

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(Third Semester)

Branch – PHYSICS

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	Recall the shape of XeF ₂ according to VSEPR theory is (i) Linear (ii) Trigonal planar (iii) T-shaped (iv) Square planar	K1	CO1
	2	The EAN of [Mn(CO) ₅ Br] is _____ (i) 34 (ii) 36 (iii) 32 (iv) 18	K2	CO1
2	3	Coniine belongs to which class of alkaloids? (i) Tropane alkaloid (ii) Pyridine alkaloid (iii) Piperidine alkaloid (iv) Indole alkaloid	K1	CO2
	4	Acid dyes are effective on wool because _____ (i) Wool contains cellulose groups (ii) Wool contains basic amino groups (iii) Acid dyes are insoluble in water (iv) Wool is synthetic fibre	K2	CO2
3	5	Identify the number of atoms present per unit cell in a body-centered cubic (BCC) crystal is (i) 1 (ii) 2 (iii) 3 (iv) 4	K1	CO3
	6	Why is diamond hard while graphite is soft? (i) Diamond has weak bonds; graphite has strong bonds (ii) Diamond has a 3D tetrahedral network; graphite has layers held by weak forces (iii) Both have 3D tetrahedral networks (iv) Both have weak van der Waals forces	K2	CO3
4	7	The rate of a chemical reaction is defined as _____ (i) The time taken for a reaction to complete (ii) The change in concentration of reactants or products per unit time (iii) The proportionality constant in a rate law (iv) The number of molecules involved in a reaction	K1	CO4
	8	Find out the use of Gold number to measure (i) Stability of sols (ii) Rate of reaction (iii) Concentration of ions (iv) Optical activity of colloids	K2	CO4
5	9	Which of the following is a characteristic of a catalytic reaction? (i) Catalyst gets consumed permanently (ii) Increases activation energy (iii) Lowers activation energy and speeds up reaction (iv) Shifts equilibrium permanently	K1	CO5
	10	According to the Stark-Einstein law, one molecule of a substance is activated by (i) One photon of light (ii) Two photons of light (iii) Any number of photons (iv) No photon required	K2	CO5

Cont...

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 Werner's theory of coordination	K2	CO1
		(OR)		
	11.b.	Illustrate the preparation properties structures and uses of IF7		
2	12.a.	Discuss the isolation and uses of nicotine and piperine	K2	CO2
		(OR)		
	12.b.	State the isoprene rule. Classify terpenoids based on the number of isoprene units and explain the isolation and uses of menthol and camphor.		
3	13.a.	Explain the elements of symmetry in crystals: plane, center and axis of symmetry with suitable diagrams	K3	CO3
		(OR)		
	13.b.	A plane cuts the axes at 2a, 3b and 4c. Determine its Weiss indices and Miller indices. Briefly analyze its orientation in the cube and effect on crystal faces		
4	14.a.	Describe the differences between order and molecularity of a chemical reaction. Provide examples to illustrate each.	K3	CO4
		(OR)		
	14.b.	Explain the preparation, purification and properties of sols. Discuss how their stability is maintained, giving one example of a protective colloid		
5	15.a.	Illustrate the difference between positive catalysis, autocatalysis, and negative catalysis with suitable examples	K3	CO5
		(OR)		
	15.b.	Define quantum yield. Explain primary and secondary photochemical processes and give one example for each		

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	Demonstrate the shapes of PCl_5 and SF_6 through VSEPR theory.	K2	CO1
2	17	Describe the preparation, properties and uses of Polyester, Teflon, and PVC.	K2	CO2
3	18	Analyze the structure of NaCl and CsCl .	K3	CO3
4	19	Derive the half-life expressions for first- and second-order reactions, explain how the rate constant may deviate, and describe one method to determine the reaction order with an example.	K3	CO4
5	20	Discuss the mechanism of enzyme catalysis. Include the role of promoters, inhibitors, and catalytic sites in your answer with a suitable reaction example.	K4	Co5

Z-Z-Z

END