

CHEMISTRY	Intermediate Part-I (11th) (1st A 325)	Paper: I	First Group
Time: 2:40 Hours	SUBJECTIVE	Marks: 68	

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

SECTION – I

2. Write short answers to any EIGHT (8) questions.

(2x8 = 16)

- Differentiate between empirical and molecular formulas.
- Define Mole and Avogadro's number.
- What is limiting reactant?
- Define sublimation. Write down names of two solids which undergo sublimation.
- Why is there a need to crystallize the crude product?
- SO₂ is comparatively non-ideal at 273 K but behaves ideally at 327°C. Give reason.
- Define critical temperature and critical pressure.
- Write down two characteristics of plasma.
- How is Caustic Soda obtained in Nelson Cell?
- Calculate the oxidation number of Phosphorus in Na₃PO₄.
- What is pseudo first order reaction? Give one example.
- What is activated complex?

3. Write short answers to any EIGHT (8) questions.

(2x8 = 16)

- How evaporation causes cooling?
- Why ethane (C₂H₆) is a gas whereas hexane (C₆H₁₄) is liquid?
- Define polymorphism. Give an example.
- What is unit cell? Give its dimensions.
- Write down two properties of positive rays.
- Calculate mass of electron from its charge and $\frac{e}{m}$ values.
- Give electronic configuration of (a) ₂₄Cr (b) ₂₀Ca
- What is atomic emission spectrum?
- Write down the Le-Chatelier's Principle.
- Define common ion effect. Give an example.

(Turn Over)

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- How buffer solutions are prepared?
- Derive K_c units for the reaction: N₂ + 3H₂ ⇌ 2NH₃

4. Write short answers to any SIX (6) questions.

(2x6 = 12)

- Dipole moment of CO₂ is zero but SO₂ is 1.61 D. Why?
- Give difference between lone pair and bond pair of electron with example.
- CO₂ is nonpolar whereas H₂O is a polar molecule. Why?
- Why NH₃ is pyramidal molecule.
- Differentiate between Internal Energy change and Enthalpy change.
- Define state and state function.
- What is water of crystallization? Give one example.
- What are ideal solutions? Give one example.
- What are Azeotropic mixtures?

SECTION – II

- (a) 10.0 g of H₃PO₄ has been dissolved in excess of water to dissociate it completely into ions. Calculate the number of molecules of H₃PO₄ in 10.0 g of H₃PO₄. Also calculate the number of positive and negative ions in case of complete dissociation. (4)
(b) Write down four applications of Dalton's law of partial pressure. (4)
- (a) What are molecular solids? Write down any three properties of Molecular solids. (4)
(b) Define orbital Hybridization. Explain sp³ Hybridization with one example. (4)
- (a) Discuss in detail Azimuthal Quantum Number. (4)
(b) Describe how the enthalpy of combustion of a substance is measured by bomb calorimeter. (4)
- (a) Define order of reaction. Discuss in detail first order reaction. (4)
(b) What is the percentage of ionization of acetic acid in a solution in which 0.1 mole of it has been dissolved per dm³ of solution? (4)
- (a) Write down measurement of boiling point elevation by Landsberger's method. (4)
(b) Explain fuel cell in detail with diagram. (4)

