

Time: One Hour

Max. Marks: 40

Instructions

Attempt All questions

- 1 The electrochemical cell in which electrical energy is consumed to bring out a chemical change is called
(A) Voltaic (Galvanic Cell) (B) Electrolytic Cell (C) Unit Cell (D) None of these
- 2 In cell formula $Zn | Zn^{++} || Cu^{++} | Cu$, the double vertical line represents
(A) Indirect contact / salt bridge (B) Direct contact (C) Same phase (D) Concentration
- 3 The example of reference electrode is/are
(A) SHE (B) Calomel (C) Silver | Silver chloride electrode (D) All of these
- 4 The relation between free energy and emf is
(A) $\Delta G = -nFE$ (B) $\Delta H = -nFE + nFT \left(\frac{\partial E}{\partial T} \right)_p$ (C) $\Delta S = nF \left(\frac{\partial E}{\partial T} \right)_p$ (D) $\Delta G^\circ = RT \ln K$
- 5 The oxidation potential of calomel electrode for 1M KCl is
(A) -0.333V (B) -0.280V (C) -0.242V (D) None of these
- 6 The site of oxidation in an electrochemical cell is
(A) The anode (B) The cathode (C) The electrode (D) The salt bridge
- 7 When $P_s = P_o$, then electrode acts as
(A) +ve electrode (B) -ve electrode (C) Null electrode (D) Reference electrode
- 8 In concentration cell with transport/ transference
(A) The two electrolyte solution are in direct contact or There is transfer of ions from one electrolyte solutions to the other takes place directly (B) The two electrolyte solutions are not in direct contact (C) The cell reaction does not involve transfer of electrolyte from one solution to the other directly (D) None of the above
- 9 Dry cell is a type of cell
(A) Reversible cell (B) Irreversible cell (C) Electrolytic Cell (D) None of these
- 10 The limitation of Quinhydrone electrode is
(A) It gives good result in solution with pH less than 8 (B) In more alkaline solution Quinhydrone electrode is not valid (C) It fails to give satisfactory result in the presence of proteins (D) All of these
- 11 In a galvanic cell or voltaic cell, the cathode is always
(A) A nonmetal (B) At which reduction takes place (C) At which oxidation takes place (D) Attached to a battery
- 12 Ferromagnetic substance consists of
(A) More number of unpaired electrons. (B) All paired electron. (C) Both A and B. (D) None of these.
- 13 Paramagnetic substanceby/in the magnetic field.
(A) Attract (B) Repelled (C) Rotated (D) Revolved
- 14 Which type of substance get permanently magnetised, when placed in magnetic field.
(A) Paramagnetic (B) Diamagnetic (C) Ferromagnetic (D) None of these
- 15 The characteristics of ferromagnetic substances are /is
(A) The line of forces tends to accumulate in substance. (B) The magnetic susceptibility is positive. (C) The magnetic permeability μ is positive and greater than one. (D) All of these.
- 16 In paramagnetic substances with increase in temperature the magnetic susceptibility
(A) Increases. (B) Decreases. (C) Show no effect. (D) Increases or Decreases.
- 17 The change in work function at constant temperature given as
(A) $\Delta A = \Delta U - T \Delta S$ (B) $\Delta A = \Delta U + T \Delta S$ (C) $\Delta A = T \Delta S - \Delta U$ (D) $\Delta A = T \Delta S + \Delta U$
- 18 The change in free energy function and work function at constant temperature and pressure given as
(A) $\Delta G = \Delta A - P \Delta V$ (B) $\Delta G = \Delta A + P \Delta V$ (C) $\Delta G = P \Delta V - \Delta A$ (D) $\Delta G = P \Delta V + \Delta A$
- 19 The decrease in free energy function at constant temperature and pressure is measure of
(A) Net work done (B) Change in enthalpy (C) Change in entropy (D) Net change in internal energy.
- 20 The variation of work function with temperature at constant volume is given by an equation.
(A) $\left(\frac{dA}{dT} \right)_T = -P$ (B) $\left(\frac{dA}{dV} \right)_T = P$ (C) $\left(\frac{dA}{dT} \right)_V = -S$ (D) $\left(\frac{dA}{dT} \right)_V = +S$
- 21 The variation of free energy function 'G' with temperature and pressure is given by an equation
(A) $dG = VdP - SdT$ (B) $dG = -VdP - SdT$ (C) $dG = -VdP + SdT$ (D) $dG = +VdP + SdT$
- 22 Mathematically the partial molar free energy is given by the equation

