Exam.Code:1032
Sub. Code: 7864

1128
M.E. (Biotechnology) First Semester
MEBIO-102: Biotechniques

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit. Make suitable assumptions wherever necessary.

x-x-x

I. Attempt the following:-

a) Assume that you have isolated and purified a novel protein from a biochemical preparation. How might you determine its subcellular distribution and possible function in the cell?

b) What will happen to the counting efficiency of a Geiger-Muller counter as the count rate rises?

c) What is FRAP technique?

d) Contrast DIGE to gel free approach.

e) What are Auger electrons?

f) Explain the concept behind Surface Plasmon Resonance [SPR] based biosensors.

g) What are isobaric tags?

h) A detector detects 2200 dpm at an efficiency of 85%. Calculate the number of cpm.

i) Enumerate various applications of mass-spectrometric techniques.

j) What are different imaging modes for atomic force microscopy? (10x1)

UNIT – I

II. a) Discuss the limitations faced during immune-cytochemical staining using conventional microscope. Describe as to how these limitations can be overcome in flow-cyto metric analysis.

b) Explain how ICAT can be used to identify differences in the protein content of two complex mixtures. (6,4)

III. a) Describe the phenomena of excitation and emission in fluorescence spectroscopy.

b) Elaborate the significance of resonance energy transfer studies.

c) Give a brief account on as to how FRAP can be used to study polymerization of proteins. (3,4,3)

P.T.O.

IV. a) Define chromatography. Suggest how you would interface gas- chromatography and liquid-chromatography with a mass- spectrometer.

b) Discuss advantages and disadvantages of Quadruple and Time-of-Flight (TOF) mass spectrometer analyzers? (5,5)

UNIT – II

V. Provide detailed description of electron microscopy covering preparation of specimen and need of vacuum. Also discuss some major considerations and compare that with cryo-ET. (10)

VI. a) Give a detailed account on the working and principle of β-scintillation counter. Also mention some of its limitations and advantages as detection method.

b) Provide brief discussion on high-throughput sequencing methods. (6,4)

VII. a) Define molecular autoradiography. A hypothetical protein "P" localizes within the nucleus in human liver cells. However upon treatment with a factor "X" it relocahzes to the cell cytoplasm and get evenly distributed there. Using your current understanding of radiotracers and autoradiography, design an experiment in validation of this statement.

b) Assuming that a protein lacks tyrosine, what isotope would you chose to measure its polymerization kinetics and why? (6,4)

x-x-x