

S. Y .BSc. Sem. - III
Chemistry - paper -1
Sample Questions

Physical chemistry
1.1- Chemical thermodynamics
1.2-Electrochemistry

- 1) Gibb's free energy is-----
 - a) Extensive property
 - b) Intensive property
 - c) Constitutive property
 - d) Optical activity
- 2) The maximum work done by the system can be obtained at the expense of-----
 - a) Gibb's free energy
 - b) Helmholtz free energy
 - c) Enthalpy
 - d) Entropy
- 3) For Non spontaneous process-----
 - a) $\Delta G = 0$
 - b) $\Delta G < 0$
 - c) $\Delta G > 0$
 - d) $\Delta G = 1$
- 4) Van't Hoff's reaction isotherm is given by relationship-----
 - a) $\Delta G = \Delta H + T [d(\Delta G)/dT]$
 - b) $\sum n d\mu = 0$
 - c) $\Delta G^0 = -RT \ln K$
 - d) $d \ln K_p / dT = \Delta H/RT^2$
- 5) Concentration of the solute in solution when it is in equilibrium with the solid substance at particular temperature is called as-----
 - a) Solubility
 - b) Solubility Product
 - c) Degree of ionization
 - d) Ionic product
- 6) Van't Hoff's reaction isotherm is given by relationship-----
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8) Calculate the ionic mobility of cation in 0.1 m solution of NaCl at 298 K, if its transport No is 0.39 and the molar conductance of NaCl at infinite dilution is $0.0127 \text{ Sm}^2 \text{ mol}^{-1}$

- a) $5.13 \times 10^{-10} \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$
- b) $5.13 \times 10^{-8} \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$
- c) $0.004953 \text{ Sm}^2 \text{ mol}^{-1}$
- d) $0.005349 \text{ Sm}^2 \text{ mol}^{-1}$

9) Limiting equivalent conductance of KNO_3 and KBr are $140.0 \text{ S cm}^2 \text{ eq}^{-1}$ and $148.0 \text{ S cm}^2 \text{ eq}^{-1}$ respectively. The limiting equivalent conductance of Br is $76.0 \text{ S cm}^2 \text{ eq}^{-1}$. The limiting equivalent ionic conductance of NO_3 -----is

- a) $58. \text{ S cm}^2 \text{ eq}^{-1}$
- b) $62 \text{ S cm}^2 \text{ eq}^{-1}$
- c) $68. \text{ S cm}^2 \text{ eq}^{-1}$
- d) $59 \text{ S cm}^2 \text{ eq}^{-1}$

10) Solubility of sparingly soluble salt $\text{Ba}_3(\text{PO}_4)_2$ is S mol L^{-1} , Hence its solubility product is-----

- a) S_2
- b) 4 S^3
- c) 108 S^6
- d) 200 S^6

11) 0.5 N solution of salt occupying a volume between two platinum electrodes 1.72 cm apart of area 4.5 cm^2 has conductance of 0.04 S ohms calculate the cell constant ?

- a) 0.3822 cm^{-1}
- b) 0.2122 cm^{-1}
- c) 0.3822 cm^{-2}
- d) 0.3833 cm^{-3}

12) Calculate equivalent conductance of 0.5 normal solution of salt if specific conductance is 0.0153 S cm^{-1}

- a) 0.58 S cm^2
- b) 0.058 S cm^2
- c) 0.580 S cm
- d) 0.581 S cm

13) Expression for cell constant is given by -----

- a) Cell constant = l / a
- b) Cell constant = l / C
- c) Cell constant = l / A
- d) Cell constant = l / P

14) Electrolytic conductance is due to which of the following species?

- a) Electron
- b) Ions
- c) Proton
- d) None

15) . Which of the following statements is correct?

- a) Electrolytes conduct electricity in solid state.
- b) The net reaction occurring in electrolytic cell is Redox reaction
- c) Ohm's law is not applicable to electrolytes

16). A solution of an electrolyte is diluted with water as a result its-----

- a) Specific conductance decreases
- b) Equivalent conductance decreases
- c) Molar conductance decreases

- 17) Which of the following factor affects electrolytic conductance-----
- Nature of solute
 - Inter ionic interaction
 - Both of the above
- 18) In pure water the product of concentration of H^+ & OH^- is constant at given temperature and it is called as -----
- Ionic Product of water
 - Solubility
 - Solubility Product
 - Degree of ionisation
- 19) Greater the ----- will be the mobility of ions hence conductance will be lower
- viscosity
 - Surface tension
 - Density
 - Resistance
- 20) The solubility of sparingly soluble salt in solvent is very-- ----
- high
 - low
 - medium
 - negligible

INORGANIC CHEMISTRY (Unit II)

2.1 Non-directional bonding

2.2 Directional bonding

2.3 Molecular orbital theory

- 21) Oppositely charged ions are held together by electrostatic force of attraction known as _____ .
- Ionic bonding
 - Covalent bonding
 - Metallic bonding
 - Directional bonding
- 22) Ionic bond is also called as _____
- Metallic bond
 - Covalent bond
 - Non-directional bond
 - Directional bond
- 23) Higher the _____ of non-metal, greater the ease of formation of anion.
- Ionisation energy
 - Sublimation energy
 - Electron affinity
 - Dissociation energy
- 24) Lower the _____ of non-metal favours the formation of ionic bond.
- Dissociation energy
 - Sublimation energy
 - Ionisation energy
 - Electron affinity.

