DAL-003-1014022 Seat No. _____

B. Sc. (Sem. IV) (CBCS) (W.E.F. 2016) Examination

April - 2022

Biochemistry : BC-401

(Biophysical & Biochemical Techniques)

(Old Course)

Faculty Code : 003

Subject Code : 1014022

Time : $2\frac{1}{2}$ Hours] [Total Marks :**70**

1 (A) Answer the following questions briefly. **4**

(1) Write the wavelength ranges for UV and Visible lights.

(2) Why do we use red colored filter in colorimeter in order to read absorbance of a blue colored solution?

(3) Which lamps are used as source of ultra violet light in UV- spectrophotometers?

(4) Define absorption maxima.

(B) Write the advantages of double beam spectrophotometers. **2**

OR

(B) Explain why we cannot use glass cuvettes to record absorbance in UV spectrophotometers ? **2**

(C) Write principle and advantages of diffraction gratings monochromators. **3**

OR

(C) Define absorption spectra and draw an absorption spectra for any substance of your choice. **3**

(D) Write a short note on Photomultiplier tubes. **5**

OR

(D) Discuss various applications of spectrophotometers in biochemistry. **5**

2 (A) Answer the following questions briefly : 4

(1) Which type of centrifuge is used to separate microsomes and ribosomes?

(2) Write the importance of refrigeration and vacuum system in ultracentrifuges.

(3) Describe two applications of clinical centrifuge.

(4) Justify the importance of balancing the centrifuge rotor by putting the samples in opposite slots.

(B) Define centrifugal force and relative centrifugal force 2

OR

(B) In an angle head rotor, the top diameter was 40 cms and bottom diameter was 60 cms. What will be the average radius of the rotor ? 2

(C) Define density gradient centrifugation and write its applications. 3

OR

(C) Briefly describe different types of rotors used in centrifuge 3

(D) Describe the sub cellular fractionation scheme for separation of different cell organelles from liver homogenate by differential centrifugation. 5

OR

(D) Write a short note on analytical ultracentrifugation and its uses. 5

3 (A) Answer the following questions briefly: 4

(1) Write examples of different isotopes of Hydrogen.

(2) Write importance of Geiger Muller counter in the laboratory.

(3) When radioactive decay by alpha emission occurs, what will be the effect on Z and A values of the radioactive element?

(4) Define Becquerel as the unit of radioactivity.

(B) Briefly describe autoradiography and its uses. 2

OR

(B) Define half lives of radioisotopes using suitable examples. **2**

(C) A sample containing radioisotope of phosphorous ^{32}P having a mass of 100grams. How many grams of the radioactivity of ^{32}P would remain after 42 days? (Half life of Radioisotope of phosphorous ^{32}P is 14 days). **3**

OR

(C) Compare the properties and penetration powers of alpha, beta and gamma radioactive emissions. **3**

(D) Write a detailed note on applications of radioisotopes in biological sciences **5**

OR

(D) Write a brief note on principle, working and applications of Liquid Scintillation Counter. **5**

4 (A) Answer the following questions briefly. **4**

(1) List the materials that can be used in molecular sieve chromatography.

(2) Which reagent is used to detect spots of phospholipids in TLC?

(3) Write full form of GLC.

(4) Name the chromatographic technique that is capable of separating molecules from the mixture based on their charge differences.

(B) What factors govern the pore size in polyacrylamide gels ? **2**

OR

(B) Write the advantages of HPLC over conventional chromatographic techniques. **2**

(C) In thin layer chromatography of Amino acids, the distance travelled by solvent front from the origin was 10 cm while the distance travelled by Glycine and Aspartic acid from the origin were 3cm and Scm respectively. Calculate the Rf values for Glycine and Aspartic acid. **3**

OR

(C) Discuss the advantages of thin layer chromatography in comparison to paper chromatography. **3**

(D) Describe the basic principle and list various applications of Affinity chromatography. **5**

OR

(D) Write the principle and applications of Molecular Sieve chromatography. **5**

5 (A) Answer the following questions briefly: 4

(1) What is the use of Ethidium bromide in gel electrophoresis?

(2) List two applications of 2D gel electrophoresis.

(3) Write importance of mixing the sample with bromophenol blue in agarose gel electrophoresis of DNA.

(4) Why the electrophoresis is usually carried out at alkaline pH?

(B) Describe the materials used as supporting medium in gel electrophoresis. **2**

OR

(B) List different spot detection methods in gel electrophoresis. **2**

(C) Describe the principle based on which the proteins are separated in SDS PAGE. **3**

OR

(C) Discuss applications of gel electrophoresis in the field of molecular biology. **3**

(D) Write principle and applications of Isoelectric focusing. **5**

OR

(D) Discuss factors affecting electrophoretic mobility of molecules. **5**
