

Reg. No.:



Name:

University of Kerala

W7562

First Semester FYUGP Degree Examination, December 2025

Discipline Specific Core Course

CHEMISTRY

UK1DSCCHE101 - FUNDAMENTALS OF CHEMISTRY I

Academic Level: 100-199

2025-Admission

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	Interpret the influence of temperature on molality.	RE	4
2	State first law of thermodynamics.	RE	3
3	Give an example of redox reaction.	UN	4
4	Identify the quantum number that describes the shape of an orbital	UN	1
5	Write the expression for work done in isothermal irreversible process.	UN	3
6	Among BH_3 and NH_3 , identify the molecule that has the greater dipole moment.	UN	2

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	Give an example of primary standard. Discuss the qualities which a primary standard must have.	UN	4
8	Define enthalpy of neutralization with example.	UN	3
9	Arrange the following bonds in order of increasing ionic character: H-Cl , H-F , H-I . Justify.	AP	2
10	Write the electronic configuration of copper. Justify your answer.	AP	1

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
	Demonstrate, with appropriate sketches, the distinct shapes of s, p, and d orbitals. Identify the quantum number that signifies orbital shape and describe its role. OR B) Define ionisation energy and outline its periodic trends. Give a brief explanation for the higher first ionisation energy of nitrogen compared to carbon and oxygen.		
12	A) Using NH_3, H_2O, and CO_2 as examples, analyse the limitations of the hybridisation model compared to VSEPR theory. OR B) Analyze the steps of the Born–Haber cycle to determine the lattice energy of NaCl and evaluate how lattice energy influences the stability and properties of ionic solids.	AN	2, 2
13	A) Using the Gibbs–Helmholtz equation, evaluate whether an exothermic reaction becomes more or less spontaneous as temperature increases. Give your reasoning. OR B) Evaluate the enthalpy of formation of methane (CH_4) using the following data: Enthalpy of combustion of carbon = -393.5 kJ/mol Enthalpy of combustion of hydrogen = -285.8 kJ/mol Enthalpy of combustion of methane = -890.3 kJ/mol	EV	3, 3
14	A) Using the concepts of common ion effect and solubility product, design a systematic method for separating a given mixture of group III and group IV cations in qualitative analysis, and justify based on the underlying principles. OR B) Using the theories of acid–base indicators, create your own way of showing which indicators are suitable for different types of acid–base titrations.	CR	4, 4