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) Magesium oxide, (ii) Silica gel, (iii) activated alumina, (iv) Pottasium 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)**