BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M. PHARM. **SEMESTER: 1ST**
BRANCH: PHARMACY **SESSION: MO'24**

SUBJECT: MPH101T/MPC101T/MPG101T/MQA101T/MPL101T
MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

TIME: 3.00 Hours **FULL MARK: 75**

INSTRUCTIONS:

1. The missing data, if any, may be assumed suitably.
2. Before attempting the question paper, be sure that you have got the correct question paper.
3. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.
5. Answer any five questions.

1a.	Discuss the instrumentations and the major differences between dispersive and Fourier Transform Infrared spectrophotometer with neat schematic diagram.	[7]
1b.	Discuss various fundamental modes of vibrations in a polyatomic system and various factors effecting the fundamental modes of vibrations.	[8]
2a.	Define, classify fluorescence quenching and discuss about static and dynamic quenching using Stern-Volmer's equations.	[7]
2b.	Describe fluorescence and phosphorescence with Jablonski diagram and discuss various factors which could influence them.	[8]
3a.	Derive Beer-Lambert's law and give a note on its limitations.	[7]
3b.	Explain the solvent effect with a suitable diagram. Discuss about types of absorption bands observed in UV-visible spectroscopy.	[8]
4a.	What is Mass Spectroscopy? Discuss its principle and derive the Fundamental equation of Mass Spectroscopy.	[7]
4b.	Enumerate different ionisation techniques employed in MS and give a comparative statement highlighting their strength and limitations.	[8]
5a.	What happens to spin-active nuclei when placed in an external magnetic field, and how does this behaviour relate to the principles of Nuclear Magnetic Resonance (NMR) spectroscopy? Please include a diagram to illustrate the concept.	[7]
5b.	Analyse the factors that influence the chemical shift in NMR spectroscopy and explain how each factor contributes to the observed shifts. Include a diagram to illustrate these factors.	[8]
6a.	Evaluate the (N + 1) rule for splitting in NMR spectroscopy, providing an example and discussing any exceptions to the rule. Draw a diagram to illustrate the concept	[7]
6b.	Identify and explain the different chromatographic methods used in drug analysis, providing examples for each. Draw a diagram to illustrate the methods	[8]
7a.	State the working principle of flame emission and atomic absorption spectroscopy with neat diagram.	[7]
7b.	Analyse the different relaxation mechanisms in NMR spectroscopy and explain their significance. Draw a diagram to illustrate these mechanisms.	[8]

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