

F3D-61-21

Roll No. : _____

Objective
Paper Code
6485

Intermediate Part First

CHEMISTRY (Objective) GROUP - I

Time: 20 Minutes

Marks: 17



Q.No.1

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

| S.# | Questions | A | B | C | D |
|-----|---|---|---|---|---|
| 1 | The geometry of SO ₂ molecule is: | Angular | Linear | Tetrahedral | Trigonal pyramid |
| 2 | Which one pair is isomorphic in nature: | NaCl, KBr | CaCl ₂ , CaCO ₃ | NaF, MgCl ₂ | Na ₂ CO ₃ , MgCO ₃ |
| 3 | When water freezes at 0°C, its density decreases due to: | Cubic structure of ice | Empty spaces present in structure of ice | Change of bond length | Change of bond angle |
| 4 | Equal masses of methane and oxygen are mixed in an empty container at 25°C. The fraction of total pressure exerted by oxygen is: | $\frac{1}{3}$ | $\frac{8}{9}$ | $\frac{1}{9}$ | $\frac{16}{17}$ |
| 5 | Pressure remaining constant at which temperature the volume of a gas will become twice of what it is at 0°C? | 546°C | 546K | 200°C | 273K |
| 6 | Solvent extraction is an equilibrium process and it is controlled by: | Law of mass action | Distribution law | The amount of solvent used | The amount of solute |
| 7 | A beaker contains 9g of water. The number of H-atoms in it is: | N _A of atoms | 2 × N _A of atoms | $\frac{1}{2}$ N _A of atoms | 3 × N _A of atoms |
| 8 | 27g of Al will react completely with how much mass of O ₂ to produce Al ₂ O ₃ ? | 8g of oxygen | 20g of oxygen | 24g of oxygen | 32g of oxygen |
| 9 | The rate of reaction: | Increases as the reaction proceeds | Decreases as the reaction proceeds | Remains constant as the reaction proceeds | May decrease or increase as the reaction proceeds |
| 10 | The properties of substances which depend solely on number of particles present is known as: | Additive properties | Constitutive properties | Additive and constitutive properties | Colligative properties |
| 11 | Stronger the reducing agent, greater is the: | Oxidation potential | Reduction potential | Redox potential | Electromotive force of cell |
| 12 | A solution with pH = 2 is more acidic than a solution with pH = 6 by a factor of: | 4 | 8 | 1000 | 10000 |
| 13 | The value of Δn for the given equilibrium N ₂ + 3H ₂ ⇌ 2NH ₃ is: | -2 | +2 | +1 | +4 |
| 14 | For a given process, the heat changes at constant pressure (q _p) and at constant volume (q _v) are related to each other as: | q _p = q _v | q _p > q _v | q _p < q _v | q _p = $\frac{q_v}{2}$ |
| 15 | In ground state of an atom, the electron is present: | In the nucleus | In the second shell | Nearest to the nucleus | Farthest from the nucleus |
| 16 | Which is correct? | Idea of presence of neutron in an atom was provided by Chadwick | Neutron was discovered by using radioactive Beryllium | Fast neutrons having energy 1.2ev | Slow neutrons have energy above 1ev |
| 17 | The planer structure of BF ₃ can be explained by the fact that BF ₃ is: | sp-hybridized | sp ² -hybridized | sp ³ -hybridized | dsp ² -hybridized |

37-XI121-30000

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Intermediate Part First
CHEMISTRY (Subjective) GROUP - I

