

**PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION MAY 2025  
(Second Semester)**

Branch - **CHEMISTRY**

**GENERAL CHEMISTRY - II**

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	Why do Lithium (Li) and Magnesium (Mg) exhibit a diagonal relationship in the periodic table? a) They have similar ionic radii and charge densities. b) They are in the same group. c) They have similar electronegativity. d) They are both transition metals.	K1	CO1
	2	Which of the following is the lightest noble gas? a) Neon      b) Krypton      c) Helium      d) Xenon	K2	CO1
2	3	What is the purpose of refining in metallurgy? a) To remove impurities from ore b) To obtain concentrated ore c) To produce an alloy d) To purify the extracted metal	K1	CO2
	4	Which of the following refining techniques is suitable for metals with high melting points, such as titanium and zirconium? a) Zone refining      b) Van Arkel method c) Electrolytic refining      d) Mond process	K2	CO2
3	5	Which of the following is not a consequence of the First Law of Thermodynamics? a) Energy can be destroyed in certain chemical reactions b) Heat energy can be converted into work c) The total energy in the universe remains constant d) Work can increase the internal energy of a system	K1	CO3
	6	The Joule-Thomson effect occurs during which type of process? a) Isothermal process      b) Adiabatic process c) Isochoric process      d) Isobaric process	K2	CO3
4	7	Markovnikov's rule predicts that during the addition of HBr to propene, the bromine atom will attach to which carbon? a) The carbon with more hydrogen atoms b) The carbon with fewer hydrogen atoms c) The carbon at the end of the chain d) The carbon at the center of the chain	K1	CO4
	8	Which of the following is true according to Saytzeff's rule? a) The major product is always the least substituted alkene b) The product distribution is independent of the base used c) Elimination occurs preferentially from a primary carbon d) The major product is the most substituted and most stable alkene	K2	CO4
5	9	According to Hückel's rule, a compound is aromatic if it contains: a) $(4n + 2)$ $\pi$ -electrons      b) $4n$ $\pi$ -electrons c) Only single bonds      d) Only $sp^3$ hybridized carbons	K1	CO5
	10	Which of the following is a necessary catalyst in Friedel-Crafts acylation? a) $H_2SO_4$ b) $FeCl_3$ c) $AlCl_3$ d) $NaOH$	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.	Interpret the diagonal relationship between lithium and magnesium.	K3	CO1
		(OR)		
	11.b.	Describe the separation of inert gases from dry air.		
2	12.a.	Explain the van Arkel process of refining of a metal.	K3	CO2
		(OR)		
	12.b.	Illustrate the zone refining process.		
3	13.a.	Briefly explain the concept of heat and work.	K4	CO3
		(OR)		
	13.b.	Differentiate the state and path functions.		
4	14.a.	Derive the general mechanism of electrophilic addition reaction in alkenes.	K4	CO4
		(OR)		
	14.b.	Critique the acidity of alkynes.		
5	15.a.	Elaborate the molecular orbital structure of benzene.	K5	CO5
		(OR)		
	15.b.	Classify following as aromatic, Non – aromatic or anti aromatic. Give explanation (i)  (ii)  (iii) 		

**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	Examine the anomalous behavior of 'Be'	K4	CO1
2	17	Explain the occurrence and extraction of Ti from its ore.	K4	CO2
3	18	(i) Derive the relationship between $C_p$ and $C_v$ . (6) (ii) Distinguish between intensive and extensive properties. (4)	K5	CO3
4	19	Criticize the following reactions of alkenes (4 × 2.5 = 10) (i) Hydroboration (ii) Epoxidation (iii) Hydroxylation (iv) Diels – Alder reaction	K4	CO4
5	20	Derive the mechanism of following reactions. (5+5) (i) Nitration of benzene (ii) Sulphonation of benzene	K5	CO5