

Roll No. 

Total No. of Pages : 01

Total No. of Questions : 08

**M.Tech.(Bio. Tech.) (Sem.-2)**  
**BIO-ANALYTICAL TECHNIQUES**  
Subject Code : MTBT-108  
M.Code : 23008

Time : 3 Hrs.

Max. Marks : 100

**INSTRUCTION TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. Define Centrifugation and briefly discuss its principle. What is the difference between Isopycnic density gradient and rate zonal centrifugation? 10+10
2. Highlight the differences between Scanning Electron Microscope and Transmission Electron Microscope with respect to instrument design and application. 20
3. Discuss the construction and working of Ultraviolet-Visible Spectrophotometer. Give applications of UV-Vis spectroscopy. 20
4. Explain the principle, instrumentation and working of HPLC. What are the different types of detectors used? 20
5. Give the principle of Gas solid chromatography. Also explain the detail working of a gas chromatograph with Flame ionization Detector. 20
6. What is autoradiography? Briefly discuss the different methods to measure the radioactive decay. 20
7. a) Highlight critically the features which render HPTLC to be a more efficient analytical technique over conventional TLC. 15  
b) In a gas chromatograph which type of column would have greater efficiency and resolution- column or packed? Why? 5
8. a) A mixture of edible oil has to be analysed for the purpose of quality assurance as per the laid down guidelines of Ministry of Food Processing and Industries (MoFPI). Suggest a chromatographic technique which shall be helpful in determining the composition of edible oil. Will this technique require a pre-column treatment of sample or not? If yes, please explain the kind of pre-treatment used and its rationale. 8  
b) Which spectroscopic technique is used for the identification of functional groups in chemical structures? Give the principle of this technique and briefly discuss the working of this instrument. 12

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**