Single Correct Answer Type:

1. Amongst the following the lowest degree of paramagnetism per mole of the compound at 298k will shown by

   (A) $MnSO_4.4H_2O$ (B) $CuSO_4.5H_2O$ (C) $FeSO_4.6H_2O$ (D) $NiSO_4.6H_2O$

2. Ammonium dichromate is used in some fire works the green coloured powder blown in the air is

   (A) CrO_3 (B) Cr_2O_3 (C) Cr (D) $CrO(O_2)$

3. Which of the following statement correct about dichromate anion?

   (A) 4 Cr-O bonds are equivalent   (B) 6 Cr-O bonds are equivalent

   (C) All Cr-O bonds are equivalent   (D) All Cr-O bonds are non equivalent

4. Froth-floatation method is successful in separation of impurities from ores because

   (A) The pure ore is lighter than water

   (B) The pure ore is soluble in water containing additives like pine oil, cresylic acid etc

   (C) The impurities are soluble in water containing additives like pine oil, cresylic acid etc

   (D) The pure ore is not as easily wetted by water as by pine oil, cresylic acid

5. Magnetic separation is used for increasing concentration of the following

   (A) Horn silver   (B) Calcite   (C) Haematite   (D) Magnesite

6. Which method of purification is represented by the equation?

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

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

7. Which of the following cannot be obtained by electrolysis of the aqueous solution of their salts?

   (A) Ag   (B) Mg and Al   (C) Cu   (D) Cr

8. Which one of the following is not a sulphide ore?

   (A) Magnetite   (B) Iron pyrites   (C) Copper glance   (D) Sphalerite

9. Which of the following condition favours the reduction of metal oxide to metal?

   (A) $\Delta H = +ve$, $T\Delta S = +ve$ at low temperature   (B) $\Delta H = +ve$, $T\Delta S = -ve$ at any temperature

   (C) $\Delta H = -ve$, $T\Delta S = -ve$ at high temperature   (D) $\Delta H = -ve$, $T\Delta S = +ve$ at any temperature

10. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid?

    (A) $Cr_2O_7^{2-}$ and H_2O are formed   (B) $Cr_2O_4^{2-}$ is reduced to +3 state of Cr

    (C) $Cr_2O_4^{2-}$ is oxidised to +7 state of Cr   (D) Cr_2O_3 and $Cr_2O_7^{2-}$ are formed

11. The radius of La^{+3} (atomic number of $La = 57$) is $1.06 A^0$. Which one of the following given values will be closest atomic radius of Lu^{+3} (atomic number of Lu = 71)

    (A) $1.40 A^0$ (B) $1.06 A^0$ (C) $0.85 A^0$ (D) $1.60 A^0$

12. Cryolite is

    (A) Na_3AlF_6 and used in the electrolysis of alumina for decreasing electrical conductivity

    (B) Na_3AlF_6 and used in the electrolysis of alumina for lowering the melting point of alumina

    (C) Na_3AlF_6 and used in the electrolytic purification of alumina

    (D) Na_3AlF_6 and used in the electrolysis of alumina

13. Which of the following substance used as froth stabilizers in froth floatation process is

    (A) Copper sulphate   (B) Aniline   (C) Sodium cyanide   (D) Potassium ethyl xanthate

14. The form of iron obtained from blast furnace is
    (A) Steel   (B) Wrought iron   (C) Cast iron   (D) Pig iron

15. Which of the following ore is best concentrated by froth floatation method?
    (A) Magnetite   (B) Siderite   (C) Galena   (D) Malachite

16. The pair that does not require calcination
    (A) ZnO and MgO   (B) Fe_2O_3 and $CaCO_3.MgCO_3$
    (C) ZnO and $Fe_2O_3.xH_2O$ (D) $ZnCO_3$ and CaO

17. Match the ores (Column-A) with metals (Column-B)

Column –A (Ore)	Column-B (Metals)
i) Siderite	a) Zn
ii) Kaolinite	b) Cu
iii) Malachite	c) Iron
iv) Calamine	d) Aluminium

    (A) i – b; ii – c; iii – d; iv – a   (B) i – c; ii – d; iii – a; iv – b
    (C) i – c; ii – d; iii – b; iv – a   (D) i – a; ii – b; iii – c; iv – d

18. Hall-Heroult's process is given by
    (A) $Cr_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Cr$ (B) $Cu^{+2}_{(aq)} + H_{2(g)} \longrightarrow Cu(s) + 2H(+)_{(aq)}$
    (C) $ZnO + C \xrightarrow[1673k]{Coke} Zn + CO$ (D) $2Al_2O_3 + 3C \longrightarrow 4Al + 3CO_2$

19. The ore that contain both Iron and copper is
    (A) Malachite   (B) Zolomite   (C) Azurite   (D) Copper pyrite

20. The colour of $KMnO_4$ is due to
    (A) $L \rightarrow M$ charge transfer transition   (B) σ to σ^* transition
    (C) $M \rightarrow L$ charge transfer transition   (D) $d - d$ transition

Numerical Based:

21. The value of ΔG_f^0 for formation of Cr_2O_3 is $-540\,kJ\,mol^{-1}$ and that of Al_2O_3 is $-827\,kJmol^{-1}$. What is the value of ΔG_f^0 for the reaction (in kj/mol)

$$\frac{4}{3}Al_{(s)} + \frac{2}{3}Cr_2O_{3(s)} \longrightarrow \frac{2}{3}Al_2O_{3(s)} + \frac{4}{3}Cr_{(s)}$$

22. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphite ion in acidic solution.

23. In German silver the percentage of silver is

24. How many of the following metals can be refined by vapour phase refining?
    Zr, Zn, Cd, Hg, Ni, Co, Pt, Fe, Ti

25. For Cu^{+2}, the spin only magnetic moment is (in BM)

KEY

1.	B	2.	B	3.	B	4.	D	5.	C
6.	C	7.	B	8.	A	9.	D	10.	A
11.	C	12.	B	13.	B	14.	D	15.	C
16.	A	17.	C	18.	D	19.	D	20.	A
21.	−287	22.	0.40	23.	0.00	24.	3.00	25.	1.73