Seat No. _____

HP-003-1014022

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

April - 2023

Biochemistry : Paper - Z - 04

(Biophysical and Biochemical Techniques; P. BC-401)

(Old Course)

Faculty Code : 003
Subject Code : 1014022

Time : $2\frac{1}{2}$ / Total Marks : 70

1 (a) Answer the following questions briefly : **4**

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

(2) Write the wavelength ranges for Ultra-violet and Visible lights.

(3) Write the name of lamps used as UV light source of in UV-spectrophotometers ?

(4) Define absorption spectra.

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

OR

(b) Define absorption spectra and draw absorption spectra of any colored dye. **2**

(c) Write the Beer's Lambert's laws of light absorption and describe their limitations. **3**

OR

(c) Write principle and advantage of diffraction gratings monochromators. **3**

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

OR

(d) Write a short note on Photomultiplier tubes (PMT) as photodetectors in spectrophotometers. **5**

2 (a) Answer the following questions briefly : **4**

(1) Separation of which of the following organelle would require highest RCF in a centrifuge ? Nucleus, mitochondria, lysosomes or microsomes ?

(2) Write two applications of clinical centrifuges in laboratory.

(3) Explain the importance of vacuum system in ultracentrifuges.

(4) Why we always use even number of samples in centrifuge rotor and never use odd number of samples ?

(b) Define centrifugal force and relative centrifugal force. **2**

OR

(b) In an angle head rotor, the top radius was 20 cms and bottom radius was 40 cms. What will be the average radius of the rotor? **2**

(c) Briefly describe different types of rotors used in centrifuge. **3**

OR

(c) Define density gradient centrifugation and write its application. **3**

(d) Write a detailed note on separation of sub cellular organelles from liver homogenate by the process of differential centrifugation. **5**

OR

(d) Write a short note on principle, instrumentation, optics and uses of analytical ultracentrifuges. **5**

3 (a) Answer the following questions briefly : **4**

(1) Write examples of different isotopes of Carbon.

(2) Describe the use of Geiger Muller counter in the laboratory.

(3) Define Becquerel as the unit of radioactivity.

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

(b) Briefly describe autoradiography and its uses. **2**

OR

(b) Describe various types of fluors used in radioactivity counting. **2**

(c) Define half lives of radioisotopes using suitable examples. **3**

OR

(c) Describe carbon dating and briefly explain its uses or importance. **3**

(d) Write a detailed note on applications of radioisotopes in diagnosis and treatment of disease. **5**

OR

(d) Write a brief note on principle, working and applications of Gamma Counter. **5**

4 (a) Answer the following questions briefly : **4**

(1) List the materials that can be used in preparation of plates for thin layer chromatography.

(2) Which reagent is used to detect spots of amino acids in paper chromatography ?

(3) Write two examples of class of substances that can be separated by using gas liquid chromatography.

(4) On what basis the molecules are separated from their mixture using ion exchange chromatography.

(b) Why do we use DC and not the AC power packs to carry out electrophoresis. **2**

OR

(b) Justify HPLC as high performance liquid chromatography. **2**

(c) In paper chromatography of Amino Acids, the distance travelled by solvent front from the origin was 5 cm while the distance travelled by alanine and tryptophan from the origin were 2cm and 4cm respectively. Calculate the Rf values for Alanine and tryptophan from the data provided. **3**

OR

(c) Describe two dimensional thin layer chromatography (2D-TLC) and its importance. **4**

(d) Write the principle and applications of Gel permeation chromatography. **5**

OR

(d) Discuss the basic principle and applications of Affiniti chromatography. **5**

5 (a) Answer the following questions briefly : **4**

(1) Write two applications of 2D gel electrophoresis.

(2) What is the use of the dye Ethidium bromide in agarose gel electrophoresis of nucleic acids?

(3) Write importance of mixing the DNA samples with bromophenol blue and glycerol before loading them in the wells for their separation by agarose gel electrophoresis.

(4) What is the effect of pH of a buffer on separation of proteins by polyacrylamide gel electrophoresis ?

(b) If we increase the ratio of concentration of Acrylamide monomer/N-N' methylene bisacrylamide while preparing the polyacrylamide gel, what effect it would have on pore size of a gel ? **2**

OR

(b) Describe importance of ammonium persulfate and TEMED in preparation of polyacrylamide gel. **2**

(c) List the applications of gel electrophoresis in the field of molecular biology. **3**

OR

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

(d) Write the principle and applications of Isoelectric focusing (IEF). **5**

OR

(d) Discuss effects of supplrting medium, molecular size, charge quantity and quality of the sample, electrical field strength and pH of the buffer used on electrophoretic mobility of molecules. **5**
