JAL-003-001326 Seat No. _____

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

November – 2019

Biochemistry : Paper - 301

(Biophysical & Biochemical Techniques) (Old Course)

Faculty Code : 003
Subject Code : 001326

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

1 Answer the following questions in just one or two lines. **20**

(1) Why red coloured filter is used in a colorimeter to measure the absorbance of a blue coloured solution ?

(2) Which of the following electromagnetic radiation would have highest energy ? Why :

Visible light, Microwaves, Ultra violet, Infra red radiation or Gamma rays.

(3) Define Molar extinction coefficient.

(4) Among the visible spectrum, arrange lights of the following colours in ascending order of their wavelengths:

Blue, Indigo, Red, Orange, Yellow, Violet and Green.

(5) What is relative centrifugal force (RCF) ?

(6) Name different types of centrifuge rotors.

(7) Write the importance of refrigeration system in high speed centrifuge.

(8) How true radius of angle head rotor is determined ?

(9) Name different radioisotopes of hydrogen.

(10) What would be the effect of radioactive decay by gamma emission on atomic number and mass number of an isotope ?

(11) If a 10 grams of a radio isotope undergoes radioactive decay and becomes 2.5 grams in 20 years. Calculate the half life of this radio isotope.

(12) Define Becquerel as unit of radioactivity.

(13) Write full form of GLC.

(14) Which chromatographic technique would you use to separate proteins differing in their size from the sample ?

(15) What is the effect of column height of resolution in column chromatography ?

(16) Describe R_f value in chromatography.

(17) If you have globular protein and fibrous protein having same charge/mass ratio, which one of the two would migrate faster in electrophoresis ? Why ?

(18) What is the basis of separation of proteins in isoelectric focusing ?

(19) How pore size in polyacrylamide gel electrophoresis could be controlled ?

(20) Write importance of trekking dye bromophenol blue in agarose gel electrophoresis of DNA.

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

(1) Draw typical absorption spectra for a coloured dye in visible range and label absorption maxima.

(2) Define radio dating and write its importance.

(3) On what basis proteins are separated in SDS PAGE ?

(4) Name two examples of substances that can be used as materials to prepare density gradients.

(5) Write effect of pH of a buffer on electrophoretic mobility of proteins.

(6) Write one example each for cation exchanger and anion exchanger resins.

(b) Answer any three of the following questions. **9**

(1) Why monochromators are better wavelength selectors compared to absorption filters ?

(2) If half life of a radio isotope in one year, after four years what percentage of the original radio activity will remain in the isotope sample ?

(3) Explain giving reasons: Why TLC is better than paper chromatography.

(4) Write different spot detection methods in paper chromatography.

(5) Write the ingredients used to make polyacrylamide gel.

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

(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 spectrophotometers.

(2) Write a short note on ion-exchange chromatography.

(3) Explain different types of radioactive decays using suitable examples.

(4) Write a note on instrumental design and applications of analytical ultracentrifuge.

(5) Discuss factors affecting electrophoretic mobility.

3 (a) Answer briefly any three of the following questions. **6**

(1) Why glass or plastic cuvettes cannot be used for absorbance measurements in UV spectrophotometer ?

(2) Write the wavelength range for visible light and ultraviolet light.

(3) Write applications of 2D Gel electrophoresis.

(4) You are having two centrifuges having rotors of different sizes. One rotor has diameter of 10 cm and other had diameter of 20 cm. If both are used for centrifugation at 10000 rpm for 15 minutes, which one of the would generate higher centrifugal force and why ?

(5) Why for gel electrophoresis of proteins, we always use buffer of alkaline pH ?

(6) Explain the terms K_d, V_o, V_i and V_e in size exclusion chromatography.

(b) Answer any three of the following questions. **9**

(1) Explain different spectra and write their importance in spectroscopy.

(2) Describe penetration power of alpha, beta and gamma radiations.

(3) What precautions you should take while packing the chromatography column with a gel ?

(4) Describe advantages and limitations of ascending paper chromatography in comparison to descending paper chromatography.

(5) Write applications of SDS page in determination of quaternary structure of oligomeric proteins.

(6) Discuss the relationship between RCF and Rpm.

(c) Answer any two of the following questions in detail. **10**

(1) Write a short note on principle and working of photomultiplier tube.

(2) Describe principle and applications of HPLC.

(3) Write the applications of radioisotopes in medicine and research.

(4) Discuss use of differential centrifugation technique in isolation of cell organelles from liver homogenate.

(5) Write short note on isoelectric focusing (IEF).
