

Write Serial No. of your answer book _____

Time Allowed : 20 Minutes

Maximum Marks : 17

Signature of Deputy Supdt. _____

Note : Use this paper to write the answers to the objective questions. No mark will be awarded for cutting, over-writing or using a pencil. This paper must be tagged with the answer-book.

1. Some possible answers to each statement are given below. Tick (✓) mark the correct answer : 17

- (i) Electrometer is also called : (Voltmeter, Avometer, Ion Collector, Galvanometer.)
- (ii) In combustion analysis, H_2O vapours are absorbed by :
(50% KOH , $Mg(ClO_4)_2$, NaOH , $MgCl_2$)
- (iii) Chromatography in which the stationary phase is liquid is called :
(Adsorption chromatography, Partition chromatography,
Column chromatography, None of these.)
- (iv) Absolute zero is equal to : ($273^\circ C$, $-273^\circ C$, $0^\circ C$, $273 K$)
- (v) A crystal system in which all the axes and angles are unequal is called :
(Tetragonal system, Monoclinic system, Triclinic system, Cubic system.)
- (vi) A Murree Hills water boils at : ($98^\circ C$, $100^\circ C$, $0^\circ C$, $50^\circ C$)
- (vii) When 6d orbital is completely filled, the entering electron goes into :
(7f , 7s , 7p , 7d)
- (viii) Lyman Series occur in : (Visible region, U.V. region, I.R. region, None of these.)
- (ix) Dipole moment of CO_2 is : (1.84 D , Zero D , 0.95 D , 2.2 D)
- (x) In sp^2 hybridization, the orbitals are oriented at an angle of :
(109.5° , 120° , 180° , 0°)
- (xi) The enthalpy change when one mole of a substance is completely burnt in excess of oxygen is called : (Enthalpy of atomization, Enthalpy of neutralization,
Enthalpy of combustion, Enthalpy of formation.)
- (xii) The sum of pH and pOH is always : (7 , Zero , 14 , 10^{-14})
- (xiii) The no. of moles of solute dissolved per dm^3 of solution is called :
(Molarity, Molality, Normality, Mole fraction.)
- (xiv) Benzene-ether can form :
(Ideal solution, Non-ideal solution, Buffer solution, None of these)
- (xv) Loss of electrons is called : (Oxidation, Reduction, Hydration, Dehydration.)
- (xvi) Fuel cells convert chemical energy into :
(Heat energy, Light energy, Electrical energy, Mechanical energy.)
- (xvii) The minimum amount of energy required for an effective collision is called :
(Activation energy, Internal energy, Translational energy, None of these.)

to be

Note : All questions are/attempted on the answer book.

SECTION – I

2. Write any TWENTY TWO short answers of the following questions :

44

- (i) Define stoichiometry and empirical formula.
- (ii) Calculate the mass in grams of 10^{-3} moles of water.
- (iii) How can the efficiency of a chemical reaction be expressed?
- (iv) Mg atom is twice heavier than that of carbon atom. Justify.
- (v) Mention the major steps involved in crystallization.
- (vi) Mention various experimental techniques which are used for the purification of substances.
- (vii) Greater the temperature of the gas, closer the straight line of P versus $1/V$ to the pressure axis. Justify it.
- (viii) How the various scales of thermometry can be interconverted?
- (ix) Joule-Thomson effect is operative in the Linde's Method of liquification of air. How?
- (x) Why the melting and boiling points of Alkanes increases with increase in Molar Masses?
- (xi) Lower alcohols are water soluble but corresponding alkanes are insoluble in water. Why?
- (xii) How liquid crystals can act as temperature sensors?
- (xiii) Define Isomorphism. Give one example.
- (xiv) How we come to know that cathode rays are material particles with negative charge?
- (xv) The e/m values of positive rays obtained from the hydrogen gas is 1836 times less than that of cathode rays. Justify it.
- (xvi) The energy associated with violet colour is greater than red colour in visible spectra. Why?
- (xvii) State Pauli's exclusion principle.
- (xviii) The abnormality of bond length in HI is less prominent than in HCl. Why?
- (xix) What is octet rule?
- (xx) How does the electronegativity difference decide the nature of chemical bond?
- (xxi) Explain the term bond order.
- (xxii) How the amount of lattice energy of an ionic compound depends upon the charge densities of the ions?
- (xxiii) What is first law of thermodynamics?
- (xxiv) When the concentration of salt is increased in an acidic buffer then the pH of the solution increases. Why?
- (xxv) What will be the effect of change in pressure on NH_3 synthesis?

(2)

2. (xxvi) What are hydrates? How they are formed?
(xxvii) What is positive deviation from Raoult's Law?
(xxviii) Why the freezing points are depressed due to presence of solutes?
(xxix) How can we say that a voltaic cell is a reversible cell?
(xxx) What are electrode reactions of a dry cell?
(xxxii) What are electrochemical series?
(xxxii) How does a catalyst affect the reversible chemical reaction?
(xxxiii) The radioactive decay is always a first order reaction. Justify.

SECTION – II

Note : Attempt any THREE questions.

3. (a) Define Debye forces, Amorphous solids, Allotropy and Hydrogen bonding. 1,1,1,1
(b) Mg metal reacts with HCl to give hydrogen gas. What is the minimum volume of HCl solution (27% by weight) required to produce 12.1g of H₂. The density of HCl solution is 1.14g / cm³ : 4
$$\text{Mg (s)} + 2\text{HCl (aq)} \rightarrow \text{MgCl}_2 \text{ (aq)} + \text{H}_2 \text{ (g)}$$
4. (a) Explain the experiment which help us to understand the discovery of protons. 4
(b) Calculate the masses of 10²⁰ molecules of each of H₂ and CO₂ at STP. What will happen to the masses of these gases, when the temperature of these gases are increased by 100 °C and pressure is decreased by 100 torr. 4
5. (a) Discuss with two suitable example VSEPR theory of covalent bond. 5
(b) Discuss three important factors influencing the rate of reaction. 3
6. (a) Define and classify colligative properties. How boiling point elevation is measured by Landsberger's Method? 5
(b) Prove that $q_p = \Delta H$ 3
7. (a) Calculate the pH of a buffer solution in which 0.11 molar CH₃COONa and 0.09 molar acetic acid solutions are present. K_a for CH₃COOH is 1.85 × 10⁻⁵. 4
(b) Balance the following equations by oxidation number method : 4
I $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} \rightarrow \text{KCl} + \text{CrCl}_3 + \text{Cl}_2 + \text{H}_2\text{O}$
II $\text{Cu} + \text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{NO} + \text{H}_2\text{O}$