Roll No. _____

Time: 02:40 Hours Marks: 68 **F80-G1-21**

SECTION - I

2. Write short answers of any EIGHT parts. 16
- Calculate mass in kilograms of 2.6×10^{20} molecules of SO_2 .
 - Calculate mass in grams of 5.136 moles of Ag_2CO_3 .
 - Calculate mass in grams of 2.74 moles of KMnO_4 .
 - Define sublimation. Name two compounds which can be sublimed.
 - Define (a) Solvent extraction (b) R_f value.
 - Derive the units for gas constant 'R' in general gas equation when pressure is in atmosphere and volume in dm^3 .
 - Briefly discuss general gas equation.
 - Describe centigrade scale of thermometry.
 - Write two applications of Dalton's law of partial pressure.
 - Define fractional distribution. Give one example.
 - What is non ideal solution? Give one example.
 - Define colligative properties. Name four colligative properties.
3. Write short answers of any EIGHT parts. 16
- Write six crystallographic elements of a tetragonal crystal system.
 - Explain crystal lattice briefly.
 - Define transition temperature giving one example.
 - Explain cleavage planes.
 - Cathode rays are material particles. Explain it.
 - Write any two properties of neutron.
 - Explain continuous spectrum briefly.
 - Define atomic absorption spectrum giving one example.
 - Give one difference between reversible and irreversible reactions.
 - Define pH and pOH.
 - Define instantaneous rate and average rate of a reaction.
 - Define order of a reaction giving one example.
4. Write short answers of any SIX parts. 12
- What is basic assumption of VSEPR theory.
 - Define coordinate covalent bond. Give example.
 - Define electron affinity. Give example.
 - Why NH_3 is a pyramidal molecule?
 - What is system and surrounding?
 - Define enthalpy of combustion. Give example.
 - What is electrochemistry?
 - What is electrolytic conduction?
 - How electrochemical series is used to calculate voltage of cell? Give example.

SECTION - II Attempt any THREE questions. Each question carries 08 marks.

5. (a) When lime stone is roasted, quicklime is produced according to following equation:
 $\text{CaCO}_3(\text{g}) \rightarrow \text{CaO}(\text{g}) + \text{CO}_2(\text{g})$
The actual yield of CaO is 2.5kg when 4.5kg of lime stone is roasted. Find its percentage yield. 04
- (b) Define and explain factors affecting the London forces. 04
6. (a) How Dalton's law of partial pressure calculates the partial pressure of a gas? 04
(b) Explain measurement of e/m value of electron. 04
7. (a) Define covalent bond. Write its types with reference to polar covalent bond. 04
(b) What is the first law of thermodynamics? How does it explain that $q_v = \Delta E$? 04
8. (a) When 1.00 mole of steam and 1.00 mole of carbon monoxide are allowed to reach equilibrium, 33.3% of the equilibrium mixture is hydrogen. Calculate the value of K_p . State the units of K_p . 04
(b) Explain how Arrhenius equation tells us the effect of temperature on the rate constant. 04
9. (a) Explain the measurement of freezing point by Beckmann's freezing point apparatus. 04
(b) Define electrochemical series. Write its two applications. 04

37-XI121-30000

F3D-42-21

Roll No. : _____

Objective
Paper Code
6486

Intermediate Part First

CHEMISTRY (Objective) GROUP - II

Time: 20 Minutes

Marks: 17



Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

| S.# | Questions | A | B | C | D |
|-----|--|---------------------------------------|-------------------------------------|--|---------------------------------------|
| 1 | Bohr model of atom is contradicted by: | Plank's quantum theory | Dual nature of matter | Heisenberg's uncertainty principle | All of these |
| 2 | Quantum number values for 2p orbitals are: | $n = 2, \ell = 1$ | $n = 1, \ell = 2$ | $n = 1, \ell = 0$ | $n = 2, \ell = 0$ |
| 3 | Which is a pseudo solid? | CaF ₂ | Glass | NaCl | All of these |
| 4 | Which is not an isomorphous pair? | NaNO ₃ , KNO ₃ | MgO and NaF | K ₂ SO ₄ and K ₂ Cr ₂ O ₇ | NaF and CaCl ₂ |
| 5 | Number of molecules in one dm ³ of water is close to: | $\frac{6.02}{22.4} \times 10^{23}$ | $\frac{12.04}{22.4} \times 10^{23}$ | $\frac{18}{22.4} \times 10^{23}$ | $55.6 \times 6.02 \times 10^{23}$ |
| 6 | Equal masses of methane and oxygen are mixed in an empty container at 25°C. The fraction of total pressure exerted by oxygen is: | $\frac{1}{3}$ | $\frac{8}{9}$ | $\frac{1}{9}$ | $\frac{16}{17}$ |
| 7 | The comparative rates at which the solutes move in paper chromatography depend on: | The size of paper | R _f values of solutes | Temperature of the experiment | Size of the chromatographic tank used |
| 8 | The ratio of actual yield to theoretical yield multiplied by 100 is called: | Complex yield | Experimental yield | %age yield | None of these |
| 9 | The calculation based on balanced chemical equation is called: | Complex calculation | Stoichiometric calculation | Non-stoichiometric calculation | None of these |
| 10 | The unit of the rate constant is the same as that of the rate of reaction in: | First order reaction | Second order reaction | Zero order reaction | Third order reaction |
| 11 | If the salt bridge is not used between two half cells, then voltage: | Decrease rapidly | Decrease slowly | Does not change | Drops to zero |
| 12 | The pH of buffers can be calculated by: | Henderson equation | Nerst equation | Kinetic equation | Arrhenius equation |
| 13 | Less soluble KClO ₃ is precipitated from its solution by common ion effect on adding: | HCl | KCl | H ₂ S | NaCl |
| 14 | For which system does the equilibrium constant, K _c has units of (concentration) ⁻¹ : | $N_2 + 3H_2 \rightleftharpoons 2NH_3$ | $H_2 + I_2 \rightleftharpoons 2HI$ | $2NO_2 \rightleftharpoons N_2O_4$ | $2HF \rightleftharpoons H_2 + F_2$ |
| 15 | If an endothermic reaction is allowed to take place very rapidly in the air, the temperature of the surrounding air: | Remains constant | Increases | Decreases | Remains unchanged |
| 16 | Octet rule is not followed in the formation of: | NF ₃ | CF ₄ | CCl ₄ | PCl ₅ |
| 17 | Which species has unpaired electrons in antibonding molecular orbitals? | O ₂ ⁺ | N ₂ ⁻ | B ₂ | F ₂ |

