

Total No. of printed pages = 6

63/2 (SEM-3) BIT 303

2021

(held in 2022)

BIOTECHNOLOGY

Paper : BIT-303

(Analytical Techniques)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks
for the questions.

1. Choose the correct answers : $2 \times 10 = 20$

(i) Mass spectrometers are used to determine
which of the following ?

(a). Composition in sample

(b) Concentration of elements in sample

(c) Relative mass of atoms

(d) Properties of sample

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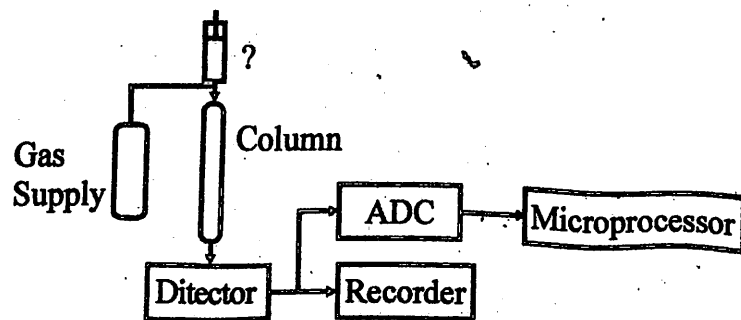
(ii) Mass spectrometer separates ions on the basis of which of the following ?

- (a) Mass
- (b) Charge
- (c) Molecular weight
- (d) Mass to charge ratio

(iii) Which of the following is not true about High pressure liquid chromatography (HPLC) ?

- (a) It requires high pressure for the separation of the species
- (b) There is no need to vaporise the samples
- (c) It is performed in columns
- (d) It has high sensitivity

(iv) Given below is the block diagram of gas chromatography. Identify the unmarked component.



(a) Pumping system

(b) Pressure regulator

(c) Flow regulator

(d) Sample injection system

(v) Which of the following is not a type of radiation detectors ?

(a) Geiger Muller counter

(b) Proportional counter

(c) Semiconductor detector

(d) Flame emission detector

(vi) NMR spectroscopy is used for determining structure in which of the following materials ?

(a) Radioactive materials

(b) Insoluble chemical compounds

(c) Liquids

(d) Gases

(vii) Electron spin resonance involves detecting the detection of a physical phenomenon of _____ of electromagnetic radiation.

- (a) Adsorption
- (b) Absorption
- (c) Radiation
- (d) Reflection

(viii) Which of the following microscopy techniques relies on the specimen interfering with the wavelength of light to produce a high contrast image without the need for dyes or any damage to the sample ?

- (a) Conventional Bright Field Light Microscopy
- (b) Phase Contrast Microscopy
- (c) Electron Microscopy
- (d) Fluorescence Microscopy

(ix) The resolving power of TEM is derived from _____

- (a) electrons
- (b) specimens
- (c) power
- (d) ocular system

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(x) Resolving power of a microscope is a function of _____.

- (a) Wavelength of light used
- (b) Numerical aperture of lens system
- (c) Refractive index
- (d) Wavelength of light used and numerical aperture of lens system

2. Answer the principles of any *eight* of the following questions : $5 \times 8 = 40$

- (i) Scanning Electron Microscopy
- (ii) Fluorescent Microscopy
- (iii) Affinity Chromatography
- (iv) Radio isotope tracer technique
- (v) PCR Primer
- (vi) Density Gradient Centrifugation
- (vii) SDS-PAGE
- (viii) ELISA
- (ix) Liquid Scintillation Counter.

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3. Answer any *two* of the following questions :

10×2=20

- (a) Write the working principle of Thermal Cycler.
- (b) What is the principle of electrophoresis ? What are the differences between the methods of Vertical Electrophoresis and Horizontal Electrophoresis ?
- (c) Write a note on construction and working principle of Scanning Electron Microscope.