



AAH-003-001622 Seat No.

B. Sc. (Sem. VI) (CBCS) Examination

April/May - 2016

BT-602 : Analytical Techniques in Biotechnology

Faculty Code : 003
Subject Code : 001622

Time : $2\frac{1}{2}$ Hours] [Total Marks : 70

Instructions : (1) All questions are compulsory.
(2) Figures at right side indicate marks of the question.

SECTION - I

(4) Biosensors work with two enzymes :

- (A) Glucose oxidase and reductase
- (B) Glucose oxidase and peroxidase
- (C) Reductase and peroxidase
- (D) Reductase and permease

(5) The QRS Wave of an ECG represents :

- (A) Ventricular depolarization
- (B) Ventricular repolarization
- (C) Atrial depolarization
- (D) Atrial repolarization

(6) Which of the following biosensors is amperometric biosensor?

- (A) Ion selective electrode
- (B) Fluorescent biosensor
- (C) Clark oxygen electrode
- (D) Fiber optic biosensor

(7) The density gradient is shallow in

- (A) Rate zonal centrifugation
- (B) Isopycnic
- (C) Both (A) & (B)
- (D) None of these

(8) Biosensor contains

- (A) immobilized enzymes
- (B) image sensing devices
- (C) mobilized enzymes
- (D) a bar code sensing device

(9) The maximum limit of agarose gel is
(A) 20 kbp (B) 30 kbp
(C) 40 kbp (D) 50 kbp

(10) Which of the following techniques can be used to measure (in vivo) the metabolic activity of the brain?
(A) Autoradiography
(B) Angiography
(C) Computerized axial tomography
(D) Positron emission tomography

(11) Intensifying screens are used for
(A) Weak beta emitters
(B) Strong beta emitters
(C) Alpha emitters
(D) All of these

(12) Which method in immobilization provides the least chances of leakage?
(A) Adsorption (B) Ionic Bonding
(C) Covalent Bonding (D) None of these

(13) A hollow-cathode lamp is :
(A) A broad-band light source
(B) A narrow-band light source
(C) A light detector
(D) not a light source.

(14) The major demerit of covalent bonding method used in immobilization of Enzyme is
(A) Leakage of Enzyme
(B) Inactivation of Active site
(C) Weak interaction
(D) None of the above

(15) Which of the following is best for the volatile mixtures?

- (A) HPLC
- (B) Gas Liquid Chromatography
- (C) Thin Layer Chromatography
- (D) Paper chromatography

(16) A person is lying inside a scanner, taking part in an experiment after an injection of 2 deoxyglucose. This person is participating in :

- (A) An fMRI study
- (B) A PET study
- (C) AN MEG study
- (D) An EEG study

(17) Infrared spectroscopy provides valuable information about

- (A) molecular weight
- (B) melting point
- (C) conjugation
- (D) functional groups

(18) A Geiger counter indirectly measures radiation by measuring

- (A) ions produced
- (B) flashes of light
- (C) speaker static
- (D) curies

(19) 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?

- (A) 26
- (B) 8
- (C) 18
- (D) 15

(20) In gas chromatography, the concentration of a substance can be determined by ...

- (A) Comparison of the Rt of the substance with that of a standard.
- (B) Measurement of the height of the peak produced by the substance
- (C) Calculation of the Rt value of the substance.
- (D) Comparison of the area under the peak produced by the substance with the areas under the peaks produced by standard solutions

SECTION - II

2 (a) Attempt any 3 of 6 : (2 Marks each)

- (1) Show the relation between Bq and C_i and dps
- (2) What are bioreactors?
- (3) What are components of centrifuge ?
- (4) What is the difference between transmission and adsorption?
- (5) Differentiate SDS PAGE from PAGE.
- (6) Define Refraction.

(B) Attempt any 3 of 6 : (3 Marks each)

- (1) Explain Beer Lambert's Law?
- (2) Write down the principle of UV-visible light Spectroscopy.
- (3) What are the biological applications of NMR ?
- (4) What are the differences between Zonal and Isopycnic centrifugation?
- (5) What is autoradiography ? Write any two applications of autoradiography in biology.
- (6) Write short note on detectors of Gas chromatography.

(c) Attempt any 2 of 5 : (5 Marks each)

- (1) Explain the different methods used for enzyme immobilization.
- (2) Give the detailed account of isopycnic centrifugation.
- (3) Define Radioactivity. Explain the methods for measuring the radioactivity.
- (4) Describe Atomic Emission Spectroscopy including the principle, and the use of major components of the instrument in the process of emission.
- (5) Define Mass Spectroscopy? What are the applications of Mass Spectroscopy?

3 (a) Attempt any 3 of 6 : (2 Marks each)

- (1) What is the principle of reverse phase chromatography?
- (2) Write down the principle of Size exclusion chromatography.
- (3) What is Nuclear Binding Energy?
- (4) Write down the applications of fMRI ?
- (5) What are the properties of solvent ?
- (6) What is top down and bottom up approach in nanotechnology ?

(b) Attempt any 3 of 6 : (3 Marks each)

- (1) What are the agents responsible for polymerization of Acrylamide gel ? Explain
- (2) Explain properties of electromagnetic radiation.
- (3) What are the differences between solvent extraction and chromatography ?
- (4) Explain Geiger Muller Region.
- (5) Explain principle of Single neuron recording.
- (6) How drug will be delivered using nanotechnology?
Explain with one suitable example

(c) Attempt any 2 of 5 : (5 Marks each)

- (1) What are the components and applications of Biosensor ?
- (2) Explain the ways through which gamma radiation interact with matter
- (3) Write down the principle and application of CAT.
- (4) Write down the principle and application of TLC? How it differs from Paper chromatography ?
- (5) Write down the principle and application of HPLC.
