BP701T: Instrumental Methods of Analysis (Theory) Question Bank

1. Unit I: UV-Visible Spectroscopy, Fluorimetry (10 Hours)

1.1 10-Mark Questions

1. With a neat labeled diagram, explain the principle and instrumentation of a double beam UV-Visible spectrophotometer.* [Dec 2021, Dec 2023, Oct 2024]
2. Derive the Beer-Lambert's law mathematically and discuss the reasons for deviations from the law.* [May 2022, Oct 2022]
3. Explain the theory and instrumentation of a fluorimeter, including the role of singlet, doublet, and triplet states in fluorescence.* [Mar 2023]
4. Discuss the electronic transitions in UV-Visible spectroscopy and their applications in spectrophotometric titrations and multi-component analysis.
5. Describe the solvent effects on UV-Visible absorption spectra and their significance in analytical applications.

1.2 5-Mark Questions

1. Explain the different types of electronic transitions involved in UV-Visible spectroscopy.* [May 2022, Mar 2023]
2. Discuss the factors affecting fluorescence intensity and their impact on fluorimetric analysis.* [Dec 2021, Mar 2023, May 2024, Oct 2024]
3. Explain the Jablonski diagram and its significance in understanding fluorescence.* [May 2022]
4. Write a note on the applications of UV-Visible spectroscopy in pharmaceutical analysis.
5. Describe the principle of simultaneous equation method for multi-component analysis in UV spectroscopy.* [Aug 2023, Oct 2024]
6. Explain the role of chromophores and auxochromes in UV-Visible spectroscopy.
7. Write a note on the instrumentation of a single beam UV-Visible spectrophotometer.

1.3 2-Mark Questions

1. Define Bathochromic shift and Hypsochromic shift.* [Dec 2021, May 2022, Dec 2023, Oct 2024]
2. State Beer's Law and Lambert's Law.* [Mar 2023, May 2024]
3. What are chromophores? Give two examples.* [Dec 2021, Dec 2023]
4. What are auxochromes? Give two examples.* [May 2022, Aug 2023]
5. Define quenching and list two factors affecting it.* [May 2022, Dec 2023, May 2024]
6. What is an isosbestic point? [Dec 2021]
7. Write two applications of fluorimetry.* [May 2024]
8. Define luminescence and give one example. [Dec 2021]
9. Mention two radiation sources used in UV-Visible spectroscopy.* [Oct 2022]
10. What is the advantage of a photomultiplier tube in UV spectroscopy? [Oct 2022]