

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

CLASS: M.Sc.  
BRANCH: Biotech

SEMESTER : II  
SESSION : SP/22

BT418: Analytical Techniques in Biotechnology

TIME: 3:00 hours

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 6 questions each of 60 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 50 marks.
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.

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- Q.1(a) What is the basic principle of a centrifuge? [2]
- Q.1(b) Calculate the  $RCF_{min}$ ,  $RCF_{av}$  and  $RCF_{max}$  for a centrifuge tube rotating at 20000 rpm and in which the distance between the rotation axis and the meniscus is 10 cm and that between rotation axis and the bottom of the tube is 18 cm. [3]
- Q.1(c) List different types of centrifugation. Explain differential centrifugation in detail. [5]
- Q.2(a) What do you understand by electrophoresis? [2]
- Q.2(b) Explain the effect of voltage, buffer composition and pH on the electrophoresis process? [3]
- Q.2(c) Describe the instrumentation and process utilized for agarose gel electrophoresis. [5]
- Q.3(a) What is the principle of Affinity chromatography? Explain the process of affinity chromatography in detail. [4]
- Q.3(b) Explain the term [6]  
(i) Capacity factor (ii) Selectivity (iv) Resolution
- Q.4(a) Derive Beers Lambert Law and mention its limitations. [5]
- Q.4(b) Give a neat sketch of the single and dual beam UV-visible spectrophotometer and list the components and their functions. [5]
- Q.5(a) Write the basic principle of Atomic Absorption Spectrophotometer. Explain the instrumentation and applications of ICP. [5]
- Or**
- With the help of a block diagram explain the instrumentation of Mass spectrometer.
- Q.5(b) What are Mass spectra? [2]
- Q.5(c) Define i) Exact mass ii) Nominal Mass iii) Curie Point [3]
- Q.6(a) What do you understand by thermogravimetry? [2]
- Q.6(b) Describe the instrumentation of thermogravimetric analyzer and explain the methodology with one example. [4]
- Q.6(c) Describe the calibration process of TGA instruments. [4]

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