

ONLY ONE OPTION IS CORRECT.

### ORES

# SBG STUDY

1. Which of the following does not contain Mg:  
(A) magnetite (B) magnesite (C) asbestos (D) carnallite
2. Which of the following is not an ore:  
(A) malachite (B) calamine (C) stellite (D) cerussite
3. Carnallite does not contain  
(A) K (B) Ca (C) Mg (D) Cl
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. 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)  $\text{FeS}_2$  is rolled gold
6. "Fool's gold" is  
(A) iron pyrites (B) horn silver (C) copper pyrites (D) bronze
7. **Assertion :** Platinum and gold occur in native state in nature.  
**Reason :** Platinum and gold are noble metals.  
(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
(C) Statement-1 is true, statement-2 is false.  
(D) Statement-1 is false, statement-2 is true.

### CONCENTRATION METHODS

8.  $\text{Ag}_2\text{S} + \text{NaCN} + \text{Zn} \longrightarrow \text{Ag}$   
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
9. Which one of the following is not a method of concentration of ore?  
(A) gravity separation (B) froth floating process  
(C) electromagnetic separation (D) smelting
10. Chemical leaching is useful in the concentration of:  
(A) copper pyrites (B) bauxite (C) galena (D) cassiterite
11. In froth-floatation process, pine oil functions as  
(A) activator (B) frother (C) collector (D) agitator

12. 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
13. 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
14. 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
15. An non-magnetic ore containing the impurity of  $\text{FeCr}_2\text{O}_4$  is concentrated by  
 (A) magnetic-separation (B) gravity separation  
 (C) froth-floatation method (D) electrostatic method
16. The beneficiation of the sulphide ores is usually done by  
 (A) Electrolysis (B) Smelting process  
 (C) Metal displacement method (D) Froth floatation method
17. The process of the isolation of a metal by dissolving the ore in aqueous solution of 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
18. Froth floatation process for concentration of ores is an illustration of the practical application of:  
 (A) Adsorption *surface area* (B) Absorption  
 (C) Coagulation (D) Sedimentation
19. **Assertion :** Sulphide ores are concentrated by froth floatation process.  
**Reason :** Pine oil acts as a frothing agent in froth floatation process.  
 (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
 (B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
 (C) Statement-1 is true, statement-2 is false.  
 (D) Statement-1 is false, statement-2 is true.
20. **Assertion :** Wolframite impurities are separated from cassiterite by electromagnetic separation.  
**Reason :** Cassiterite being magnetic is attracted by the magnet and forms a separate heap.  
 (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
 (B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
 (C) Statement-1 is true, statement-2 is false.  
 (D) Statement-1 is false, statement-2 is true.



21. 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

22. When roasting is carried out :
- (i) Sulphide ore is converted into oxide and sulphate  
(ii) remove water of hydration  
(iii) the ore melts  
(iv) arsenic and sulphur impurities are removed

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

### REDUCTION PROCESS

23. In the aluminothermite process, Al acts as
- (A) An oxidising agent (B) A flux  
(C) A reducing agent (D) A solder

24. **Assertion :** Al is used as a reducing agent in aluminothermy.

**Reason :** Al has a lower melting point than Fe, Cr and Mn.

M.P of Al =  $660^{\circ}\text{C}$ ,  $Mg = 1244^{\circ}\text{C}$   
Fe =  $1535^{\circ}\text{C}$ , Cr =  $1900^{\circ}\text{C}$ ,  $Mg =$

- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
(C) Statement-1 is true, statement-2 is false.  
(D) Statement-1 is false, statement-2 is true.

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

- (A)  $\text{Cu}_2\text{S} + \frac{3}{2}\text{O}_2 \longrightarrow \text{Cu}_2\text{O} + \text{SO}_2$  ;  $\text{CuO} + \text{C} \longrightarrow \text{Cu} + \text{CO}$   
(B)  $\text{Cu}_2\text{S} + \frac{3}{2}\text{O}_2 \longrightarrow \text{Cu}_2\text{O} + \text{SO}_2$  ;  $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \longrightarrow 6\text{Cu} + \text{SO}_2$   
(C)  $\text{Cu}_2\text{S} + 2\text{O}_2 \longrightarrow \text{CuSO}_4$  ;  $\text{CuSO}_4 + \text{Cu}_2\text{S} \longrightarrow 3\text{Cu} + 2\text{SO}_2$   
(D)  $\text{Cu}_2\text{S} + \frac{3}{2}\text{O}_2 \longrightarrow \text{Cu}_2\text{O} + \text{SO}_2$  ;  $\text{Cu}_2\text{O} + \text{CO} \longrightarrow 2\text{Cu} + \text{CO}_2$

26. 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

27. In which of the following isolations no reducing agent is required:

- (A) iron from haematite (B) Tin from cassiterite  
(C) mercury from cinnabar (D) zinc from zinc blende



## PURIFICATION METHODS

28. 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) Aluminothermite process (B) Electrolysis process  
(C) Van-Arkel's process (D) Cupellation

29. **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  $H_2O$ .

- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
(C) Statement-1 is true, statement-2 is false.  
(D) Statement-1 is false, statement-2 is true.

30. **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  $H_2O$ .

- (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
(C) Statement-1 is true, statement-2 is false.  
(D) Statement-1 is false, statement-2 is true.

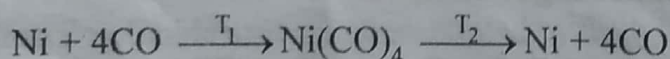
31. Bessemerisation is carried out for

I : Fe, II : Cu, III : Al, IV : silver  
(A) I, II (B) II, III (C) III, IV (D) I, III

32. 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

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



$T_1$  and  $T_2$  are:

- (A)  $100^\circ C, 50^\circ C$  (B)  $50^\circ C, 100^\circ C$  (C)  $50^\circ C, 230^\circ C$  (D)  $230^\circ C, 50^\circ C$

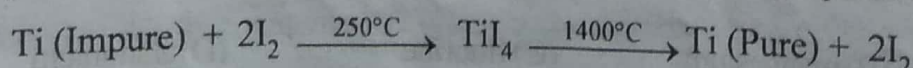
34. Zone refining is based on the principle of

- (A) fractional distillation (B) fractional crystallisation  
(C) partition coefficient (D) chromatographic separation

35. 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

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



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

37. 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



38. 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
39. **Assertion :** Titanium is purified by Van-Arkel method.  
**Reason :** Ti reacts with  $I_2$  to form volatile  $TiI_4$  which decomposes at 1673 K to give pure Ti.  
 (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
 (B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
 (C) Statement-1 is true, statement-2 is false.  
 (D) Statement-1 is false, statement-2 is true.
40. **Assertion :** Nickel is purified by the thermal decomposition of nickel tetracarbonyl.  
**Reason :** Nickel is a transitional element.  
 (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
 (B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
 (C) Statement-1 is true, statement-2 is false.  
 (D) Statement-1 is false, statement-2 is true.
41. Refining of silver is done by:  
 (A) liquation (B) poling (C) cupellation (D) van Arkel method
42. Mercury is purified by:  
 (A) Passing through dilute  $HNO_3$  (B) Distillation  
 (C) Distribution (D) Vapour phase refining
43. **Assertion :** Lead, tin and bismuth are purified by liquation method.  
**Reason :** Lead, tin and bismuth have low m.p. as compared to impurities.  
 (A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.  
 (B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.  
 (C) Statement-1 is true, statement-2 is false.  
 (D) Statement-1 is false, statement-2 is true.
44. 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

### EXTRACTION OF METALS

45. Which of the following process is not associated with recovery of the silver -  
 (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 boiling  $Na[Ag(CN)_2]$  aq.
46. Blister Cu is about:  
 (A) 60% Cu (B) 90% Cu (C) 98% Cu (D) 100% Cu



47. Iron obtained from blast furnace is: (A) wrought iron (B) cast iron (C) pig iron (D) steel
48. Which of the following term is not related to Al-extraction (A) Serpek's process (B) Hall-Heroult process (C) Thermite process (D) Hoop's process
49. Dow's process (A) involves purification of copper (B) involves extraction of magnesium (C) gives metal chloride as product (D) gives pure Na as product
50. 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
51. 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
52. In the commercial electrochemical process for aluminium extraction the electrolyte used is (A)  $\text{Al}(\text{OH})_3$  in NaOH solution (B) an aqueous solution of  $\text{Al}_2(\text{SO}_4)_3$  (C) a molten mixture of  $\text{Al}_2\text{O}_3$ ,  $\text{Na}_3\text{AlF}_6$  &  $\text{CaF}_2$  (D) a molten mixture of  $\text{Al}_2\text{O}_3$  and  $\text{Al}(\text{OH})_3$
53. Blister copper is refined by stirring molten impure metal with green logs of wood because such a wood liberates hydrocarbon gases (like  $\text{CH}_4$ ). This process X is called \_\_\_\_\_ and the metal contains impurities of Y is \_\_\_\_\_. (A) X = cupellation, Y =  $\text{CuO}_2$  (B) X = poling, Y =  $\text{Cu}_2\text{O}$  (C) X = poling, Y = CuO (D) X = cupellation, Y = CuO
54. A piece of steel is heated until redness and then plugged into cold water or oil. This treatment of steel makes it (A) soft and malleable (B) hard but not brittle (C) more brittle (D) hard and brittle
55. Modern method of steel manufacturing is (A) open hearth process (B) L.D. Process (C) Bessemerisation (D) Cupellation
56. 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
57. For extraction of sodium from NaCl, the electrolytic mixture  $\text{NaCl} + \text{KCl} + \text{CaCl}_2$  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  $\text{Na}_3\text{AlF}_6$  and  $\text{CaCl}_2$  (D) the discharge potential of  $\text{Na}^+$  is less than that of  $\text{K}^+$  and  $\text{Ca}^{2+}$  ions.