



Reg. No.:

Name:

University of Kerala

First Semester FYUGP Degree Examination, December 2025

Discipline Specific Core Course

CHEMISTRY

UK1DSCCHE102 - CHEMICAL FRONTIERS – BONDING TO ENVIRONMENTAL PERSPECTIVES

Academic Level: 100-199

2025-Admission onwards

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark
Each.Answer all questions

Qn No.	Question	CL	CO
1	Name the quantum number that determines the orientation of orbitals in three-dimensional space.	RE	1
2 is the energy released when one mole of an ionic compound is formed from its gaseous ions.	RE	2
3	The maximum number of electrons in p_x orbital is	UN	1
4	Write an example for a triatomic molecule with zero dipole moment.	UN	2
5	Give an example of antitumor drug.	UN	3
6	Mention a primary pollutant responsible for acid rain.	UN	4

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Explain why two electrons in the same orbital must have opposite spins.	UN	1
8	Examine the bonding in ethylene and determine its geometry.	UN	2
9	Identify the medicinal uses of arsenic containing organometallic compounds.	AP	3
10	Illustrate the effect of CFCs emitted from household appliances on the ozone layer.	AP	4

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A)	AP	1, 1

Qn No.	Question	CL	CO
	<p>Using examples from the periodic table, explain the periodic trends in the properties, ionization energy and electron affinity. Predict and justify how these properties change across a period and down a group.</p> <p>OR</p> <p>B)</p> <p>a. Predict the block of an element from its electronic configuration with suitable examples.</p> <p>b. Describe two general properties each of representative and transition elements based on their outer electronic configuration.</p>		
12	<p>A)</p> <p>Analyze the hybridization and geometry of XeF_2, IF_7, and SF_6. Compare how the number of bonding and lone pairs on the central atom affects the molecular shape, bond angles and type of hybridization in each molecule.</p> <p>OR</p> <p>B)</p> <p>Analyze the effects of both intramolecular and intermolecular hydrogen bonding on the physical properties of compounds, focusing on boiling point, solubility and volatility with specific examples to illustrate your points.</p>	AN	2, 2
13	<p>A)</p> <p>Assess the role of organometallic compounds across different applications.</p> <p>OR</p> <p>B)</p> <p>Compare and evaluate organometallic compounds of magnesium and lithium based on their synthesis and chemical reactivity.</p>	EV	3, 3
14	<p>A)</p> <p>Design a wastewater treatment plan for an industrial area. Include the causes of water pollution and explain how methods like activated charcoal and reverse osmosis can purify the water.</p> <p>OR</p> <p>B)</p> <p>Draw and analyze the titration curves for (i) a strong acid with strong base, (ii) a strong acid with weak base, and (iii) a weak acid with strong base. Explain the changes in pH at different stages and the position of the equivalence point in each case.</p>	CR	4, 4