1. In which of the following metallurgy, self reduction is not possible

(1) $ZnS \rightarrow Zn$ (2) $PbS \rightarrow Pb$

(3) $Cu_2S \rightarrow Cu$ (4) $HgS \rightarrow Hg$

2. Which reaction(s) occurs during calcination

(a) $CaCO_3 \longrightarrow CaO + CO_2$

(b) $2FeS_2 + \frac{11}{2}O_2 \longrightarrow Fe_2O_3 + 4SO_2$

(c) $Al_2O_3.x\,H_2O \longrightarrow Al_2O_3 + x\,H_2O$

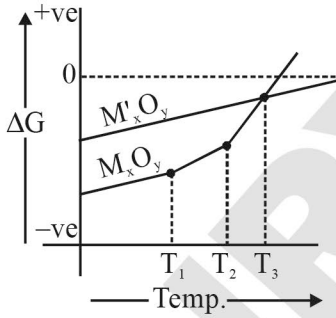
(d) $ZnS + \frac{3}{2}O_2 \longrightarrow ZnO + SO_2$

correct option are

(1) a and b (2) b and c

(3) a and c (4) b and d

3. Which of the following statement is **incorrect**. On the basis of following structure.



(1) T_1 & T_2 are M.P. & B.P. of metal M respectively

(2) Above T_3 M' is more reducing than M

(3) M_xO_y & M'_xO_y are unstable at $\Delta G > 0$

(4) Below T_3 M is less reducing than M'

4. During the extraction of Ag and Au using a KCN solution and Zn, cyanide ions and Zn react with metal ion as respectively

(1) a reducing Agent, an oxidising Agent

(2) a complexing Agent, a reducing Agent

(3) an oxidising Agent, a complexing Agent

(4) a reducing Agent, a complexing Agent

5. Match the column

Column-I	**Column-II**
(a) Zone refining	(P) Ge, Si, Ga
(b) Mond process	(Q) Cu
(c) Van arkel method	(R) Zr, Ti
(d) Electrolytic refining	(S) Ni

(1) (a) P (b) S (c) R (d) Q

(2) (a) S (b) Q (c) P (d) R

(3) (a) R (b) Q (c) P (d) S

(4) (a) Q (b) R (c) P (d) S

6. Match the column-

Column – I	Column – II
(a) Copper pyrites	(P) $ZnCO_3$
(b) Malachite	(Q) $CuCO_3.Cu(OH)_2$
(c) Calamine	(R) $CuFeS_2$
(d) Sphalerite	(S) ZnS

(1) (a) Q (b) R (c) S (d) P

(2) (a) R (b) Q (c) P (d) S

(3) (a) P (b) Q (c) R (d) S

(4) (a) S (b) P (c) R (d) Q

7. Which of the following is incorrectly matched:-

(1) Electrolytic Reduction – Extraction of Al

(2) Cyanide process – Reduction of Pb

(3) Leaching – Extraction of Ag

(4) Zone refining – Ultra pure Ge

8. Sheelite ($CaWO_4$) is an ore of tungsten which contain tungestate ion, Tungestate ion is also present in

(1) Limonite (2) Dolomite

(3) Wolframite (4) Siderite

9. Which of the following pair is incorrectly matched

(1) Kroll's process – Titanium

(2) Froth floatation – Cerussite

(3) Distillation – Zinc

(4) Depressants – NaCN

10. Which of the following metals cannot be extracted by carbon reduction process?
(1) Pb (2) Al (3) Hg (4) Zn

11. (i) A (Amorphous solid) $\xrightarrow[\text{air}]{O_2}$ B $\xrightarrow{\text{lime water}}$ milky

(ii) Metal sulphide $\xrightarrow{\text{roasting}}$ B (gas) $\xrightarrow{KMnO_4/H^+}$ decolorisation of $KMnO_4$

(iii) B (gas) $\xrightarrow{Fe^{3+}}$ Fe^{2+}

Correct statement is
(1) A is FeO (2) B is CO_2
(3) B is SO_2 (4) A is ZnS

12. Correct match is

Purification by	Method
(1) Zr	Polling
(2) Zn	Van Arkel
(3) Ni	Distillation
(4) Ge	Zone refining

13. Extraction of silver from argentiferous lead is done by
(1) Parkes process
(2) Serpeck process
(3) Down's process
(4) Castner-Kellner process

14. Thermite is a mixture of
(1) Zn + Mg (2) Fe + Al
(3) Fe_2O_3 + Al (4) Cu + Mg

15. Sulphide ore is
(1) copper pyrites (2) malachite
(3) haematite (4) magnesite

16. Which of the following term is not related to Al extraction
(1) Serpeck's process
(2) Hall - Heroult process
(3) Thermite process
(4) Hoop's process

17. Which of the following metal is leached by cyanide process
(1) Ag (2) Na
(3) Al (4) Cu

18. Which of the following is concentrated by froth-floatation method?
(1) cassiterite (2) magnetite
(3) malachite (4) galena

19.

