



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

1 There are 20 multiple choice questions (MCQs). **20×1=20**

Choose the correct option :

- (1) The unit used to measure the amount of radiation absorbed by a gram of material is called the _____
(A) rad (B) RBE
(C) curie (D) rem
- (2) The radioisotope used as a diagnostic tool to measure thyroid function is _____
(A) I-131 (c) P-32
(B) Tc-99 (D) Co-60
- (3) Krypton-79 has a half-life of 35 hours. How many half-lives have passed after 105 hours?
(A) 1 half life
(B) 2 half lives
(C) 3 half lives
(D) 4 half lives

- (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 R_t of the substance with that of a standard.
 - (B) Measurement of the height of the peak produced by the substance
 - (C) Calculation of the R_t 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 B_q 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.
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