

CHEMISTRY PAPER-I GROUP-I MTN-41-21 TIME ALLOWED: 20 Minutes
OBJECTIVE MAXIMUM 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 bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

- (1) For which system does the equilibrium constant, K_C has units of (concentration)⁻¹?
 (A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (B) $H_2 + I_2 \rightleftharpoons 2HI$
 (C) $2NO_2 \rightleftharpoons N_2O_4$ (D) $2HF \rightleftharpoons H_2 + F_2$
- (2) The molal boiling point constant is the ratio of the elevation in boiling point to:
 (A) Molarity (B) Molality (C) Mole fraction of solvent (D) Mole fraction of solute
- (3) If a strip of Cu metal is placed in a solution of $FeSO_4$:
 (A) Cu will be deposited (B) Fe is precipitated out
 (C) Cu and Fe both dissolve (D) No reaction takes place
- (4) 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
- (5) The comparative rates at which the solutes move in paper chromatography, depend upon:
 (A) The size of paper (B) R_f values of solutes
 (C) Temperature of the experiment (D) Size of the chromatographic tank used
- (6) A pair of elements having single isotope are:
 (A) ${}^{19}_9F$, ${}^{197}_{79}Au$ (B) ${}^{127}_{53}I$, ${}^{81}_{35}Br$ (C) ${}^{16}_8O$, ${}^{14}_7N$ (D) ${}^{75}_{33}As$, ${}^{14}_7N$
- (7) 1 mole of CH_3OH and C_2H_5OH have:
 (A) Equal number of molecules (B) Equal number of atoms
 (C) Equal number of ions (D) Equal number of protons
- (8) Dalton's law of partial pressure can be derived from:
 (A) Avogadro's law (B) General gas equation (C) Charles's law (D) All of these
- (9) At absolute zero total Kinetic energy of gas molecules is:
 (A) Maximum (B) Zero (C) Never becomes lower than 20 KJ (D) Minimum
- (10) Deby forces are also called:
 (A) Dipole-dipole forces (B) Dipole-Induced dipole forces (C) London forces (D) Ion-dipole forces
- (11) Acetone and chloroform are soluble in each other due to:
 (A) Intermolecular H – bonding (B) Ion-dipole interaction
 (C) Instantaneous dipole forces (D) All of these
- (12) The total number of Fundamental particles in an atom of Carbon – 14 is:
 (A) 6 (B) 8 (C) 14 (D) 20
- (13) Bohr model of an atom is contradicted by:
 (A) Plank's quantum theory (B) Dual nature of matter
 (C) Heisenberg Uncertainty Principle (D) All of these
- (14) Among the following quantum a pair of molecule having similar geometry:
 (A) BF_3 , NH_3 (B) BF_3 , AlF_3 (C) BeF_2 , H_2O (D) BCl_3 , PCl_3
- (15) Which one of following has the highest bond order?
 (A) O_2^{+1} (B) O_2^{+2} (C) O_2^{-1} (D) O_2^{-2}
- (16) Energy of universe remains constant it is called:
 (A) First law of thermodynamics (B) First law of thermochemistry
 (C) Second law of thermochemistry (D) Second law of thermodynamics
- (17) Which statement about the following equilibrium is correct?
 $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)} \quad \Delta H = -188.3 \text{ KJ mol}^{-1}$
 (A) The K_p value falls with a rise in temperature (B) The K_p value falls with increasing pressure
 (C) Adding V_2O_5 catalyst increase the equilibrium yield of SO_3 (D) The K_p value is equal to K_C

INTERMEDIATE PART-I (11th CLASS)

CHEMISTRY PAPER-I GROUP-I MTN-41-21 TIME ALLOWED: 2.40 Hours
SUBJECTIVE MAXIMUM MARKS: 68

NOTE: - Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. **Attempt any eight parts.** **8 × 2 = 16**
- Write assumptions of stoichiometry.
 - Why does actual yield is always less than theoretical yield?
 - Define Avogadro's number and give one example.
 - Define R_f value (retardation factor).
 - What are different types of chromatography?
 - Derive numerical value of gas constant R in S.I units.
 - Derive an expression for calculating density of a gas from general gas equation.
 - Explain Avogadro's law by giving one example.
 - State Dalton's Law of Partial Pressure.
 - What are different types of solubility curves?
 - Write names of different types of colligative properties of solutions.
 - Explain hydration energy of ions briefly.
3. **Attempt any eight parts.** **8 × 2 = 16**
- What are Debye forces?
 - Why HF has lower boiling point than H_2O ?
 - What are crystalline solids?
 - What is a unit cell?
 - What is atomic absorption spectrum?
 - What is Stark effect?
 - What is uncertainty principle?
 - Calculate wavelength of electron moving with velocity $2.188 \times 10^6 \text{ ms}^{-1}$.
 - What are conditions to maximize yield of NH_3 ?
 - How K_C is used to find the direction of reaction?
 - What is reaction intermediate, give example?
 - Define order of reaction, with example.
4. **Attempt any six parts.** **6 × 2 = 12**
- Explain with reason that π bonds are more diffused than σ bonds.
 - Ionization energy decreases down the group and increases along the period, give reason.
 - Write two postulates of VSEPR theory.
 - Prove $\Delta E = qv$
 - Prove $qp = \Delta H$
 - Define covalent bond. Give one example.
 - Calculate the oxidation number of Mn in $KMnO_4$.
 - What is function of salt bridge in Galvanic cell?
 - What is difference between oxidation and reduction process, give one example of each?

SECTION-II

NOTE: Attempt any three questions.

3 × 8 = 24

- 5.(a) 10g of H_3PO_4 has been dissolved in excess of water to dissociate it completely into ions.
 Calculate (i) masses of individual ions
 (ii) number of positive and negative charges dispersed in solution 4
- (b) Give uses of liquid crystals. 4
- 6.(a) What is Boyle's law of gases? Give its experimental verification. 4
- (b) What is spectrum? Differentiate between continuous spectrum and line spectrum. 4
- 7.(a) Explain atomic orbital hybridization with reference to structures for C_2H_4 and C_2H_2 . 4
- (b) Define the following enthalpies and give one example for each.
 (i) standard enthalpy of atomization (ii) standard enthalpy of formation 4
- 8.(a) Define the following terms: 4
 (i) Instantaneous rate (ii) Specific rate constant (iii) order of reaction (iv) Activated complex
- (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 6.0×10^{-2} .
 Calculate the value of K_P for this reaction. 4
- 9.(a) What do you mean by depression of freezing point and describe Beckmann's method for measurement of depression of freezing point. 4