



U7494

Reg. No.:

Name:.....



University of Kerala
First Semester Degree Examination, November 2024
Four Year Under Graduate Programme
Discipline Specific Core Course
CHEMISTRY
UK1DSCCHE101 - FUNDAMENTALS OF CHEMISTRY I
Academic Level: 100-199

Time: 1½ Hours

Max.Marks:42

Part A.

Answer All Questions, Objective Type. 1 Mark Each.
(Cognitive Level: Remember/Understand)
6 Marks. Time: 6 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
1.	What quantum number indicates the shape of an orbital?	Remember	CO-1
2.	Calculate the bond order of O_2^+ .	Remember	CO-2,3
3.	State second law of thermodynamics?	Understand	CO-4
4.	Name an internal redox indicator	Understand	CO-5,6
5.	What is the molecular geometry for ammonia?	Understand	CO-2,3
6.	What is entropy?	Understand	CO-4

Part B.

Answer All Questions, Short Answer. 2 Marks Each.
(Cognitive Level: Understand/Apply)
8 Marks. Time: 24 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
7.	Explain Hund's rule with an example.	Understand	CO-1
8.	Give explanations for the observed bond angle in water?	Understand	CO-2,3
9.	Calculate the bond energy for H-Cl bond. Given that the enthalpies of formation of HCl(g), H(g) and Cl(g) are -92.2 kJmol^{-1} , 217 kJmol^{-1} and 121.4 kJmol^{-1} .	Apply	CO-4
10.	25 ml H_2SO_4 solution required 48.75 ml of 0.02 M NaOH for complete titration. Calculate the molarity of H_2SO_4 .	Apply	CO-5,6

Part C.

**Answer all 4 Questions, choosing among options within each question.
Long Answer. 7 marks each. (Cognitive Level: Understand/Apply/Analyze)
28 Marks. Time: 60 Minutes**

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
11.	a. Write the electronic configuration of copper (Z=29). Explain the rules you followed for it. OR b. Discuss the significance of quantum numbers and write the n, l and m values of 3s electrons.	Understand	CO-1
12.	a. Predict the geometry and shape of ethane, ethene and ethyne molecules from the type of hybridization? OR b. Apply Born-Haber cycle, for the calculation of lattice energy of MgCl_2 . Give the significance of lattice energy in solids.	Apply	CO-2,3
13.	a. How can you correlate molar heat capacities with ΔU and ΔH ? Discuss about the significance of Kirchoff's equation. OR b. i. Predict the feasibility of a process using different thermodynamic conditions. (3 marks) ii. Enthalpy and entropy changes of a reaction are $40.63 \text{ kJ mol}^{-1}$ and $108.8 \text{ JK}^{-1} \text{ mol}^{-1}$ respectively. Predict the feasibility of the reaction at 27°C . (4 marks)	Apply	CO-4
14.	a. What are acid-base indicators? Discuss and analyse their use in the titration curves for the titration of i) a strong acid with a strong base ii) a weak acid with a strong base iii) a strong acid with a weak base OR b. Analyze the role of the common ion effect in the precipitation reactions during inorganic qualitative analysis and evaluate its impact on the solubility of salts and the separation of cations in a solution.	Analyze	CO-5,6