphide followed by reduction. Metallic zinc distills over as it is volatile and impurities like Cd, Pd and Fe gets condensed. The crude metal obtained is called spelter, which may be purified by
(A) electrolysis process (B) fractional distillation
(C) polling (D) heating with iodine

Q.3 Calcination and roasting processes of reduction of ores to their oxides are beneficial
(A) to convert ores into porous form so that their reduction becomes easier
(B) as volatile impurities like P, As, Sb, S are removed
(C) as organic impurities are removed.
(D) as the ores are converted into oxide form which makes the reduction easier

Q.4 In the extraction of copper, the reaction which takes place in Bessemer converter is
(A) $2Cu_2O + Cu_2S \longrightarrow 6Cu + SO_2\uparrow$ (B) $CuFeS_2 + O_2 \longrightarrow Cu_2S + 2FeS + SO_2\uparrow$
(C) $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2\uparrow$ (D) $2FeS + 3O_2 \longrightarrow 2FeO + 2SO_2$

Q.5 Extraction of silver from argentiferrous lead (Pb +Ag) involves
(A) distillation method (B) cupellation
(C) froth flotation method (D) treatment with NaCl

Q.6 In the manufacturing of metallic sodium by fused salt-electrolysis method (Down's process), small amount of $CaCl_2$ that added is known as auxiliary electrolyte and is used to
(A) improve the electrical conductance (B) decrease the melting point of NaCl
(C) stabilise the metallic sodium (D) increase the temperature of electrolysis

Q.7 Metal(s) which does/do not form amalgam is/are
(A) Fe (B) Pt (C) Zn (D) Au

Q.8 Auto reduction process is used in extraction of
(A) Cu (B) Hg (C) Al (D) Fe

Q.9 Zone refining is used for purification of
(A) Ge (B) Si (C) Ga (D) Se

Q.10 Which of the following process (es) are used for purification of Bauxite ore?
(A) Hall's process (B) Serpeck's process (C) Baeyer's process (D) Mond's process

Q.11 Metals which can be extracted by smelting process
(A) Pb (B) Fe (C) Zn (D) Mg

Q.12 Common impurities present in Bauxite are
(A) CuO (B) ZnO (C) Fe_2O_3 (D) SiO_2

Q.13 Which of the following reduction reactions are actually employed in commerical extraction of metals?
(A) $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$
(B) $Cr_2O_3 + 2Al \rightarrow Al_2O_3 + 2Cr$
(C) $2Na[Au(CN)_2] + Zn \rightarrow Na_2[Zn(CN)_4] + 2Au$
(D) $Cu_2S + Pb \rightarrow Cu + PbS\downarrow$

Q.14 Which of the following cannot be obtained by electrolytic reduction of their compounds in aqueous solution?
(A) Barium (B) Cadmium (C) Potassium (D) nickel

Q.15 Which of the following ores is(are) concentrated by froth floatation?
(A) haematite (B) galena (C) copper pyrite (D) azurite

Q.16 Which of the following statements is/are common between roasting and sintering?
(A) Both require heating of the ore.
(B) Both involve burning away of organic matter.
(C) Both the process cause partial fusion of ore, resulting in bigger lumps.
(D) Both are performed only for sulphide ores.

Q.17 Which of the following reaction(s) occur during calcination?
(A) $CaCO_3 \rightarrow CaO + CO_2$ (B) $4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$
(C) $2Al(OH)_3 \rightarrow Al_2O_3 + 3H_2O$ (D) $CuS + CuSO_4 \rightarrow 2Cu\ 2SO_2$

Q.18 Roasting is usually performed in
(A) blast furnace (B) reverberatory furnace
(C) Bessemer's converter (D) electric furnace

Q.19 Which of the following is(are) sulphide ores?
(A) Argentite (B) Galena (C) Anglesite (D) Copper glance

Q.20 Which of the following is(are) regarded as iron ores?
(A) Haematite (B) Magnetite (C) Limonite (D) Copper pyrites

Q.21 Which of the following employ downward movement of ore due to gravity?
(A) Gravity separation (B) Froth floatation
(C) Blast furnace (D) Bessemer's coverter

Q.22 Calcium silicate slag formed in extraction of iron
(A) prevents the reoxidation of molten iron. (B) catalyses the combustion of carbon.
(C) reduces CO_2 toCO at the bottom of the furnace. (D) is used in cement industry.

