

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025  
(First Semester)

Branch - CHEMISTRY

GENERAL CHEMISTRY - I

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10  $\times$  1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Heisenberg's uncertainty principle relates: (a) Mass & energy (b) Position & momentum (c) Charge & spin (d) Frequency & velocity	K1	CO1
	2	Mulliken's scale of electronegativity uses _____ (a) Ionization energy + electron affinity (b) Bond energy (c) Atomic radius (d) Shielding effect	K2	CO1
2	3	Shape of $\text{PCl}_5$ molecule according to VSEPR theory is: (a) Square planar (b) Trigonal planar (c) Trigonal bipyramidal (d) Octahedral	K1	CO2
	4	The strongest hydrogen bonding occurs in: (a) HF (b) $\text{H}_2\text{O}$ (c) $\text{NH}_3$ (d) $\text{CH}_4$	K2	CO2
3	5	A covalent bond is formed due to: (a) Transfer of electrons (b) Complete loss of electrons (c) Sharing of electrons (d) Attraction between nucleus and nucleus	K1	CO3
	6	Which of the following molecules does not exist according to MO theory? (a) $\text{H}_2$ (b) $\text{He}_2$ (c) $\text{Li}_2$ (d) $\text{N}_2$	K2	CO3
4	7	Boyle's law can be derived from kinetic theory by assuming: (a) Constant temperature (b) Constant pressure (c) Constant volume (d) Constant molecular mass	K1	CO4
	8	Viscosity of a gas _____ with increase in temperature. (a) Decreases (b) Remains constant (c) Increases (d) First increases then decreases	K2	CO4
5	9	Delocalization of $\pi$ -electrons leading to stability is called: (a) Resonance (b) Hyperconjugation (c) Electromeric effect (d) Steric hindrance	K1	CO5
	10	Which of the following is an electrophile? (a) $\text{OH}^-$ (b) $\text{NH}_3$ (c) $\text{BF}_3$ (d) $\text{CN}^-$	K2	CO5

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**SECTION - B (35 Marks)**

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Derive De Broglie equation.  (OR)	K1	CO1
	11.b.	State and explain Hund's rule and Pauli's exclusion principle.		
	12.a.	Describe Fajan's rules. Explain with examples the factors that increase covalent character in ionic compounds.  (OR)		CO2
2	12.b.	Define hydrogen bonding. Differentiate intermolecular and intramolecular hydrogen bonding with examples.	K1	
	13.a.	Write the postulates of VB theory. Explain the theory by taking one example.  (OR)	CO3	
	13.b.	Prove that according to MOT bond order of CO molecule is 3.		
4	14.a.	Derive Boyle's and Charles's law and compare the laws.  (OR)	K4	CO4
	14.b.	Explain the postulates of Kinetic Theory of Gases.		
	15.a.	Analyze the formation, structure and stability of carbocation.  (OR)		CO5
5	15.b.	Compare inductive effect and electromeric effect.	K4	

**SECTION - C (30 Marks)**

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe in detail the trends of atomic radius, ionization energy, electron affinity, and electronegativity in a group. Give suitable examples.	K1	CO1
2	17	What is lattice energy? Write the Born-Haber cycle for NaCl and explain its applications.	K1	CO2
3	18	Construct a MO diagram for NO and N <sub>2</sub> molecules and calculate bond order.	K3	CO3
4	19	(a) Illustrate Maxwell Boltzmann distribution laws of molecular velocities (b) Explain the effect of temperature on distribution of molecular velocities.	K4	CO4
5	20	Apply the hybridization principle to ascertain the structure of methane, Ethylene and acetylene.	K4	CO5