

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 × 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 PCl <sub>5</sub> 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) H <sub>2</sub> O (c) NH <sub>3</sub> (d) CH <sub>4</sub>	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) H <sub>2</sub> (b) He <sub>2</sub> (c) Li <sub>2</sub> (d) N <sub>2</sub>	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) OH <sup>-</sup> (b) NH <sub>3</sub> (c) BF <sub>3</sub> (d) CN <sup>-</sup>	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.	K1	CO1
		(OR)		
	11.b.	State and explain Hund's rule and Pauli's exclusion principle.		
2	12.a.	Describe Fajan's rules. Explain with examples the factors that increase covalent character in ionic compounds.	K1	CO2
		(OR)		
	12.b.	Define hydrogen bonding. Differentiate intermolecular and intramolecular hydrogen bonding with examples.		
3	13.a.	Write the postulates of VB theory. Explain the theory by taking one example.	K4	CO3
		(OR)		
	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.	K4	CO4
		(OR)		
	14.b.	Explain the postulates of Kinetic Theory of Gases.		
5	15.a.	Analyze the formation, structure and stability of carbocation.	K4	CO5
		(OR)		
	15.b.	Compare inductive effect and electromeric effect.		

**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