0502E1463

Candidate's Seat No :_____

MSc Sem.-1 Examination

404

Forensic Science

February-2025

Time : 2-30 Hours] [Max. Marks : 70

Ques.1 Answer the following questions:

i. Explain the working principle of a UV-Vis spectrophotometer and discuss its relationship with Lambert-Beer's Law. 7Marks

ii. Discuss two factors that affect fluorescence, providing a detailed explanation. 7Marks

OR

i. Write a short note on the fingerprint region in IR spectroscopy and its importance. 7Marks

ii. Write a short note on the concepts of shielding and deshielding in NMR with examples. 7Marks

Ques.2 Answer the following questions:

i. Write a short note on the detectors used in X-ray spectroscopy. 7Marks

ii. What is differential thermal analysis (DTA)? Explain the technique in detail. 7Marks

OR

i. Discuss the principle and instrumentation of Auger Electron Spectroscopy (AES). 7Marks

ii. What is plasma? Discuss Direct Coupled Plasma (DCP) and Inductively Coupled Plasma (ICP). 7Marks

Ques.3 Answer the following questions:

i. What is fluorescent microscopy? Provide a detailed explanation of its principle and highlight its applications in forensic science. 7Marks

ii. Compare Agarose Gel Electrophoresis and SDS-PAGE, outlining their differences and forensic significance. 7Marks

OR

i. Describe the working of a Scanning Electron Microscope (SEM) and explain its role in forensic investigations. 7Marks

ii. Elaborate on the principle, methodology, and forensic relevance of High-Performance Liquid Chromatography (HPLC). 7Marks

Ques.4 Answer the following questions:

i. Explain the functioning of the ion sorter in a single focusing mass spectrometer 7Marks

ii. Explain fast atom bombardment ionization technique used in mass spectrometry 7Marks

OR

i. Discuss electron ionization and chemical ionization technique in mass spectrometry 7Marks

ii. Describe the working of any two types of detectors used in mass spectrometer. 7Marks

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E1463-2

Ques.5 Attempt any seven out of twelve. 14Marks

1. Define "soft ionization technique"
2. Give any two applications of a mass spectrometer
3. What is the Full form of PMT? Write its use.
4. How does the (n+1) rule help in predicting spin-spin splitting in NMR?
5. Explain in short: immunodiffusion electrophoresis.
6. What is the major disadvantage of electron ionization?
7. Define the terms absorbance and transmittance.
8. Define fluorescence and phosphorescence.
9. Differentiate between stretching and bending vibrations in IR spectroscopy.
10. What is retention time in chromatography, and why is it significant?
11. Name two detectors used in gas chromatography and explain their importance.
12. How does the flame work as a source in AAS?

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