2111E738

Candidate's Seat No :_____

M.Sc Sem-3 Examination

502

Life Science

November-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions:

All questions are compulsory.

Illustrate your answers with neat diagrams wherever necessary.

Question - 1 **Write the following**

i) Write a short note on concept of pH and pH scale. [07]

ii) Explain the basic principle of UV/visible spectroscopy. [07]

OR

i) Write a short note on Buffer and buffering system with an example [07]

ii) Discuss instrumentation of flourimetry. [07]

Question - 2 **Write the following**

i) Explain principles and application of paper chromatography. [07]

ii) Write short note on ultracentrifugation. [07]

OR

i) Write short note on theory and principles of centrifugation. [07]

ii) Explain principles and application of gel permeation chromatography. [07]

Question - 3 **Write the following**

i) Write short note on 2D gel electrophoresis [07]

ii) Write short note on immunoelectrofocusing [07]

OR

i) Write short note on Sanger sequencing. [07]

ii) Write short note on Flow cytometry. [07]

Question - 4 **Write the following**

i) Explain the working principle of liquid scintillation counting. Discuss in detail how the scintillation process converts radioactive emissions into measurable signals and the factors that affect the counting efficiency, including sample preparation, quenching, and energy transfer. [07]

ii) Explain different types of radioactive isotopes with two examples each example? [07]

OR

i) Explain the steps in correct sequences which are followed in the radio tracer techniques? [07]

ii) Explain the process of autoradiography in detecting and visualizing radioactive molecules in biological samples. Discuss the preparation of samples, exposure to radiation, development of autoradiograms, and the factors affecting the sensitivity and resolution of the images, such as exposure time and the type of radioactive isotope used. [07]

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Question - 5 **Attempt any seven out of twelve** [14]

i) Which is biological buffer system? Give example.

ii What is amphoteric nature of amino acid?

iii What is the principle of liquid scintillation counting, and how does it detect radioactive emissions?

iv Explain the importance of affinity and specificity in the antibodies used in RIA. How do these properties affect the sensitivity of the assay?

v What is the function of the monochromator?

vi What is the half life of ^{125}I and ^{131}I and what type of radiation they emit?

vii How do you optimize 2D electrophoresis conditions for complex protein samples?

viii How the labelling of the radiotracer precursor is performed?

ix How can autoradiography be used to determine the localization and quantification of nucleic acids in cells? Discuss the advantages of using isotopic vs. non-isotopic labels.

x What are the common methods for visualizing and analyzing separated substances in partition chromatography?

xi Which centrifugation method is used to separate cell organelles?

xii What are the stable isotopes? Give two examples.