List-I	List-II
(a) Cyanide process	(P) Ultra pure 'Ge'
(b) Froth floatation process	(Q) Pine oil
(c) Electrolytic reduction	(R) extraction of Al
(d) Zone refining	(S) extraction of Au

	a	b	c	d
(1)	R	P	S	Q
(2)	S	Q	R	P
(3)	R	Q	S	P
(4)	S	P	R	Q

20. The substance used as froth stablisers in froth-floatation process is :
(1) Copper sulphate
(2) Aniline
(3) Sodium cyanide
(4) Potassium ethyl xanthate

21. In the froth floatation process, for the benefaction of ores, the ore particles float because:
(1) They are light
(2) Their surface is not easily wetted by water
(3) They bear electrostatic charge
(4) They are insoluble

22. Cassiterite is an ore of:
(1) Mn (2) Ni
(3) Sb (4) Sn

23. Pyrolusite is a/an:
(1) Oxide ore (2) Sulphide ore
(3) Carbide ore (4) Not an ore

24. Which of the following metal is not extracted by electrolysis?
(1) Na (2) Mg
(3) Al (4) Fe

25. Aluminium is extracted by the electrolysis of:

(1) Bauxite

(2) Alumina

(3) Alumina mixed with molten cryolite

(4) Molten cryolite

26. The function of flux during the smelting of the ore is:

(1) To make the ore porous

(2) To remove gangue

(3) To facilitate reduction

(4) To facilitate oxidation

27. Complex formation method is used for the extraction of :

(1) Zn (2) Ag (3) Hg (4) Cu

28. In alumino-thermite process, aluminium is used as:

(1) Oxidizing agent

(2) Reducing agent

(3) Dehydrating agent

(4) Complex formation agent

29. Generally self-reduction of the sulphide ore takes place during:

(1) Roasting

(2) Smelting

(3) Calcination

(4) Cupellation

30. Purest form of iron is:

(1) Cast iron

(2) Wrought iron

(3) Pig iron

(4) None of these

31. In the extraction of nickel by Mond's process, the metal is obtained by:

(1) Electrochemical reduction

(2) Thermal decomposition

(3) Chemical reduction by aluminium

(4) Reduction by carbon

32. Calcination is the process of heating the ore:

(1) In inert gas

(2) In the presence of air

(3) In the absence of air or limited supply of air

(4) In the presence of CaO and MgO

33. The slag obtained during the extraction of copper from copper pyrites is composed of:

(1) Cu_2S (2) $CuSiO_3$

(3) $FeSiO_3$ (4) SiO_2

34. Zone-refining has been employed for preparing ultrapure samples of:

(1) Cu (2) Zn (3) Ge (4) Ag

35. Which method of purification is represented by the equations:

$$\underset{\text{(Impure)}}{Ti} \xrightarrow{500K} TiI_4 \xrightarrow{1675K} \underset{\text{(Pure)}}{Ti} + 2I_2$$

(1) Cupellation (2) Poling

(3) Van Arkel (4) Zone refining

36. When copper ore is mixed with silica in a reverberatory furnace, copper matte produced is?

(1) Sulphides of copper (II) and iron (II)

(2) Sulphides of copper (II) and iron (III)

(3) Sulphides of copper (I) and iron (II)

(4) Sulphides of copper (I) and iron (III)

37. Which of the following reactions is an example of autoreduction?

(1) $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$

(2) $Cu_2O + C \rightarrow 2Cu + CO$

(3) $Cu^{2+}(aq) + Fe(s) \rightarrow Cu(s) + Fe^2$

(4) $Cu_2O + \frac{1}{2} Cu_2S \rightarrow 3Cu + \frac{1}{2} SO_2$

38. Zone refining is based on the principle that_____.

(1) Impurities of low boiling metals can be separated by distillation

(2) Impurities are more soluble in molten metal than in solid metal

(3) Different components of a mixture are differently adosrbed on an adosrbent

(4) Vapours of volatile compound can be decomposed in pure metal

39. Electrolytic refining is used to purify which of the following metals?

(1) Cu and Zn (2) Ge and Si

(3) Zr and Ti (4) Zn and Hg

40. Which of the following oxides can not be reduced by carbon (coke) ?

(1) CaO, K_2O (2) Cu_2O, K_2O

(3) Fe_2O_3, ZnO (4) PbO, Fe_3O_4

METALLURGY ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**1**	**3**	**4**	**2**	**1**	**2**	**2**	**3**	**2**	**2**	**3**	**4**	**1**	**3**	**1**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**1**	**4**	**2**	**2**	**2**	**4**	**1**	**4**	**3**	**2**	**2**	**2**	**1**	**2**
Que.	31	32	33	34	35	36	37	38	39	40					
Ans.	**2**	**3**	**3**	**3**	**3**	**3**	**4**	**2**	**1**	**1**					