Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 08

PHD (Biotechnology)

BIOCHEMICAL AND SEPARATION TECHNOLOGY

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTIONS TO CANDIDATES :

1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

Q1 a) A mixture of edible oil has to be analyzed for the purpose of quality assurance as per laid down guidelines by the ministry of food processing and industries. Suggest a chromatographic technique which would be helpful in determining the composition of edible oil? Will this technique require any pre-column treatment of the sample or not? If yes please explain the kind of pretreatment used and its rationale.

b) Give the schematic setup of the Gas Chromatograph having FID detector and briefly discuss its working.

Q2 a) Give the diagrammatic setup of a double beam UV-Visible spectrophotometer neatly labelling its components.

b) Give the differences between scanning electron microscope and light microscope.

Q3 a) You have to separate a mixture of DNA from Plant, animal and Microbial source. The tools available to you are electrophoresis, centrifuge and Column chromatograph. Which technique or a combination of technique is would you use and why? Give brief details of the probable method to be adopted.

b) Write short notes on **any two** of the following (400-500 words) :

i) Density Gradient Centrifugation

ii) Fluorescence Microscopy

iii) Western Blotting

iv) Affinity Chromatography

Q4 a) Differentiate between rate zonal centrifugation and density gradient centrifugation giving suitable examples.

b) Draw a neat diagram of a compound light microscope and label it's all parts? Differentiate between Resolution and magnification of a microscope.

Q5 a) Differentiate between polyacrylamide gel electrophoresis and agarose gel electrophoresis by giving suitable examples.

b) Give the four principles on which fluorescence spectroscopy is based. Give the applications of Fluorescence spectroscopy.

Q6 a) Geiger Muller Counter and Scintillation counter are two instruments used for measuring the radioactivity. Which of the two are better and why? Explain briefly the working of the best instrument.

b) Give the applications of radioisotopes in biotechnology research and in medical sciences.

Q7 a) Highlight the advantages of HPLC over open column chromatography.

b) Paper Chromatography has been one of the early techniques used for the separation of mixtures. What are the different types of paper chromatography? Which is the most accepted form of paper chromatography? Give the principle of Paper chromatography.

Q8 a) Briefly give the principle of Nuclear Magnetic Resonance spectroscopy (NMR).

b) Give an account on the medical and non-medical application of NMR.