M.Sc. Examination, 2017

Semester- II

Zoology

Paper - MZCT-202

(Theoretical Basis of Methods in Biology)

Time: 3 Hours **Full Marks: 40**

Questions are of value as indicated in the margin.

*Answer **any four** questions*

1. (a) How Applied Centrifugal Field (G) is related to Relative Centrifugal Field (RCF)?
   (b) Distinguish between analytical and preparative centrifugation.
   (c) Compare and contrast the principle and applications of differential and density-gradient centrifugation. 2+2+(3+3)=10

2. (a) Give an account of the chemical components required for setting up a polymerization reaction in vertical PAGE. Indicate their functions in brief.
   (b) Comment on how a native protein molecule undergoes changes when subjected to boiling with treatment buffer containing SDS and β-mercaptoethanol.
   (c) Native PAGE electrophoresis is not suitable for determination of protein molecular mass – explain. 4+3+3=10

3. (a) State Beer-Lambert's law and its applications in quantitative biochemistry.
   (b) Comment on the limitations of this law.
   (c) How spectrophotometry is superior to colorimetry? (3+2)+2+3 = 10

4. (a) Give an account of "Double-antibody" or "Sandwich" ELISA.
   (b) How specificity and sensitivity are important for this assay?
   (c) How signal amplification is achieved in this colorimetric assay?
   4+4+2=10

5. (a) Define resolution in microscopy. How it is influenced by wave length of light and numerical aperture of lens? Write a brief note on the objective lens of a light microscope.
   (b) Describe briefly the procedure of biological sample preparation for TEM study.
   (1+2+2)+5=10

6. Answer ***any two*** of the following: 5x2=10
   (a) Quality Control Parameters in radioimmunoassay (RIA)
   (b) Separation Systems employed in competitive protein binding assay
   (c) Free Radical Catalysis and its importance in PAGE
   (d) Relative front (Rf) and its importance in protein molecular mass determination

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