



DE-003-001326

Seat No. _____

B. Sc. (Sem. III) (CBCS) Examination

March – 2022

Biochemistry : Paper - 301

(Biophysical and Biochemical Techniques)

Faculty Code : 003

Subject Code : 001326

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

1 Answer the following question in brief : 20

- (1) Which centrifugation technique is used to separate viruses?
- (2) Write the full form of RCF
- (3) In an angle head rotor, top diameter was 8 cm and bottom diameter was measured as 12 cm. Find the average radius of the rotor.
- (4) Define isotonic solution
- (5) Write the full form of TLC
- (6) Which technique is used in separation of proteins based on their size difference?
- (7) Write one application of Gas Liquid Chromatography (GLC)
- (8) At what temperature the agarose gel will set and form semi solid gel bed?
- (9) Uncharged radiation produced by decay of radio isotopes is_____.
- (10) The radioactive isotope has a half life of 30 min, after 2 hours the fraction of original amount remaining would be_____.
- (11) Which isotope is being used in determination of age of fossilized trees?
- (12) Write the full form of CPM (in context with radio activity)

- (13) What is the effect of size in the agarose gel electrophoresis?
- (14) Which gel can be used to remove glucose from a starch solution?
- (15) The separation of proteins by iso-electric focusing is based on
- (16) Write the use of SDS in electrophoresis.
- (17) Which of the visible light would have highest wavelength?
- (18) Write the use of photo detector in spectrophotometer
- (19) Write the use of Diffraction grating.
- (20) Define Hyperchromicity

2 (A) Answer briefly any **three** of the following questions : **6**

- (1) Why glass or plastic cuvettes can't be used for measuring absorbance in UV spectrophotometers?
- (2) Describe the units of radioactivity.
- (3) Write the principle of SDS PAGE
- (4) Why small DNA molecules move faster than large DNA molecules in gel electrophoresis?
- (5) Why differential centrifugation of cell organelles is carried out in isotonic medium ?
- (6) Write the names of constituents of polyacrylamide gel and describe the process of polymerization of polyacrylamide gel.

(B) Answer any **three** of the following questions : **9**

- (1) Explain Molar extinction coefficient with suitable example
- (2) Explain giving examples the role of fluors in liquid scintillation counting of beta rays emitting isotopes.
- (3) Why very small particles in a suspension do not get sedimented on their own under the influence of gravitational force?
- (4) Write about various detection methods used in paper chromatography

(5) Why DNA sample is mixed with glycerol and bromophenol blue before loading in the wells of agarose gel for electrophoresis.

(6) Compare TLC and Paper chromatography

(C) Answer any **two** of the following questions in detail : **10**

(1) Draw a labelled diagram of double beam spectrophotometer and write advantages of double beam instruments in comparison to the single beam spectrophotometer.

(2) Define electrophoresis and discuss various factors affecting electrophoretic mobility of sample

(3) Explain: Radioactive decay of radio isotopes by alpha, beta and gamma rays emissions.

(4) Describe the process of differential centrifugation and separation of cell organelles from liver homogenate.

(5) Explain HPLC with suitable diagram.

3 (A) Answer briefly any **three** of the following questions : **6**

(1) Write the use of filters in colorimeter.

(2) Write limitations of Beer-Lambert's laws of light absorption.

(3) Define Ampholyte mixture

(4) Discuss the role of molecular sieve chromatography in determination of molecular weight of globular proteins

(5) Write the effect of pH on electrophoresis.

(6) Name the optics used in analytical ultracentrifuge to monitor progress of sedimentation.

(B) Answer any **three** of the following questions : **9**

(1) How turbidometric applications of colorimeter useful in microbiology?

(2) What are the applications of GM counter?

(3) Briefly discuss 2D-TLC.

- (4) Why ordinary writing paper can't be used in paper chromatography?
- (5) A Protein is giving single band in native PAGE at 200,000 Dalton. In SDS- PAGE, same protein gives two bands at 100,000 Dalton and 50,000 Daltons. What information you can derive from this data about quaternary (subunit) structure of the protein?
- (6) Explain the applications of centrifugation.

(C) Answer any **two** of the following questions in detail : **10**

- (1) Write a short note on Iso Electric Focusing.
- (2) Describe principle and applications of Gel exclusion chromatography.
- (3) Discuss applications of radioisotopes.
- (4) Write short note on analytical ultracentrifuge.
- (5) Write a short note on Diffraction gratings monochromator.
