**2018**

# BIOTECHNOLOGY

## BIO T-303

## ANALYTICAL TECHNIQUE

Full Marks: 80

Time: 3 hours.

*The figures in the margin indicates full marks for the questions :*

1. **Answer the following (any eight)** 1x8=8

(a) Name a stain that is commonly used in Transmission Electron Microscope (TEM).

(b) Which microscopic technique is used to observe unstained and living cells?

(c) Name the enzyme popularly used in PCR for DNA polymerization.

(d) What is HPLC?

(e) What type of separation is achieved in Affinity Chromatography?

(f) What are different forces acting on a particle during centrifugation?

(g) Define RCF?

(h) What is the unit of Sedimentation Coefficient?

(i) What isTEMED?

(j) Define isoeclectric point of a protein?

**2.Write brief notes (any six)** 2x6=12

a) What is a standard curve?

b) What is the pKa of a solution? Mention one application of Henderson - Hasselbalch equation.

c) What is the principle of Gel Permeation Chromatography?

d) What is the most common used detector in UV - VIS spectrometers and why?

e) What is the principle of hydrophobic chromatography?

f) What kind of samples can be measured with Circular Dichroism and what can be learned?

g) What are the main differences between TLC and Paper Chromatography?
h) Draw schematic of the components of Raman Spectroscopy.

**3. Write short notes on any four:** 5x4=20

(a) Enzyme Immobilization
(b) Transmission Electron Microscope (TEM)
(c) Cell Immobilization
(d) AFLP
(e) Reverse Transcriptase
(f) Scintillation Counters
(g) Capillary Electrophoresis
(h) Radio - immunoassay.

4. What are the main components of a HPLC system? Differentiate between HPLC and FPLC. 4+4=8

5. What is NMR? State the principle of NMR. How does the phenomenon of NMR help in biolo; studies? 4+4=8

*Or*

Write a descriptive account on centrifugation. What are the different types of centrifuge use modern research? Mention the application of this technique.

6. Write the working principle and application of Mass - Spectrometry and Plasma Emission Spectroscopy. 6+6=12

*Or*

Write an essay on the working principle of Light Microscope. Describe in brief the applications of different types of Light Microscope.

7. Define Radioisotopes and Autoradiography. Describe how Radioisotopes and Autoradiograph} be used for labelling and detecting proteins.

*Or* 8+4=12

Describe different methods of Cell Immobilization and mention their applications.

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