- (A) $\bar{U}_i = \left(\frac{\partial U}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$ (B) $\bar{V}_i = \left(\frac{\partial V}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$ (C) $\bar{A}_i = \left(\frac{\partial A}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$ (D) $\bar{G}_i = \left(\frac{\partial G}{\partial n_i} \right)_{T, P, n_1, n_2, \dots}$
- 23 The third law of thermodynamics may be stated as :
 (A) At absolute zero the entropy of all perfectly crystalline solid tends to decrease. (B) The entropy of a perfectly crystalline solid taken zero at absolute zero. (C) The entropy of a substance is related to its heat capacity. (D) The entropy of every substance is zero at 0 °C .
- 24 The relation between standard free energy and equilibrium constant is
 (A) $\Delta G^\circ = -RT \ln K_p$ (B) $\Delta G^\circ = RT \ln K_p$ (C) $\Delta G^\circ = R \ln K_p$ (D) $\Delta G^\circ = T \ln K_p$
- 25 The equation $\log \frac{K p_2}{K p_1} = \frac{\Delta H^\circ}{2.303R} \left[\frac{T_2 - T_1}{T_1 T_2} \right]$ is integrated form of
 (A) Clausius- Clapeyron equation (B) Van't- Hoff equation (C) Gibbs- Duhem equation (D) None of these
- 26 The equation $\frac{dP}{dT} = \frac{\Delta H}{T \Delta V}$ is called
 (A) Gibb – Helmholtz equation (B) Kirchoff's equation (C) Clapeyron equation (D) Clausius Clapeyron equation
- 27 . The application / s(Uses) of Van't- Hoff equation is / are
 (A) It is used to calculate the equilibrium constant at any other temperature provides equilibrium constant at one temperature and ΔH° are known. (B) It is useful to calculate ΔH° when $K p_1$ and $K p_2$ at two temperatures T_1 and T_2 are known. (C) Both A and B (D) None of these.
- 28 The Biological function of K^+ ion is
 (A) To Carry Oxygen (B) To Circulate Blood (C) To Control Osmotic pressure & Water retention (D) To synthesize food
- 29 Porphin structure made up of -----
 (A) Four pyrrole rings (B) Three pyrrole rings (C) Four benzene rings (D) Three benzene rings
- 30 Hemoglobin and myoglobin are
 (A) Iron complex of porphyrin (B) Cobalt complex of porphyrin (C) Iron complex of amines (D) Cobalt complex of amines
- 31 ----- is responsible for red colour of blood.
 (A) Chlorophyll (B) Hemoglobin (C) Both of these (D) None of these
- 32 Which of the following element is absent in carboranes?
 (A) Sulphur (B) Carbon (C) Hydrogen (D) Boron
- 33 Dicarbaclosododecacborane formed at 700°C is in which isomeric form?
 (A) Ortho isomer (B) Para isomer (C) Meta isomer (D) stereoisomer
- 34 How many number of three centred electron pair bond present in Diborane?
 (A) One (B) Two (C) Three (D) four
- 35 The molecular formula for dicarbaclosododecacborane is
 (A) $CB_{10}H_{12}$ (B) $C_2B_5H_6$ (C) CB_5H_6 (D) $C_2B_{10}H_{12}$
- 36 According to wade's rule number of electron pair present in multicenter bonding orbitals of $(CH)_2B_{10}H_{10}$ carborane is
 (A) 12 (B) 13 (C) 14 (D) 10
- 37 Carborane has (m+2) electron pair in it's multicenter bonding orbital then it is classified as
 (A) Nidocarborane (B) Closocarborane (C) ArchenoCarborane (D) None of these
- 38 $C_2B_8H_{10}$ is a ----- boranes.
 (A) Nido (B) Closo (C) Arachno (D) none of above
- 39 When diborane reacts with ammonia it forms
 (A) Boric Acid (B) Sodium Boro Hydride (C) Borazine (D) Halo borane
- 40 Diborane on hydrolysis gives
 (A) Hydroxy Borate (B) Boric acid (C) Halo Borane (D) Borazine