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

CLASS: M. Tech **SEMESTER : I**
BRANCH: Biotech **SESSION : MO/2025**

SUBJECT: BE512- MODERN METHODS OF INSTRUMENTATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	What is the principle of affinity chromatography? Explain the proper diagram and also mention the applications.	[5]	CO3	3
Q.1(b)	Explain the following with respect to a chromatographic instrument: (i) Retention time (ii) Capacity factor (iii) Selectivity (iv) Resolution	[5]	CO3	5
Q.2(a)	Design schematic of HPLC instrument. Explain the functions of each component.	[5]	CO1, CO4	6
Q.2(b)	A double-focusing mass spectrometer combines both electric and magnetic sector fields to achieve high resolution. Explain the principle of double focusing in mass spectrometry and also mention the different steps in analysis.	[5]	CO1, CO4	6
Q.3(a)	Prepare a schematic of a double-beam UV-vis Spectrophotometer and also mention its application.	[5]	CO1, CO2	5
Q.3(b)	Explain the instrumentation and applications of ICP-OES.	[5]	CO3	4
Q.4(a)	How will you analyze the isolated DNA samples to determine their size? Explain the process in detail.	[5]	CO4,	4
Q.4(b)	Describe the various steps involved in SDS- PAGE, starting from sample preparation.	[5]	CO3, CO4	4
Q.5(a)	What is Curie point? Explain the calibration of the TGA instrument using the Curie point method.	[5]	CO1, CO3	3
Q.5(b)	Describe the instrumentation of TGA. Give any example of a thermogravimetric measurement	[5]	CO1, CO4	4

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