

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code:R3C02

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

Biotechnology

R21UBT302 – ANALYTICAL METHODS AND INSTRUMENTATION

(Regulations R2021)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 2 = 20 Marks)

1. Write a short note on detection limits - LoD and LoQ CO1-U
2. Define calibration curve. CO1-U
3. State Beer – Lambert's law CO1-U
4. Give the molecular formula of hydrocarbon cation with an m/z value of 91. CO1-U
5. Why PAGE is not used for DNA? CO1-U
6. Enlist the advantages of coulometry. CO1-U
7. In Gel Permeation Chromatography whether the compounds with low molecular size moves faster than the higher size compounds. Justify the statement. CO3 -App
8. What is the principle involved affinity chromatography? CO1-U
9. List the advantages of particle induced X-ray emission. CO1-U
10. How does High-Resolution Mass Spectrometry (HRMS) work? CO3 -App

PART – B (5 x 16= 80Marks)

11. (a) Explain in detail about the volumetric analysis with an example. CO1-U (16)
Or
(b) Discuss in detail about the different methods for calibration of instruments. CO1-U (16)
12. (a) How can you do quantitative analysis using Nephelometry? CO2-App (16)

Or

- (b) In a laboratory, during the analysis, liquid samples are aspirated and introduced into the flame via spray chamber, which breaks the aspirated liquid into fine droplets. Explain the analytical method in detail CO2-App (16)
13. (a) You are a forensic analyst conducting a criminal investigation. You are given DNA evidence from a bloodstain at the crime scene and DNA from 3 suspects. Adopt the appropriate technique to find the criminal and justify your selection. CO3-Ana (16)
- Or
- (b) A scientist isolates a protein from a plant tissue and is unsure of its identity. Based on its behavior, he suspects it may be globulins, prolamins, or glutelins. Select type of analytical technique can be helpful to identify the protein? CO3-Ana (16)
14. (a) Explain the theory involved in affinity chromatography with its applications. CO1-U (16)
- Or
- (b) Explain the instrumentation of HPLC with neat diagram with more emphasis on pumps and detectors used. CO1-U (16)
15. (a) Can radioisotopes be used for plants? Discuss the application of isotopes and radiation in agriculture CO2-App (16)
- Or
- (b) How does PIXE works? Elaborate the principle and instrumentation of PIXE. CO2-App (16)