Annexure "C"

Syllabus for Laboratory Assistant

Total Marks 120 **Time 2 Hours**

Part-I: 16 Marks

Stereochemistry:

Elements of symmetry, Chirality due to chiral centre, molecules with more than one Chiral centre, threo and erythron isomers optical activity in the absence of chiral carbon (biphenyls, allenes and spirans). Chirality due to helical shape. Enantiotropy and diastereotropic atoms, groups and faces. Asymmetric synthesis, stereospecific reactions. (Diels Alder reaction, anti-addition of halogens, enzyme catalyzed reactions and Rhodium complex reaction). Stereoselective synthesis of ephedrine and epiandrosterone and pheromone.

Part-II: 16 Marks

Delocalized Chemical bonding

Conjugation, Cross conjugation, rule of resonance, steric inhibition of resonance.

Aromaticity: Huckel rule and concept of aromaticity, Molecular orbital description of aromaticity and antiaromaticity, Relation between NMR and aromaticity. Annulenes (Two to more than ten-electron system), Aromaticity of hetero annulenes and fullerenes (C-60). Homoaromaticity.

Hyper conjugation: Explanation of hyper conjugative effect, isovalent and sacrificial hyper conjugations.

Tautomerism: Different types including valence tautomerism.

Part-III: 16 Marks

Reaction Mechanism/Structure and reactivity

Types of mechanisms. Types of reactions, thermodynamic and kinetic requirements, Hammond postulate, Curtrin-Hammett principle. Potential energy diagrams, transition states and intermediates. Methods of determining reaction mechanism, isotope effects. **Effect of structure on reactivity:** Resonance and field effects, steric effect, quantitative treatment. The Hammett equation and linear free energy relationship, substituent and reaction constants. Taft equation.

Part-IV: 8 Marks

Aliphatic Electrophilic substitutions

General mechanism of SE1, SE2 and Sei reactions, Mechanism of reactions involving migration of double bond. Effect of substrate, leaving group and solvent on reactivity. Strok-enamine reaction.

Part-V: 8 Marks

Aliphatic Nucleophilic substitutions

Mechanisms and stereochemical implications of SN2, SN1, SNiandneighbouring group participation (by double and single-bonds) reactions. Effect of substrate structure, attacking nucleophile, leaving group and solvent on the rates of SN1 and SN2 reactions. Mixed SN1 and SN2 reactions. Nucleophilic substitution at allylic, aliphatic trigonal and vinylic carbon.

Part -VI 8 Mark

Elimination reactions:

Discussion of E1, E2, E1cB and E2C mechanisms. Effect of substrate structure base and the leaving group on reactivity. Competition between substitution and elimination reactions, Stereochemistry and orientation of E2 elimination. Mechanism and orientation in pyrolytic eliminations, Shapiro reaction.

Part-VII 8 Marks

Aromatic Electrophilic substitution

The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The ortho/para ratio, ipso attack. Orientation of substitution in benzene rings having more than one substituents. Orientation in other ring systems. Mechanisms of diazonium coupling, Vilsmeier-Haackand Gattermann-Koch reactions and Fries rearrangements

Part-VIII:

Part- I: 8 Marks

I). Preventive conservation in terms of:

1. Light
2. Insects
3. Fungus
4. Atmosphere
5. Pollution

Part-II): 8 Marks

Curative Conservation terms of:

1. Care of stone collection.
2. Conservation of polished/unpolished wood.
3. Conservation of Animal Skin, Photographs, sketches.

Part-III). 8 Marks

How to make a condition report?

Basic things to keep in mind during conservation

General Knowledge: 16 Marks

1. What is Preventive conservation?
2. What is curative conservations?
3. What is conservation
4. What is archaeology?
5. What is archives? When was achieves established in J&K?
6. What is museum? When was SPS museum Srinagar established/Give history?
7. When was Dogra art museum Jammu established?
8. What is documentation?
9. How is Identification of Antiquities made?
10. What type of antiquities were recovered from the archeological site at Harvan during the course of excavation?