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Total Number of Pages : 2

B.TECH

4th Semester Regular Examination-April-May 2019**BBTPC4030 – BIO ANALYTICAL TECHNIQUES****(Regulations 2017) BIOTECH Branch**

Time : 3 Hours

Maximum : 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) 10 x 2=20 Mark**Q.1. Answer ALL Questions.**

- a. According to the Beer-Lambert Law, on which of the following does absorbance not depend? [CO1] [PO1]
A) Colour of the solution.
B) Distance that the light has travelled through the sample.
C) Solution concentration.
D) Extinction coefficient of the sample.
- b. The distance between the centers of the peaks of doublet is called as? [CO1] [PO3]
A) Coupling constant B) Spin constant C) Spin-spin coupling D) Chemical shift
- c. Which of the following is the reference that is generally used in FTIR interferometer? [CO1] [PO1]
A) Air B) NaCl solution C) Alcohol D) Base solution
- d. Which among the following helps us in getting a three-dimensional picture of the specimen? [CO2] [PO1]
A) Transmission Electron Microscope B) Scanning Electron Microscope C) Compound Microscope D) Simple Microscope
- e. Polymerase used for PCR is extracted from _____ [CO2] [PO4]
A) *Escherichia coli* B) *Homo sapiens* C) *Thermus aquaticus* D) *Saccharomyces cerevisiae*
- f. In Column chromatography, the stationary phase is made of _____ and the mobile phase is made of _____ [CO3] [PO1]
A) Solid, liquid B) Liquid, liquid C) Liquid, gas D) Solid, gas
- g. Your purification strategy of combinations of chromatography steps gives a protein preparation with a single band on SDS-PAGE. Which of the following would be best for determining the protein concentration (as mg/ml or molarity)? [CO3] [PO3]
A) Measure a UV absorbance scan and use the absorbance at 280nm with the molar extinction coefficient (predicted from the amino acid sequence)
B) Determine amino acid composition after hydrolysis to amino acids
C) Colorimetric assay using Bradford or BCA assays
D) "Guesstimate" the concentration from the intensity of bands on SDS-PAGE gels
- h. Syringe pumps used in High pressure liquid chromatography are most suitable for which of the following columns? [CO3] [PO5]
A) Capillary columns B) Guard columns C) Short-fast columns D) Small bore columns
- i. When nuclear radiations pass through, gas ionization is produced. This is the principle of which of the following detectors? [CO4] [PO1]
A) Proportional counter B) Flow counter C) Geiger Muller counter D) Scintillation counter
- j. If a radiolabel is used to tag a DNA molecule, the technique used to localise would be [CO4][PO12]
A. X-ray crystallography B. Autoradiography C. Fluorescence microscopy D. Electron microscopy

PART – B: (Short Answer Questions) 2x10=20 Marks**Q.2. Answer ALL questions**

- a. List different techniques used to study physiochemical properties of biomolecules? [CO1][PO1]
- b. What are the different methods used in the preparation of samples for Electron microscopy? [CO1] [PO3]
- c. Differentiate between Native PAGE and SDS PAGE? [CO2] [PO1]
- d. What are the different membrane used in Blotting? [CO2] [PO5]



e	Why the continuous centrifugation is advantages than batch in industry?	[CO2] [PO6]
f	What is Retention factor/ Retardation factor (R_f)?	[CO3] [PO1]
g	What are the different types of column used in HPLC?	[CO3] [PO5]
h	Difference between normal phase and reversed phase chromatography	[CO3] [PO2]
i	Define Townsend avalanche effect?	[CO4][PO12]
j	How radioactive waste need to be disposed?	[CO4][PO12]

PART – C: (Long Answer Questions) 15x4=60 Marks

Q.3 Answer ALL questions

a.	Write in details about the construction and working principle of Nuclear Magnetic Resonance?	8 7	[CO1] [PO1]
b.	Explain the difference in Transmission Electron Microscope and Scanning Electron Microscope with a neat diagram?		[CO1] [PO1]

OR

c.	Write about the principle, construction and working of FT-IR?	8 7	[CO1] [PO3]
d.	Write about the principle, construction and working of X –ray crystallography		[CO1] [PO5]

Q.4

a.	Write about the principle of 2D PAGE? Explain in detail about the analysis of 2D – gel?	8 7	[CO2] [PO4]
b.	Explain principle of sedimentation and describe the different types of centrifuge?		[CO2] [PO5]

OR

c.	Write about the principle, construction and working of Southern blotting with a neat diagram?	8 7	[CO2] [PO1]
d.	Write about the principle, working and applications of PCR?		[CO2] [PO6]

Q.5

a.	(a) Explain the term chromatography. List the experimental procedure on chromatography and give the classification of various chromatography?	8	[CO3] [PO2]
	(b) Write Brief note on the separation techniques for a mixture of Cu, Co and Ni?	7	
b.	(a) Discuss Thin layer chromatography and Paper chromatography in detail. (b) Describe the theory, instrumentation and application of HPLC?		[CO3] [PO1]

OR

c.	What are the differences between ion exchange and gel perfusion chromatography?	8 7	[CO3] [PO3]
d.	Describe the theory, instrumentation and application of Gas Chromatography?		[CO3] [PO5]

Q.6

a.	What are the radioactivity activity detection methods based on ionization?	8 7	[CO4] [PO2]
b.	excitation (solid and liquid scintillation counting)		[CO4] [PO1]

OR

c.	Explain the principle and working of autoradiography?	8 7	[CO4] [PO1]
d.	What are the safety aspects of handling radioactive material? Explain in detail?		[CO4][PO12]