**Note :** Four choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. on the Objective Bubble Sheet. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

**Q.No.1**

(1) Solvent Extraction is an Equilibrium Process and is controlled by :
(A) Law of Mass Action   (B) The amount of Solvent used
(C) Distribution Law   (D) The amount of Solute

(2) The Volume occupied by 1 . 4 g of $N_2$ at S.T.P is :
(A) 2 . 24 $dm^3$   (B) 22 . 4 $dm^3$   (C) 1 . 12 $dm^3$   (D) 112 $cm^3$

(3) The mass of 1 Mole of Electron is :
(A) 1 . 008 mg   (B) 0 . 55 mg   (C) 0 . 184 mg   (D) 1 . 673 mg

(4) The Comparative rate at which the solute moves in Paper Chromatography depends on :
(A) The size of Paper   (B) $R_f$ values of solutes
(C) Temperature of the experiment   (D) Size of the Chromatographic tank used

(5) In order to mention Boiling Point of Water at $110^o$C , the External Pressure should be :
(A) Between 760 torr and 1200 torr   (B) Between 200 torr and 760 torr
(C) 765 torr   (D) Any value of Pressure

(6) A real gas obeying Van der Waals equation will resemble ideal gas if :
(A) Both ' a ' and ' b ' are large   (B) Both ' a ' and ' b ' are small
(C) ' a ' is small and ' b ' is large   (D) ' a ' is large and ' b ' is small

(7) Pressure remaining constant , at which temperature , the volume of a gas will become twice of what it is at $0^o$C : (A) $546^o$C   (B) $200^o$C   (C) 546 K   (D) 273 K

(8) Ionic Solids are characterized by :
(A) Low Boiling Point   (B) Good Conductivity in Solid State
(C) High Vapour Pressure   (D) Solubility in Polar Solvents

(9) The nature of Positive rays depend upon :
(A) The Nature of the Electrode   (B) The Nature of the Discharge Tube
(C) The Nature of the residual Gas   (D) All of the above

(10) Which of the Hydrogen Halides has highest Percentage of Ionic Character :
(A) HCl   (B) HBr   (C) HF   (D) HI

(11) The number of Bonds in Nitrogen Molecule :
(A) One Sigma and One Pi   (B) One Sigma and two Pi
(C) Three Sigma only   (D) Two Sigma and One Pi

(12) Quantum number values for 2p Orbitals are :
(A) $n = 2 , \ell = 1$   (B) $n = 1 , \ell = 2$   (C) $n = 1 , \ell = 0$   (D) $n = 2 , \ell = 0$

(13) 18 g glucose is dissolved in 90 g of $H_2O$ . The relative lowering of Vapour Pressure is equal to :
(A) $\frac{1}{5}$   (B) 5 . 1   (C) $\frac{1}{51}$   (D) 6

(14) The pH of $10^{-3}$ mol $dm^{-3}$ of an Aqueous Solution of $H_2SO_4$ is : (A) 3   (B) 2 . 7   (C) 2 . 0   (D) 1 . 5

(15) If an endothermic reaction is allowed to take place very rapidly in the air , the temperature of the surrounding air : (A) Remains Constant   (B) Increases   (C) Remains Unchanged   (D) Decreases

(16) The Cathodic Reaction in the Electrolysis of dil . $H_2SO_4$ with Pt Electrode is :
(A) Reduction   (B) Oxidation
(C) Both Oxidation and Reduction   (D) Neither Oxidation nor Reduction

(17) In Zero Order Reaction , the rate is independent of :
(A) Temperature of Reaction   (B) Concentration of Reactants
(C) Concentration of Products   (D) None of these

**Note :** It is compulsory to attempt any (8 – 8) Parts each from Q.No. 2, Q.No.3 and attempt any (6) Parts from Q.No.4. Attempt any (3) Questions from Part – II. Write same Question No. and its Part No. as given in the Question Paper.

