

B.Sc. Sem.-VI (Hons.) Examinations 2022
Subject-Biotechnology(Hons.)
Paper- CC-13 (Bio Analytical Tools)

Time- 2hrs

Full Marks- 40

Q1. Answer *any five* from the following questions :

2 x 5 =10

- (a) What do you mean by resolution of a microscope?
- (b) What is the full form of FRET? Mention one application of this phenomenon in biology.
- (c) How can you check the purity of DNA with the help of a UV-VIS spectrophotometer?
- (d) What is Svedberg Unit. Mention its use in biological sciences.
- (e) Name two chemicals that are frequently used in gradient centrifugation.
- (f) Why natural polysaccharides cannot be analyzed with Gas Chromatography without modification?
- (g) Name two polymerizing agents used in polyacrylamide gel electrophoresis.
- (h) What are ampholytes? Mention one use of ampholytes?

Q2. Answer *any four* questions from the following:

5 x 2 = 10

- (a) Schematically describe Western Blotting technique with suitable sketches.
- (b) What is a Bio-sensor? Explain the working principle of any one biosensor with suitable sketch. 1+4=5
- (c) Define Isoelectric Point of a protein. How can you separate components of a protein mixture using isoelectric focusing gel electrophoresis technique? 1+4=5
- (d) What are void volume and dead volume of a Gel Filtration Chromatography Column? How can you determine molecular weight of proteins using Gel Filtration Chromatography? 2+3=5

Q3. Answer *any two* questions from the following:

10 x 2 = 20

- (a) What are the differences between bright field and phase contrast microscope? Draw and describe the light path in phase contrast microscope. Mention some applications of phase contrast microscopes in life sciences. 3+5+2
- (b) Explain Beer-Lambert Law. Is it possible to quantify DNA or protein present by UV-VIS spectrophotometry in a solution without using any chemical reagents? What is λ_{max} ? How can you determine the λ_{max} value of a given photoreactive chemical? 3+2+2+3

(c) Schematically describe sample preparation for Scanning Electron Microscopic study. What will happen if the sample contains moisture? What are the advantages and disadvantages of TEM and SEM? 4+1+5

(d) Write a note on principle and application of pulse field gel electrophoresis. What are fluorophores? Name three fluorophores routinely used in fluorescence microscopy and mention their applications. 5+2+3