MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Department of Biotechnology
Question Bank - Academic Year (2020-21)

Course Code & Course Name : 16BTE15 & BIOLOGICAL SPECTROSCOPY

Year/Sem/Sec : III/VI

Unit-I: Introduction

Part-A (2 Marks)

1. What is unpolarized light and polarized light?
2. Describe the types of polarized light with diagrams?
3. Define dextrorotatory and laevorotatory substances in optical rotation?
4. Expand ORD and it's definition?
5. Define polarization of light?
6. Explain optical rotation and it's types?
7. What are the different components of polarimeter?
8. Expand CD and give the use and purposes.
9. Expand ORD and give the use and purposes.
10. What is the source lamp used in polarimeter and why?

Part-B (16 Marks)

1. Explain the working and a neat instrumentation diagram of polarimeter? (16)
2. Explain the working and a neat instrumentation diagram of ORD? (16)
3. Explain the working and a neat instrumentation diagram of CD spectroscopy? (16)
4. Explain the working and a neat instrumentation diagram of ORD? (16)

5.(i). Write a short note on circular dichroism of nucleic acid? (8)

(ii). Describe the importance on circular dichroism of proteins? (8)

Unit-II :

Part-A (2 Marks)

1. Define chemical shift?
2. Expand ESR, NMR, MRI and NOE?
3. What is relaxation mechanism in NMR?
4. Expand NOE, MD-NMR, ESR and MS?
5. Give the unit scale of chemical shift and provide the reason.

6. Differentiate between upper chemical shift and lower chemical shift.
7. What is ESR multidimensional spectroscopy and give example?
8. Define pascal's triangle with example by giving it's unit?
9. What is complex coupling with example?
10. List the different components used in MRI and

Part-B (16 Marks)

1.	Explain the working and instrumentation of NMR for determination of macromolecular structure?	16
2.	Explain the working, components and instrumentation of MRI with a neat diagram?	16
3.	Explain in detail about chemical shift and spin-spin coupling?	16
4.	Describe in detail about the determination of macromolecular structure by NMR?	16
5.(i).	Explain nuclear over hauser effect in detail	8
(ii).	Explain relaxation mechanism in detail	8

Unit-III :
Part-A (2 Marks)

1. Define peptide and protein?
2. Define carbohydrates and types?
3. Expand FAB, APCI, MALDI-TOF and ESI?
4. What is sample introduction inlet and their types?
5. Describe carbohydrates and their types?
6. Expand FAB, APCI, MALDI-TOF and ESI?
7. Define MS and give it's example?
8. Expand MALDI-TOF, ESI, APCI and APPI.
9. Mention some of the applications used in MS?
10. What is bimolecular MS and give it's example?

Part-B (16 Marks)

1.	Explain in detail about the types of ion sources with suitable diagrams	16
2.	Explain in detail about the types of mass analyzers with suitable diagrams?	16
3.	Explain in detail about the types of ion detectors with suitable diagrams?	16
4.	Describe the importance of peptide and protein analysis, carbohydrates and small molecules using MS?	16
5.(i).	Explain in detail about the types of sample introduction with suitable diagrams	8
(ii).	Explain in detail about bimolecular MS?	8

Unit-IV :
Part-A (2 Marks)

1. Define crystal lattice with diagram?
2. Define the term anomalous diffraction?
3. Name some 4 differences between unit cell and crystal lattice?
4. Explain the term phase problem?
5. Expand SC, BCC, FCC and XRD
6. What is scattering of x-rays, give it's example?
7. Define electron diffraction with example?
8. Define neutron diffraction with example?
9. What is unit cell and mention their types?
10. Difference between reflection and diffraction?

Part-B (16 Marks)

1.	Explain in detail about the types of diffraction methods (Electron and Neutron)?	16
2.	Explain in detail about the determination of crystal structure, phase problem and methods to solve?	16
3.	Explain in detail about the diffraction of crystal and methods for measuring diffraction pattern of crystal?	16
4.	Explain the XRD methods for measuring diffraction pattern and also the term unit cell and their types in detail with suitable diagrams?	16
5.(i).	Explain in detail about scattering of x-rays with a neat diagram?	8
(ii).	Explain in detail about Bragg's law with suitable diagram?	8

Unit-V :

Part-A (2 Marks)

1. Define combinatorial synthesis and give their types?
2. Expand ELISA, HTS, SAR and H2L.
3. Define microscopy and mention their classification?
4. Expand TEM, SEM, AFM and STM.
5. Mention some of the methods used for screening the compounds.
6. Give the function of probe tip in AFM.
7. What is TEM and SEM, mention some of the differences between them.
8. What is STM and AFM, mention some of the differences between them.
9. In general, mention some of the applications of microscopy.
10. In general, mention some of the applications of HTS.

Part-B (16 Marks)

1.	Explain in detail about the principle, instrumentation and working of SEM with a neat diagram?	16
2.	Explain in detail about the principle, instrumentation and working of STM with a neat diagram?	16

3.	Explain in detail about the principle, instrumentation and working of TEM with a neat diagram?	16
4.	Explain in detail about the principle, instrumentation and working of AFM with a neat diagram?	16
5.(i).	Give a short notes on combinatorial chemistry.	8
(ii).	Write in detail about High Throughput sequencing methods.	8

Course Faculty **HoD**