| Make Diagram where necessary. | | | Part - I | | 22 x 2 = 44 |
| --- | --- | --- | --- | --- | --- |

| Q.No.2 | (i) | Why some Elements have Atomic Masses in fraction? | | |
| --- | --- | --- | --- | --- |
| | (ii) | Define Pressure . Give Units of Pressure. | | |
| | (iii) | Define Atomicity and Isotopy. | (iv) | Differentiate between Diffusion and Effusion. |
| | (v) | Why Sintered Glass Crucible is better than Gooch Crucible? | (vi) | Define Crystallization. Write down only two names of its steps. |
| | (vii) | What are two causes of deviation from Ideality of Gases? | (viii) | Write down major steps involved in Complete Quantitative Analysis. |
| | (ix) | How Partial Pressure of Dry Gas can be calculated by Dalton's Law of Partial Pressure? | (x) | How the value of $K_c$ Predict the Extent of Reaction ? Give examples. |
| | (xi) | How would you maximize the yield of Ammonia in Haber 's Process ? | (xii) | Justify the effect of Catalyst on Equilibrium Constant. |
| Q.No.3 | (i) | Why Boiling Point of Water is different at Murree Hills and Mount Everest? | (ii) | One feels sense of Cooling under the fan after bath. Why? |
| | (iii) | Define Allotropy. Give example | (iv) | Cleavage itself is an Isotropic behaviour why? |
| | (v) | State Pauli 's Exclusion Principle. | (vi) | Define ppm. Write Formula. |
| | (vii) | Why Boiling point of Solvent increases by adding Solute? | (viii) | Define Order of Reaction. Give example. |
| | (ix) | Write Electronic Configuration of Chromium ( At. No . 24 ). | (x) | What happens when the Neutron Decay? |
| | (xi) | The e/m of positive rays is less than Cathode Rays . Justify. | (xii) | A Catalyst is Specific in its action. Justify with example. |
| Q.No.4 | (i) | What is trend of Variation for Electron Affinity in the Periodic Table? | | |
| | (ii) | Predict the Geometry of Molecule $H_2O$ by VSEPR Theory. | | |
| | (iii) | Why Sigma Bond is stronger than Pi Bond ? | | |
| | (iv) | Define Dipole Moment and write its Unit. | | |
| | (v) | Justify that $\triangle E = q_v$ . | | |
| | (vi) | Explain the term Enthalpy . Also write its formula. | | |
| | (vii) | Define Enthalpy of Atomization with an example. | | |
| | (viii) | Calculate Oxidation No. of Cr in $K_2Cr_2O_7$ | | |
| | (ix) | Lead Accumulator is a Chargeable Battery. Comment on it. | | |

| ( Part – II ) | | | | 3 x 8 = 24 |
| --- | --- | --- | --- | --- |

| Q.No.5 | (a) | What are Isotopes ? Discuss Relative Abundance of Isotopes. | (4) |
| --- | --- | --- | --- |
| | (b) | Describe the given properties of Crystalline Solids : (i) Anisotropy (ii) Polymorphism | (4) |
| Q.No.6 | (a) | There is a mixture of Hydrogen , Helium and Methane occupying a Vessel of Volume 13 dm$^3$ at 37 $^\circ$C and Pressure of 1 atm . The Masses of $H_2$ and $He$ are 0 . 8 g and 0 . 12 g respectively . Calculate the Partial Pressures in torr of each gas in the mixture . | (4) |
| | (b) | State and explain Heisenberg 's Uncertainty Principle . | (4) |
| Q.No.7 | (a) | Explain effect of Bonding on following properties of Compounds : (i) Isomerism (ii) Reaction Kinetics | (4) |
| | (b) | $N_{2(g)}$ and $H_{2(g)}$ combine to give $NH_{3(g)}$. The value of $K_c$ in this reaction at 500$^\circ$C is 6 . 02 x 10$^{-2}$ . Calculate the value of $K_p$ for this Reaction. | (4) |
| Q.No.8 | (a) | Define Internal Energy and Enthalpy. Prove $\triangle H = q_p$ | (4) |
| | (b) | Define Electrochemical Series. Explain the following applications in detail : (i) Prediction of the Feasibility of a Chemical Reaction (ii) Calculation of emf of the Cell | (4) |
| Q.No.9 | (a) | What are Continuous and Discontinuous Solubility Curves ? Give examples. | (4) |
| | (b) | What are Enzymes ? Give three Characteristics of Enzyme Catalysis. | (4) |