

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(Sixth Semester)

Branch -CHEMISTRY

INORGANIC 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	Which of the following element is NOT a lanthanide? (i) Cerium (ii) Europium (iii) Lutetium (iv) Uranium	K1	CO1
	2	Lanthanide ions show colour mainly due to (i) d-d transitions (ii) f-f transitions (iii) charge transfer transitions (iv) s-p transitions	K2	CO1
2	3	The place of Actinides in the periodic table is (i) Period 6 (ii) Period 7 (iii) Period 4 (iv) Period 5	K1	CO2
	4	Actinide contraction is mainly due to (i) Increase in atomic mass (ii) Increase in nuclear charge only (iii) Poor shielding effect of 5f electrons (iv) High electronegativity	K2	CO2
3	5	In the Geiger-Muller counter, the intensity of radiation is indicated by (i) Leaf deflection (ii) Visible tracks in vapor (iii) Audible clicks or count rate (iv) Temperature rise	K1	CO3
	6	If a radioactive nucleus emits a beta particle, its atomic number (i) Increases by 2 (ii) Decreases by 1 (iii) Increases by 1 (iv) Remains the same	K2	CO3
4	7	Which instrument is used to identify isotopes by their mass? (i) Barometer (ii) Aston's mass spectrograph (iii) Geiger-Muller counter (iv) Electroscop	K1	CO4
	8	Isobars are nuclei with the same _____ (i) Mass number (ii) Atomic number (iii) Number of neutrons (iv) Number of electrons	K2	CO4
5	9	Which of the following hydrides is covalent? (i) LiH (ii) NaBH ₄ (iii) MgH ₂ (iv) CaH ₂	K1	CO5
	10	Boron nitride (BN) is an example of _____ (i) Ionic nitride (ii) Interstitial nitride (iii) Metallic nitride (iv) Covalent nitride	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.	Explain the phenomenon of lanthanide contraction.	K2	CO1
		(OR)		
	11.b.	Describe the extraction of lanthanides from monazite sand.		
2	12.a.	Outline the differences between Lanthanides and Actinides.	K2	CO1
		(OR)		
	12.b.	Summarize the preparation of transuranic elements.		
3	13.a.	Explain the properties of alpha, beta, and gamma rays and give one application of each.	K3	CO2
		(OR)		
	13.b.	Describe the law of radioactive decay, half-life, average life with one example.		
4	14.a.	Represent isotopes of hydrogen and calculate average atomic mass of chlorine given isotopic abundances.	K3	CO2
		(OR)		
	14.b.	Explain the thermal diffusion method for the separation of isotopes.		
5	15.a.	For the following industrial applications, identify the type of carbide, give one example, and explain why it is suitable for (i) Producing acetylene gas when reacted with water. (ii) Making extremely hard cutting tools. (iii) Acting as a reducing agent in metallurgical processes.	K3	CO3
		(OR)		
	15.b.	Design a laboratory setup to prepare lithium nitride safely on a small scale. Explain the uses of lithium nitride.		

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	Discuss the following properties of lanthanides (i) Position in the periodic table (ii) General characteristics (iii) Magnetic properties (iv) Formation of complexes (v) Oxidation states and their stability	K2	CO1
2	17	Describe the extraction, properties and uses of thorium.	K2	CO1
3	18	Construct the working principles of electroscope and Wilson's cloud chamber methods for the detection and measurements of radioactivity.	K3	CO2
4	19	Identify isotopes using Dempster's mass spectrograph and explain the working principle.	K3	CO2
5	20	Compare LiAlH_4 and NaBH_4 in structure, properties, and reducing ability. Which is better for reducing a carbonyl compound and why?	K4	CO3

Z-Z-Z END