

Roll No. of Candidate : _____

445-6221

CHEMISTRY

(INTERMEDIATE PART - I) 321 - (III)

Paper - I

Group - II

Time: 20 Minutes

OBJECTIVE ----- Code : 6486

Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1. An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are the main ions in the filtrate?
(A) Ag^+ and NO_3^- only (B) Ag^+ and Ba^{2+} and NO_3^-
(C) Ba^{2+} and NO_3^- only (D) Ba^{2+} and NO_3^- and Cl^-
2. Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at 0°C
(A) 546°C (B) 200°C (C) 546 K (D) 273 K
3. The number of bonds in nitrogen molecule is
(A) one σ and one π (B) one σ and two π
(C) three sigma only (D) two σ and one π
4. When water freezes at 0°C , its density decreases due to
(A) cubic structure of ice (B) empty spaces present in the structure of ice
(C) change of bond lengths (D) change of bond angles
5. Isotopes differ in
(A) properties which depend upon mass
(B) arrangement of electrons in orbitals
(C) chemical properties
(D) the extent to which they may be affected in electromagnetic field
6. 18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to
(A) $\frac{1}{5}$ (B) 5.1 (C) $\frac{1}{51}$ (D) 6
7. The nature of the positive rays depend on
(A) the nature of electrode (B) the nature of the discharge tube
(C) the nature of the residual gas (D) all of these
8. The velocity of photon is
(A) independent of its wavelength (B) depends on its wavelength
(C) equal to square of its amplitude (D) depends on its source
9. One calorie is equivalent to
(A) 0.4184 J (B) 41.84 J (C) 4.184 J (D) 418.4 J
10. Acetone and chloroform are soluble in each other due to
(A) intermolecular hydrogen bonding (B) ion - dipole interaction
(C) instantaneous dipole (D) all of these
11. Solvent extraction is an equilibrium process and it is controlled by
(A) law of mass action (B) the amount of solvent used
(C) distribution law (D) the amount of solute
12. 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
13. Which of the following species has unpaired electrons in antibonding molecular orbitals?
(A) O_2^{2+} (B) N_2^{-2} (C) B_2 (D) F_2
14. 27 g of Al react completely with how much mass of O_2 to produce Al_2O_3
(A) 8 g of oxygen (B) 16 g of oxygen (C) 32 g of oxygen (D) 24 g of oxygen
15. The cathodic reaction in electrolysis of dil. H_2SO_4 with Pt electrodes is
(A) reduction (B) oxidation
(C) both oxidation and reduction (D) neither oxidation nor reduction
16. The molar volume of CO_2 is maximum at
(A) STP (B) 127°C and 1 atm (C) 0°C and 2 atm (D) 273°C and 2 atm
17. The pH of $10^{-3}\text{ mol dm}^{-3}$ of an aqueous solution of H_2SO_4 is
(A) 3.0 (B) 2.7 (C) 2.0 (D) 1.5

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.

(SECTION – I)**1. Write short answers to any EIGHT questions.****(2 x 8 = 16)**

- i - What is gram formula? Give example.
- ii - Define stoichiometry, write down its two laws.
- iii - How limiting reactant is identified?
- iv - What is distribution law?
- v - What is mobile phase and stationary phase?
- vi - What is physical meaning of value of R?
- vii - What is Avogadro's law? Give example.
- viii - Where plasma is found?
- ix - How pressure of dry gas is calculated?
- x - Define solubility curve, give its types.
- xi - Give two differences between ideal and non-ideal solutions.
- xii - What is fractional crystallization?

3. Write short answers to any EIGHT questions.**(2 x 8 = 16)**

- i - Explain cleavage plane is anisotropic property.
- ii - Amorphous solids like glass are also called super cooled liquids. Explain.
- iii - Define isomorphism by giving one example.
- iv - Explain why HF is weak acid than HI?
- v - Define Zeeman effect and stark effect.
- vi - State Heisenberg's uncertainty principle, write down its mathematical form.
- vii - What is spin quantum number? Give its significance.
- viii - What is difference between orbit and orbital?
- ix - Write down equilibrium constant expression for the reaction:
$$\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$$
- x - Calculate pH of 0.001 M HCl solution.
- xi - Explain the radioactive decay is 1st order reaction.
- xii - Justify the statement "the unit of rate constant of a second order reaction is $\text{dm}^3 \text{mole}^{-1} \text{s}^{-1}$ but the unit of rate of reaction is $\text{mole dm}^{-3} \text{s}^{-1}$."

4. Write short answers to any SIX questions.**(2 x 6 = 12)**

- i - Name the four factors affecting ionization energies.
- ii - Why ionization energy decreases down the group inspite of the increase in proton number?
- iii - Why second ionization energy is higher than first ionization energy?
- iv - Define electron affinity with an example.
- v - Define first law of thermodynamics.
- vi - Define heat and work.
- vii - Calculate oxidation state of chromium in dichromate ion.
- viii - What is the use of salt bridge in voltaic cell?
- ix - Why voltaic cell is a reversible cell?

(Turn Over)

(SECTION – II)

5. (a) Calculate the gram atoms (moles) in (4)
(i) 0.1 g of sodium (ii) 0.1 kg of silicon
(b) Explain the following properties of crystalline solids. Give two examples in each case: (4)
(i) Isomorphism (ii) Transition Temperature
6. (a) Derive an equation to find out the partial pressure of a gas knowing the individual moles (4)
of component gases and the total pressure of the mixture.
(b) Give the postulates of Bohr's atomic model. Which postulate tells us that orbits are (4)
stationary and energy is quantized?
7. (a) Define electron affinity. Name the factors affecting on it. How does it vary in the (4)
periodic table.
(b) State first law of thermodynamics. Write down its mathematical expression. (4)
Prove that $\Delta H = q_p$
8. (a) What is the percentage ionization of acetic acid in a solution in which 0.1 mol of it (4)
has been dissolved per dm^3 of the solution. ($K_a = 1.85 \times 10^{-5}$)
(b) Explain half life method and large excess method to find the order of reaction. (4)
9. (a) Freezing points of solutions are depressed when non-volatile solutes are present in (4)
volatile solvents. Justify it. Plot a graph to elaborate your answer.
(b) Write down the various rules for assigning oxidation number. (4)