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

CLASS: MSC/PRE-PHD **SEMESTER : II/NA**
BRANCH: BIOTECHNOLOGY **SESSION : SP/19**

SUBJECT: BT418 ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY

TIME: 3.00 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.

Q.1(a) Construct Svedberg equation for unhydrated molecule. Categorize different types of centrifugation and their applications. [5]

Q.1(b) Sketch the principle and application Atomic force microscopy (AFM) in molecular physics with proper example. What is the different modes AFM? [5]

Q.2(a) Compare Electro osmosis and Electrophoresis. Summarize and depict zeta potential with Helmholtz-Smoluchowski equation and its measurements. [5]

Q.2(b) Compose and sketch Two-dimensional gel and isoelectric focusing methods for protein separation. [5]

Q.3(a) Hypothesize the principle of Ion exchange chromatography with examples of cation and anion exchangers. Write in brief about i) Resolution ii) Selectivity of choromatography system. [5]

Q.3(b) Compare Adsorption chromatography and Partition chromatography. Construct a block diagram of HPLC with the its components and their functions. [5]

Q.4(a) Analyze and express the methodology for FRET technique. What is chemical shift and COSY related. [5]

Q.4(b) Established the relation between transmittance and absorbance. Illustrate with a schematic diagram single beam UV spectrophotometer also mention its uses. [5]

Q.5(a) Hypothesize and analyze the instrumentation and applications of ICP. Compare atomic flame emission spectrophotometry with atomic absorption spectrophotometry. [5]

Q.5(b) Paraphrase and summarize the following bio-techniques a) MALDI-TOF in MS and b) Differential scanning calorimeter? [5]

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