22CHU101N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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 x 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	What is the correct order of orbitals in which electrons are filled? a) 4s, 3d, 4p, 5s, 4d b) 3d, 4s, 4p, 4d, 5s c) 3d, 4p, 4s, 4d, 5s d) 5s, 4p, 3d, 4d, 5s	K1	CO1
	2	The electronegativity of the following elements increases in the order a) C < N < Si < P b) Si < P < C < N c) N < C < P < Si d) C < Si < N < P	K2	CO1
2	3	$AlCl_3$ is covalent while AlF_3 is ionic. This can be justified on the basis of a) the VB theory b) Fajans' rules c) the MO theory d) hydration energy	K1	CO2
	4	The density of water is greater than that of ice because of a) dipole-dipole interaction b) hydrogen bonding c) dipole–induced dipole interaction d) covalent bond formation	K2	CO2
3	5	What's the bond order of Oxygen? a) 3 b) 2 c) 1 d) 0	K1	CO3
	6	The axial overlap between the two orbitals leads to the formation of a_____ a) sigma bond b) pi bond c) multiple bond d) dative bond	K2	CO3
4	7	The energy of an ideal gas depends only on its a) volume b) pressure c) temperature d) number of moles	K1	CO4
	8	The average velocity of a ideal gaseous molecule at 27°C is 0.4 ms^{-1}. The mean velocity at 927 °C is a) 0.4 ms^{-1} b) 0.8 ms^{-1} c) 1.2 ms^{-1} d) 1.6 ms^{-1}	K2	CO4
5	9	Which of the following are nucleophiles? a) BF_3 b) Cl_2C: c) NR_4^+ d) I^-	K1	CO5
	10	The correct order of carbocation regarding the stability is a) 3°> 2°> 1° b) 3°< 2°< 1° c) 2°> 1°> 3° d) 2°<3°< 1°	K2	CO5

SECTION - B (35 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 x 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Discuss in detail about the de Broglie equation.	K2	CO1
		(OR)		
	11.b.	Explain the Pauli's exclusion principle and Aufbau principle.		
2	12.a.	List out the Radius ratio rule and its limitation.	K4	CO2
		(OR)		
	12.b.	Inference the Hydrogen bonding and Vander waal's attraction.		

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3	13.a.	Develop the correlation of bond energies and bond length in VB theory.	K3	CO3
		(OR)		
	13.b.	Organize the application of MO theory.		
4	14.a.	Distinguish between average, most probable and root mean square velocity.	K4	CO4
		(OR)		
	14.b.	Analyze the principle of equipartition of energy and its application in estimating the total energy of given gaseous molecules.		
5	15.a.	Construct the Hybridization and geometry of acetylene.	K3	CO5
		(OR)		
	15.b.	Experiment with the Resonance and hyperconjugation effect.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 x 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Examine the Bohr and sommerfeld model of atom.	K4	CO1
2	17	Inspect the lattice energy with Born haber cycle.	K4	CO2
3	18	Discover the MO diagram of O_2 and NO.	K4	CO3
4	19	Compare the derivation of Boyle law, Charles law, Avogadro's law and prefect gas equation using kinetic gas equation.	K4	CO4
5	20	Analyze the reactive intermediates of carbocation, carbanions, free radical and carbenes with suitable examples.	K4	CO5

Z-Z-Z END