Roll No. ..... Total Pages : 3

CMD/M-20 **18017**

BIOPHYSICS

Paper–BTI-202

Time Allowed : 3 Hours] [Maximum Marks : 65

Note : Attempt **five** questions in all, selecting at least **two** questions from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. Explain the following :

   (a) PI

   (b) Molar extinction coefficient.

   (c) Sedimentation coefficient.

   (d) Cation exchanger.

   (e) Radioactive decay.

   (f) Monochromator.

   (g) Polyacrylamide gel formation.

   (h) Units of radioactivity. 1.5×8=12

   (i) Retention factor. 1

UNIT–I

2. (a) Enlist various types of reference electrodes. Discuss merits and demerits of each type. 6

(b) Describe the structure of glass electrode. 3.5

(c) Write the principle of determination of pH using pH indicators. 3.5

3. (a) Enlist various factors affecting sedimentation of a particle. Explain with the help of mathematical equation for sedimentation rate. 6

(b) How is zonal rotor used for gradient centrifugation? Explain with appropriate diagram. 3.5

(c) Give a brief account of essential components of ultracentrifuge. 3.5

4. (a) Describe the principle and applications of affinity chromatography. Why is spacer arm important in this technique? 6

(b) Write the principle and applications of paper chromatography. 3.5

(c) How can the molecular weight of a macromolecule be determined using chromatography technique? 3.5

UNIT–II

5. (a) Discuss the applications of agarose and polyacrylamide gel electrophoresis. 6

(b) What would be the order of migration of the following forms of DNA in agarose gel electrophoresis :

(i) Linear double stranded DNA.

(ii) Open circular DNA.

(iii) Supercoiled DNA. 3.5

(c) What is a Solubilizer? Enlist various solubilizers used in SDS-PAGE. 3.5

6. (a) How is ionization chamber used to determine radioactivity? Explain different regions and their applications. 6

(b) Enlist various fluors used in solid and liquid scintillation counting. 3.5

(c) Give a brief account of applications of radioisotopes in the field of medicine. 3.5

7. (a) Compare visible and UV-spectroscopes for the source of light, monochromators and sample holders. 6

(b) Define Beer-Lambart's law. 3.5

(c) How is standard curve used to determine concentration of a compound in an unknown sample? 3.5