RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (Special) Degree in Applied Biology
Third Year – Semester II Examination – April /May 2016

MIB 4205 - ANALYTICAL TECHNIQUES IN BIOLOGY

Time: Two (02) hours

Answer **any four** questions only.

1. a) What is meant by a total protein fingerprint of an organism. **(20 marks)**

   b) Describe briefly a method used for total protein fingerprinting in plants. **(50 marks)**

   c) A student faced following problems while attempting to study proteins using polyacrylamide gel electrophoresis. Suggest the possible causes and remedies to overcome those problems.

   i. Failure of the sample to form a layer at the well bottom

   ii. Variation in the staining density along the width of a stained band

   iii. Heavily stained band at the origin of the separating gel **(30 marks)**

2. a) Define "distribution coefficient" in chromatography. **(10 marks)**

   b) Describe how you would carry out a preliminary study of secondary metabolites present in a plant. **(90 marks)**

3. a) Give any four properties of a protein used for characterization. **(20 marks)**

   b) Explain briefly why ammonium sulphate is often used for salting out of proteins. **(30 marks)**

   c) A student working with proteins accidently mixed his sample with a salt solution. Unfortunately, neither chromatographic columns nor resins are available in the laboratory.

   Explain a method which he could use to remove salts in the protein sample. **(50 marks)**

4. a) Explain the need of calibrating a pH meter before use. **(15 marks)**

   b) How would you carry out a two-point calibration of a pH meter? **(15 marks)**

   c) Mention when to use one-point calibration and two-point calibration. **(10 marks)**

   d) Explain how QPCR can be used to quantify human DNA from other DNA in a mixed DNA sample. **(60 marks)**

5. a) Distinguish the terms emission, transmission, scattering and florescence with respect to spectroscopy. **(30 marks)**

   b) Explain the law which relates absorbance of light by a solution and its solute concentration. **(30 marks)**

   c) Compare and contrast rate zonal centrifugation and sedimentation equilibrium centrifugation. **(40 marks)**

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