Roll No. of Candidate : _____

CHEMISTRY		Intermediate Part-I (11 th) (1 st A 325-I)		Paper: I	Second Group
Time: 20 Minutes		OBJECTIVE Code: 6482		Marks: 17	
Q. No.	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 the relevant question number. Use marker or pen to fill in the circles. Cutting or filling of two or more circles will result zero mark in that question.				
1					
S. #	Questions	A	B	C	D
1	The mass of one mole of electrons is	1.008 mg	0.55 mg	0.184 mg	1.673 mg
2	One mole of SO ₂ contains	6.02×10^{23} atoms of Oxygen	18.1×10^{23} molecules of SO ₂	6.02×10^{23} atoms of Sulphur	4 gram atoms of SO ₂
3	The most common laboratory example of solvent extraction is	Benzene extraction	Hexane extraction	Ether extraction	Water extraction
4	The critical temperature of Ammonia is	– 118.75 K	400 K	200 K	405.6 K
5	Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at 0°C	546°C	200°C	546 K	273 K
6	The molar heat of vapourization of water is	20.6 KJ/mol	30.6 KJ/mol	40.6 KJ/mol	50.6 KJ/mol
7	When water freezes at 0°C its density decreases due to	Cubic structure of ice	Empty spaces present in the structure of ice	Change of bond length	Change of bond angles
8	Splitting of spectral lines when atoms are subjected to a strong electric field is called	Zeeman effect	Stark effect	Photoelectric effect	Compton effect
9	When 6d orbital is complete, the entering electron goes in to	7 f	7 s	7 p	7 d
10	The number of bonds in Nitrogen molecule is	One σ One π	One σ Two π	Three sigma only	Two σ One π
11	Which has Zero dipole moment	NH ₃	CHCl ₃	H ₂ O	BF ₃
12	Calorie is equivalent to	0.4184 J	41.84 J	4.184 J	418.4 J
13	The pH of 10 ⁻³ moles dm ⁻³ of an aqueous solution of H ₂ SO ₄ is	3.0	2.7	2.0	1.5
14	The solubility product of AgCl is 2×10^{-10} mol ² dm ⁶ . The maximum concentration of Ag ⁺ ions in the solution is	2.0×10^{-10} mol dm ⁻³	1.41×10^{-5} mol dm ⁻³	1.0×10^{-10} mol dm ⁻³	4.0×10^{-20} mol dm ⁻³
15	Stronger the oxidizing agent, greater is the	Reduction potential	Oxidation potential	Redox potential	E.M.F of the cell
16	Molarity of pure water is	55.5	1	18	6
17	In zero order reaction, the rate is independent of	Concentration of reactants	Temperature	Concentration of products	None of these

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SECTION – I

2. Write short answers to any EIGHT (8) questions.

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- What conditions are assumed during stoichiometric calculations?
- Justify the statement that 23 g of Sodium and 238 g of Uranium have equal number of atoms in them.
- Define molar volume. Write down one example.
- State distribution law.
- Write down uses of chromatography.
- What is absolute zero?
- Derive value and unit of 'R' in SI system.
- What is Dalton's Law of Partial Pressures?
- How is Copper purified by electrolytic cell?
- What is standard Hydrogen electrode?
- Differentiate between instantaneous rate and average rate of reaction.
- What is first order reaction? Write down one example.

3. Write short answers to any EIGHT (8) questions.

(2x8 = 16)

- Why Fluorine is a gas and Iodine is solid?
- Earthenware Vessels keep water cool. Justify.
- Differentiate between amorphous and crystalline solids.
- Define symmetry. What are symmetry elements?
- Write down two properties of cathode rays.
- What is atomic absorption spectrum?
- Differentiate between frequency and wave number.
- State Hund's Rule.
- Calculate pH of 10^{-4} mol.dm⁻³ of Ba(OH)₂
- The solubility of glucose in water is increased by increasing the temperature. Write down reason.

(Turn Over)

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- A mixture of NH₄OH and NH₄Cl give basic buffer. Justify it.
- How the K_c predicts the direction of reaction?

(2x6 = 12)

4. Write short answers to any SIX (6) questions.

- Why Oxygen molecule is paramagnetic in nature?
- Differentiate between a sigma bond and pi bond.
- Bond angle in water is 104.5° instead of 109.5°. Write down reason.
- Differentiate between coordinate covalent bond and covalent bond.
- Define heat and work.
- Define spontaneous reaction.
- Define molarity. Write down its formula and unit.
- What is cryoscopic constant? Write down one example.
- Write down any two properties of ideal solution.

SECTION – II

- (a) A well-known ideal gas is enclosed in a container having volume 500cm³ at STP. Its mass comes out to be 0.72g. What is the molar mass of this gas? **(4)**
(b) Write down graphical explanation of Boyle's Law. **(4)**
- (a) What are ionic solids? Write down any six properties of ionic solids. **(4)**
(b) Draw MOT diagrams of O₂ and N₂ molecules. **(4)**
- (a) Derive the equation for the radius of nth orbital of Hydrogen atom using Bohr's Model. **(4)**
(b) Draw a complete, fully labelled Born-Haber cycle for the formation of Sodium Chloride (NaCl). **(4)**
- (a) How the nature of reactants and concentration of reactants affect the rate of reaction. **(4)**
(b) Ca(OH)₂ is sparingly soluble compound. Its solubility product is 6.5×10^{-6} . Calculate the solubility of Ca(OH)₂. **(4)**
- (a) Define the following with one example of each: **(4)**
 - A concentrated solution
 - A consolute temperature
 - Conjugate solution
 - Heat of hydration
- (b) Define electrode potential. Write down measurement of electrode potential of Copper. **(4)**