Q.23 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

Q.24 Noble metal(s) which are commercially extracted by cyanide process is(are)
(A) copper (B) silver (C) gold (D) mercury

Q.25 Carbon reduction method is employed for commercial extraction of
(A) haematite (B) cassiterite (C) iron pyrite (D) corundum

Q.26 The chief rection(s) occuring in blast furnace during extraction of iron from haematite is(are)
(A) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$ (B) $FeO + SiO_2 \rightarrow FeSiO_3$
(C) $Fe_2O_3 + C \rightarrow 2Fe + 3CO$ (D) $CaO + SiO_2 \rightarrow CaSiO_3$

Q.27 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

Q.28 During extraction of copper, it is obtained in the form of molten *matte*. Which of the following is **not true**?
(A) *matte* is further treated reverbratory furnace
(B) molten *matte* is electrolysed
(C) It is treated with a blast of air and sand
(D) It is dissolved in $CuSiF_6$ and crystallised.

Q.29 Which of the following ores is (are) concentrated industrially by froth floatation?
(A) Copper pyrites (B) Galena (C) Dolomite (D) Carnallite

Q.30 Which of the following is true for calcination of a metal ore?
(A) It makes the ore more porous
(B) The ore is heated to a temperature when fusion just begins
(C) Hydrated salts lose their water of crystallisation
(D) Impurities of S, As and Sb are removed in the form of their volatile oxides.

Q.31 The major role of fluorspar (CaF_2) which is added in small quantities in the electrolytic reduction of alumina dissolved in fused cryolite (Na_3AlF_6) is
(A) as a catalyst
(B) to make the fused mixture very conducting
(C) to lower the temperature of the melt
(D) to decrease the rate of oxidation of carbon at the anode .

Q.32 The difference(s) between roasting and calcination is (are)
(A) roasting is highly endothermic while calcination is not.
(B) partial fusion occurs in calcination but not in roasting.
(C) calcination is performed in limited supply of air but roasting employs excess air.
(D) combustion reactions occur in roasting but not in calcination.

Q.33 Leaching is used for the concentration of:
(A) Red bauxite (B) Haematite (C) Gold ore (D) Silver ore

ANSWER KEY

ONLY ONE OPTION IS CORRECT.

Q.1	B	Q.2	B	Q.3	C	Q.4	A	Q.5	B	Q.6	A	Q.7	C
Q.8	D	Q.9	C	Q.10	D	Q.11	C	Q.12	B	Q.13	D	Q.14	C
Q.15	C	Q.16	C	Q.17	B	Q.18	B	Q.19	D	Q.20	D	Q.21	B,C
Q.22	C	Q.23	C	Q.24	A	Q.25	A	Q.26	A	Q.27	C	Q.28	A
Q.29	B	Q.30	A	Q.31	B	Q.32	C	Q.33	B,C	Q.34	C	Q.35	B
Q.36	B	Q.37	B	Q.38	B	Q.39	B	Q.40	A	Q.41	B	Q.42	C
Q.43	C	Q.44	B	Q.45	C	Q.46	A	Q.47	A	Q.48	D	Q.49	C
Q.50	B	Q.51	D	Q.52	A	Q.53	B	Q.54	D	Q.55	B	Q.56	B
Q.57	B	Q.58	B	Q.59	B	Q.60	A	Q.61	B	Q.62	A	Q.63	B
Q.64	A	Q.65	A	Q.66	D	Q.67	C	Q.68	A	Q.69	A	Q.70	D
Q.71	C	Q.72	A	Q.73	D	Q.74	A	Q.75	C	Q.76	B	Q.77	D
Q.78	A	Q.79	C	Q.80	D	Q.81	D	Q.82	C	Q.83	D	Q.84	B
Q.85	B	Q.86	D	Q.87	B	Q.88	A	Q.89	C	Q.90	A	Q.91	B
Q.92	A	Q.93	C	Q.94	A	Q.95	B	Q.96	A	Q.97	D	Q.98	A
Q.99	B	Q.100	B										

ONE OR MORE THAN ONE OPTION MAY BE CORRECT

Q.1	B,C,D	Q.2	A,B	Q.3	A,B,C,D	Q.4	A,C,D
Q.5	A,B	Q.6	A,B	Q.7	A,B	Q.8	A,B
Q.9	A,B,C	Q.10	A,B,C	Q.11	A,B,C	Q.12	C,D
Q.13	B,C	Q.14	A,C	Q.15	B,C	Q.16	A,B
Q.17	A,C	Q.18	A,B	Q.19	A,B,D	Q.20	A,B,C
Q.21	A,C	Q.22	A,D	Q.23	A,B	Q.24	B,C
Q.25	A,B	Q.26	A,D	Q.27	A, B,D	Q.28	B,D
Q.29	A,B	Q.30	A,C	Q.31	B,C	Q.32	C,D
Q.33	A,C,D						