- 25) If radius ratio value is between 0.225 – 0.414, then coordination number of cation is _
- 2
 - 3
 - 4
 - 6
- 26) The number of ions in the formula unit of NaCl is/are _____.
- One
 - Two
 - Three
 - Four.
- 27) The Born-Landé equation is used to calculate _____.
- Lattice energy
 - Solvation energy
 - Electron affinity
 - Ionisation energy
- 28) An ionic compound is _____
- Generally salt
 - Held together by ionic bonds
 - Composed of anions and cations
 - All of the above
- 29) Valence shell Electronic configuration of Nitrogen atom is _____
- $2S^2, 2P^3$
 - $2S^2, 2P^1$
 - $2S^2, 2P^2$
 - $2S^2, 2P^4$
- 30) According to VBT, O_2 molecule has _____ covalent bond.
- single
 - double
 - triple
 - no
- 31) In phosphonium ion, the formal charge on H atom is _____
- +1
 - +2
 - 1
 - Zero
- 32) In $BeCl_2$, the central Be atom is _____ hybridised.
- sp
 - sp^2
 - sp^3
 - sp^2d
- 33) The Shape of $BeCl_2$ molecule based upon concepts of hybridisation is _____
- Linear
 - Trigonal planar
 - Tetrahedral
 - Bent
- 34) The bond angle in sp hybridisation is _____ .
- 120°
 - 180°
 - 90°
 - $109^\circ.28'$

- 35) The geometry of NH_3 molecule based upon concepts of hybridisation is _____
- Linear
 - Trigonal planar
 - Tetrahedral
 - Bent
- 36) The number of resonating structures of CO_3^{2-} ion are _____
- 1
 - 2
 - 3
 - 4
- 37) Hybridisation involves _____
- Mixing of atomic orbitals centered on same atom
 - Mixing of atomic orbitals centered on different atoms
 - Addition of an electron to an atom
 - Addition of an electron pair s to an atom
- 38) According to MOT, which of the following is not paramagnetic _____
- O_2
 - O_2^+
 - N_2
 - B_2
- 39) According to MOT, bond order of H_2 molecule is _____
- 1
 - 2
 - 3
 - zero
- 40) Bonding molecular orbitals are produced by _____
- Constructive interaction of Atomic orbital
 - Destructive interaction of Atomic orbital
 - Overlap of Atomic orbital of two negative ions
 - Overlap of Atomic orbital of two positive ions

Organic Chemistry

41. In SN^1 mechanism rate of reaction is depend on concentration
- Both reactant
 - Only on Alkyl halides
 - Only on Alkali
 - Not related to rate
42. Which of following is best example of SN^1 Substitution reaction.
- Methyl Bromide
 - 2 bromo Propane
 - Tertiary Butyl bromide
 - 1- bromo propane
43. In benzyne intermediate when substitution takes place at adjacent position is called substitution.
- Addition Elimination
 - Elimination Addition
 - Cine substitution
 - Elimination reaction

44. Which of the following is the example of organometallic compound?
- C_2H_5OH
 - $Mg(OH)_2$
 - RLi
 - $LiCl$
- a. Ionic organometallic compound
b. Covalent organometallic compound
c. Compounds with multi-centered bond
d. Pi coordinated Organo metallic compounds
45. is example of Pi coordinated Organo metallic compounds Organometallic compound.
- Alkyl magnesium Halide
 - Alkyl Lithium
 - Tetra alkyl lead
 - Ferrocene
46. Phenyl lithium is prepared by the action of on lithium
- Chloro benzene in CCl_4
 - Cyclohexyl Chloride in Hexane
 - Bromo benzene in Hexane
 - Benzene & Cl_2
47. Physical properties of alcohol depends on the characteristics of
- Melting point
 - Boiling point
 - O-H bonding
 - Solubility
48. Three moles of alcohol reacts with PCl_3 whereas required to react with PCl_5 to alkyl halides.
- Three
 - Four
 - One
 - Two
49. Phenol reacts with alkyl halide to gives ether. This reaction is known as.....
- Dows process
 - Williamson Synthesis
 - Fries rearrangement
 - Claisen Reaction
50. Reaction of HCl with ethylene oxide result in the formation of
- Chloro benzene in CCl_4
 - Cyclohexyl Chloride in Hexane
 - Bromo benzene in Hexane
 - Benzene & Cl_2