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Odd Semester Examination-2024

Paper Name: Chemistry

Time: 2.5 hours

Note: Use of calculator is allowed.

Paper Code: BTCSE 101

Maximum Marks: 60

Section A (Attempt all)

Q. No.	Questions	Marks	CO	BL
1	Define internal energy of a system, Entropy and second law of thermodynamics.	5	3	2
2	Define effective nuclear charge and shielding effect.	5	4	1
3	Discuss how the radius of cation differs from its parent neutral atom.	5	4	2
4	Discuss Cyclization and Oxidation reactions, using one example each.	5	6	4

Section B (Attempt any four)

Q. No.	Questions	Marks	CO	BL
1	Write down the mathematical expression for Schrodinger's equation in spherical coordinate system and explain the different terms involved in it. Also draw Radial Distribution Curves for 3s and 3p orbital electrons.	10	1	3
2	Discuss in detail the ionisation energy, factors affecting the ionisation energy and the order of first, second and third ionisation energy.	10	4	4
3	Discuss different types of structural isomerism with an example.	10	5	1
4	Using the Nernst Equation, calculate the emf of the cell. $\text{Zn} \text{Zn}^{2+} (0.001\text{M}) \text{Ag}^+ (0.1\text{M}) \text{Ag}$ Standard potential of Ag/Ag^+ half-cell is +0.80V and Zn/Zn^{2+} is -0.76V.	10	3	5
5	Discuss in details about the infrared (IR) spectroscopy. Also write down the applications of infrared radiations.	10	2	3
6	(a) Evaluate the CFSE and Magnetic Moment for $[\text{Mn}(\text{CN})_6]^{4-}$ complex. (b) Draw Molecular Orbital Energy-Level Diagram for the N_2 molecule.	10	1	5

BL- Bloom Taxonomy Levels (1- Remembering, 2- Understanding, 3- Applying, 4- Analysing, 5- Evaluating, 6- Creating)

CO: Course Outcomes