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

CLASS: BTech **SEMESTER : V**
BRANCH: Biotechnology **SESSION : MO/2025**

SUBJECT: BE301 BIOANALYTICAL TECHNIQUES

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	What is a centrifuge? Explain with the help of a schematic diagram.	[2]	1	2
Q.1(b)	Elaborate on the basic principle of centrifugation.	[3]	1	2
Q.2(a)	Centrifugation requires 10,000 x g with a radius of 9.5 cm. Calculate the value of the necessary rpm?	[2]	1	4
Q.2(b)	What is differential centrifugation? State its limitations.	[3]	1	3
Q.3(a)	Differentiate between rate-zonal and isopycnic centrifugation with an example.	[2]	1	3
Q.3(b)	What is electrophoresis? State its working principle with a neat and labelled diagram.	[3]	2	2
Q.4(a)	How do the length of the electrophoresis tank and the potential between the anode and cathode affect the separation time?	[2]	2	4
Q.4(b)	Calculate the electric field for a given potential difference and length of 100V and 10cm. Compute the electrophoretic mobility assuming a net charge of +2e and a friction coefficient of 1. Where, e = 1.602×10^{-19}C.	[3]	2	4
Q.5(a)	Why is pH gradient used in isoelectric focusing?	[2]	2	3
Q.5(b)	Why is isoelectric focusing used in 2-dimensional electrophoresis?	[3]	2	3

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