38-XI121-32000

Intermediate Part First
CHEMISTRY (Subjective) GROUP - II

Roll No. _____

Time: 02:40 Hours

Marks: 68

F80-42-21

SECTION - I

2. Write short answers of any EIGHT parts.

- (i) No individual neon atom has a mass of 20.18 amu.
- (ii) What is a limiting reactant?
- (iii) What is percentage yield? Give its importance.
- (iv) Define sublimation. Give example.
- (v) What is solvent extraction?
- (vi) Derive Avogadro's Law from KMT.
- (vii) Give characteristics of plasma.
- (viii) What is law of distribution of velocities?
- (ix) What is centigrade scale of temperature?
- (x) Give two differences between ideal and non-ideal solutions.
- (xi) Define solubility and solubility curves.
- (xii) Define enthalpy or heat of solution.

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3. Write short answers of any EIGHT parts.

- (i) Define polymorphism by giving one example.
- (ii) Define unit cell. Write dimensions of unit cell.
- (iii) What is difference between crystal and crystallite?
- (iv) Why H₂O is liquid and H₂S is gas at room temperature?
- (v) Why the positive rays are also called canal rays?
- (vi) Why alpha rays are bounced back in Rutherford experiment?
- (vii) Calculate mass of electron by using e/m value.
- (viii) What is difference between orbit and orbital?
- (ix) Define acidic and basic buffers.
- (x) Define common ion effect by giving one example.
- (xi) Define rate determining step by giving one example.
- (xii) Define energy of activation.

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4. Write short answers of any SIX parts.

- (i) How electronegativity helps us to understand the nature of bond?
- (ii) Differentiate between ionic and covalent bond.
- (iii) Why some covalent bonds are polar while others are non-polar?
- (iv) What is oxonium ion? How it is formed?
- (v) What is enthalpy?
- (vi) What is standard enthalpy of a reaction?
- (vii) Calculate oxidation number of manganese in KMnO₄.
- (viii) Calculate oxidation number of sulphur in sulphate ions.
- (ix) Define electrode potential.

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SECTION - II Attempt any THREE questions. Each question carries 08 marks.

5. (a) Calculate the number of grams of K₂SO₄ and water produced when 14g of KOH are reacted with excess of H₂SO₄. $2\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$ 04
(b) Explain the following properties of crystalline solids. Give one example in each case: 04
(i) Anisotropy (ii) Symmetry (iii) Polymorphism (iv) Habit of a crystal
6. (a) Derive general gas equation for one mole of a gas from gas laws at S.T.P. 04
(b) What is spectrum? Explain atomic emission spectrum and atomic absorption spectrum. 04
7. (a) Give the postulates of VSEPR theory. 04
(b) Explain these terms: (i) Standard heat of neutralization (ii) Standard enthalpy of solution 04
8. (a) N₂(g) and H₂(g) combine to give NH₃(g). The value of K_c in this reaction at 500°C is 6.0×10^{-2} . Calculate the value of K_p for this reaction. 04
(b)(i) Define activation energy and activated complex. (ii) What is meant by specific rate constant? 04
9. (a) Explain Landsberger's method for the measurement of boiling point elevation. 04
(b) Define electrochemical series. Write its any two applications. 04

38-XI121-32000

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