Government Degree College, Baramulla (Autonomous)

Term End External Examination 4th Semester (Session- July 2024)

Subject: Chemistry

Course No and Title: CHMC2422M/Chemistry-V

Time: 2.15 hours Max Marks:100 Min. Marks:40

Section A: Objective Type Questions

Q1. Choose the appropriate Answer: (8x1.5=12)

i. In the context of black body radiation, what is the relationship between temperature and peak wavelength of emitted radiation.

A They are directly proportional **B** They are inversely proportional

C They are unrelated **D** They are logarithmically related.

ii. Which of the following is true for a particle in a one dimensional box of length L.

A The wavefunction is zero at the boundaries **B** The energy levels are equally spaced.

C The particle can be found outside the box. **D** The energy levels depend on the square of the quantum number.

iii. Furan is derivative of which type of hydrocarbon

A Alkane **B** Alkenes

C Diene **D** Alkyne

iv. What happens to the reactivity of pyrrole in an electrophilic aromatic substitution reaction when compared to benzene?

A Pyrrole is less reactive than benzene **B** Pyrrole is more reactive than benzene

C Pyrrole is as reactive as benzene **D** Pyrrole does not undergo electrophilic aromatic substitution reaction

v. The term memory effect in a chemical reaction refers

A The retention of structural information during a reaction **B** The ability of a structural to remember its previous state

C The phenomenon where the rate of reaction is influenced by past condition **D** The capacity of a molecule to undergo repeated transformations.

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vi. In the context of the Baeyer-Villiger oxidation, which group shows the highest migratory aptitude?

A Aromatic ring **B** Secondary alkyl

C Primary alkyl **D** Tertiary alkyl

vii. Which metal ion plays a vital role in nerve impulse transmission?

A Sodium (Na^{+}) **B** Lithium (Li^{+})

C Zinc (Zn^{2+}) **D** Copper (Cu^{2+})

viii. In the sodium-potassium pump how many sodium ions are transported?

A One **B** Two

C Three **D** Four

Section-B: Descriptive Type Questions (Short Type)

Q2: Answer all the Questions (8 x 4 =32)

i. Why are Hermitian operators important in quantum mechanics?

ii. What are the Eigen function and Eigen values,

iii. Write down the properties on thiophenes.

iv. Discuss the role of bridged heterocyclic compounds in catalysis.

v. What factors influence migratory aptitude in reactions?

vi. What are the conditions required for Lossen rearrangement.

vii. Describe role of chelating agents in medicine.

viii. Explain the role of Zinc as cofactor in carboxypeptidase.

Section – C: Descriptive Type Questions (Medium Type)

Answer all the questions: (4 x 7=28)

Q3. Explain the Dulong-petit's law. What does it predict about the heat capacity of solids.

OR

Explain Planck's radiation law and its significance.

Q4. Write down chemical properties of Dioxane and pyridines.

OR

Describe Fischer indole synthesis and its key features.

Q5. Explain Photo-Fries rearrangement and its applications.

OR

Pinacol-Pinacolon rearrangement and its key features.

Q6. Explain the role of Myoglobin and hemocyanin.

OR

Describe the role of metal ions in the biological systems.

Section – D: Descriptive Type Questions (Long Type)

Answer any two of the following: (2 x 14=28)

Q7. Derive Schrodinger wave equation and its importance.

Q8. Describe the chemical properties, reactivity and applications of furan.

Q9. Discuss the mechanism and synthetic application of the Claisen rearrangement.

Q10. Explain oxygen transport and storage in the biological system.