

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

**BSc DEGREE EXAMINATION MAY 2026
(Fourth Semester)**

Branch- **CHEMISTRY**

GENERAL CHEMISTRY - IV

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Question No.	Question	K Level	CO
1	The unit cell parameter $a = b = c$ and $\alpha = \beta = \gamma = 90^\circ$ represents _____ crystal system. a) cubic b) orthorhombic c) triclinic d) monoclinic	K1	CO1
2	What is the coordination number for an atom in bcc unit cell? a) 10 b) 12 c) 8 d) 6	K2	CO1
3	Which one is most acidic among the following? a) 2,4-dinitrophenol b) 2,4,6-trinitrophenol c) <i>o</i> -nitrophenol d) <i>p</i> -nitrophenol	K1	CO2
4	Identify the reagent used to synthesize Diazonium chloride from amines. a) Sn/HCl b) NaNO ₂ /HCl c) CaCl ₂ /HCl d) Cu/HCl	K2	CO2
5	A pair of stereoisomers which are not mirror image of each other are called _____. a) Enantiomers b) Diastereomers c) Metamers d) Recemates	K1	CO3
6	Geometrical isomers are _____. a) Enantiomers b) Diastereomers c) Metamers d) Anomers	K2	CO3
7	The Freundlich adsorption isotherm relates adsorption and _____. a) Pressure b) Temperature c) Nature of adsorbent d) Nature of adsorbate	K1	CO4
8	The process of removal of adsorbed species from the surface is called _____. a) adsorption b) absorption c) desorption d) diffusion	K2	CO4
9	Identify the non-combustible gas among the following. a) ethane b) carbon monoxide c) nitrogen d) acetylene	K1	CO5
10	Which one of the following has high calorific value? a) carbon dioxide b) coal c) petrol d) LPG	K2	CO5

Cont...

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

Question No.	Question	K Level	CO
11.a.	How are miller indices (hkl) of a plane determined? Draw (110), (111) and (210) planes of a cubic unit cell.	K2	CO1
	(OR)		
11.b.	Derive Bragg's equation.		
12.a.	i. Write the preparation of amines by Hoffmann method and Gabriel phthalimide method. ii. Discuss the reaction and mechanism of reductive amination.	K3	CO2
	(OR)		
12.b.	i. The pK_b values of p-nitroaniline and m-nitroaniline are 13 and 11.5 respectively. Which is a weaker base and why? ii. How will you obtain 1. p-Dinitrobenzene from nitrobenzene. 2. Benzoic acid from benzene diazonium chloride 3. p-Hydroxy azobenzene from aniline		
13.a.	i. Illustrate the method of preparation of Racemic mixture. ii. What is resolution? Discuss any two methods.	K3	CO3
	(OR)		
13.b.	i. Define geometrical isomerism with example. ii. Why <i>meso</i> compounds are optically inactive?		
14.a.	i. Differentiate Chemisorption and physisorption. ii. Discuss the factors that influencing adsorption.	K4	CO4
	(OR)		
14.b.	i. List out characteristic of catalyst. ii. Explain acid-base catalysis with example.		
15.a.	Explain the method of distillation of crude petroleum.	K4	CO5
	(OR)		
15.b.	Compare the advantages and disadvantages of gaseous and liquid fuels.		

SECTION -C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks (3 × 10 = 30)

Question No.	Question	K Level	CO
16	i. Find the inter-planar distance in a crystal in which a series of planes produce a first order reflection from a copper X-ray tube ($\lambda = 1.54 \text{ \AA}$) at an angle of 22.5° . ii. Compare the unit cell structures of NaCl and CsCl.	K3	CO1
17	i. Discuss Hinsberg's method for separation of mixtures of amines. ii. Explain the mechanism of Phase transfer catalyst involved reactions.	K4	CO2
18	i. Analyze the stereochemistry Allenes and Biphenyl. ii. Design asymmetric synthesis with optically active reagent.	K4	CO3
19	i. Explain Langmuir theory of adsorption. ii. Derive Michaelis Menten equation for enzyme catalysis.	K3	CO4
20	Illustrate the manufacturing of Water gas and Oil gas.	K3	CO5

Z-Z-Z END