

Registration No:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

B.Tech
PBT4I103

4th Semester Regular / Back Examination 2017-18

BIOINSTRUMENTATION

BRANCH: BIOTECH

Time: 3 Hours

Max Marks: 100

Q.CODE: C 661

Answer Part-A which is compulsory and any four from Part-B.

The figures in the right hand margin indicate marks.

Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1 Answer the following questions: *multiple type or dash fill up type* (2 x 10)

- a) Which of the following can't be used as adsorbent in column adsorption chromatography-
(i) Magnesium oxide, (ii) Silica gel, (iii) activated alumina, (iv) Potassium permanganate
- b) Chromatography is based on the
(i) Different rate of movement of the solute in a column, (ii) Separation of one solute from other constituents by being captured on the adsorbent, (iii) Different rate of movement of the solvent in the column, (iv) None of the above
- c) In gas chromatography, the basis for separation of the components is the difference in (i) Partition coefficients, (ii) Conductivity, (iii) Molecular weight, (iv) Molarity
- d) A student sets up a paper chromatogram and places a spot of green food dye on the origin. After six minutes the solvent has moved 12 cm and a blue spot has advanced 9 cm. After fourteen minutes the solvent has advanced a further 8 cm. How many cm from the origin is the blue spot likely to be? (i) 18 cm, (ii) 15 cm, (iii) 12 cm, (iv) 9 cm
- e) Mass spectrometers are used to determine which of the following? (i) Composition of sample, (ii) Concentration of element, (iii) Relative mass of atoms, (iv) properties of sample
- f) In mass spectrometer, the sample that has to be analysed is bombarded with which of the following?
(i) protons, (ii) electrons, (iii) neutrons, (iv) alpha particles
- g) Chemical shifts originate from (i) magnetic momentum, (ii) electron shielding, (iii) free induction decay, (iv) scalar coupling (J-coupling)
- h) Scanning electron microscopy (SEM) is best used to study
(i) small internal cell structures, (ii) surface morphology, (iii) both, (iv) none of the above
- i) Why thin section of specimen is necessary for TEM? (i) electrons are negatively charged, (ii) electrons have no mass, (iii) electrons have wave nature, (iv) electrons have poor penetrating power

- j) All of the above are true for TEM and SEM except (i) illuminating source is electron beam, (ii) microscope is focused using electromagnetic , (iii) specimen less than 0.2 microns, (iv) specimen must be sectioned prior viewing

- Q2** Answer the following questions: **Short answer type** (2 x 10)
- a) Differentiate between SDS-PAGE and Native PAGE.
 - b) Write the working principle of CD.
 - c) How FT-IR works?
 - d) Write the importance of X-ray crystallography study.
 - e) Differentiate between 1D PAGE and 2D PAGE.
 - f) What are the safety aspects of handling radioactive material?
 - g) What is van Deemter plot?
 - h) What is peak broadening?
 - i) Differentiate between normal phase and reversed phase chromatography.
 - j) What is time of flight? Write its importance in Mass spectral analysis.

Part – B (Answer any four questions)

- Q3** a) Write the different types of Blotting techniques. Discuss in detail principle and working of Northern Blot analysis. (10)
- b) Write the principle and working of isoelectric focusing. (5)
- Q4** a) Discuss the general principle of electrophoresis. Write a note on native gel. (10)
- b) Discuss the working principle and application of DSC. (5)
- Q5** a) Discuss the principle, working and application of NMR spectroscopy with suitable example. (10)
- b) Write a note on working of Mass-spectrometry. (5)
- Q6** a) Discuss in detail the sample preparation method for electron microscopy. (10)
- b) Differentiate between TEM and SEM. (5)
- Q7** a) Briefly enumerate the different radioactivity detection methods. (10)
- b) Write a note on Autoradiography. (5)
- Q8** a) Classify different types of chromatography techniques. (10)
- b) Discuss the working of Affinity chromatography. (5)
- Q9** a) Discuss in details the construction of Biosensors and their working. (10)
- b) Write a note on Application of Biosensors in Environmental control. (5)