



Seat No. _____

HA-003-2016042

B. Sc. (Sem. VI) Examination

April - 2023

Biotechnology : BT602

(Analytical Techniques in Biotechnology) (2019)

Faculty Code : 003

Subject Code : 2016042

Time : $2\frac{1}{2}$ / Total Marks : 70

Instructions :

- (1) All questions are compulsory.
- (2) The right-side figure indicates total marks of the questions.
- (3) Draw the figure wherever necessary.

- 1** (a) Answer the questions : **4**
- (1) A Geiger counter can provide an indirect measure of radioactivity because radiation has a property of _____.
 - (2) An atom or molecule with an unpaired electron in the outer shell is called _____.
 - (3) Atomic and molecular masses are expressed as _____.
 - (4) The most penetrating of the three common types of nuclear radiation is the _____.
- (b) Answer any one question : **2**
- (1) Explain half-life of radioisotopes.
 - (2) Give radioisotopes of hydrogen.
- (c) Answer any one question : **3**
- (1) Give principle and application of Scintillation counter.
 - (2) Describe in short about types of radioactive decay.
- (d) Answer any one question : **5**
- (1) Give applications of radioactivity in biological science.
 - (2) Write a note on health hazards associated with radioactivity.

- 2 (a) Answer the questions : 4
- (1) _____ is the tracking dye used in the PAGE.
 - (2) 2 D gel is based on two techniques _____ and _____.
 - (3) Electrophoresis was discovered by _____.
 - (4) The separation technique of particle under the influence of centrifugal force is called _____.
- (b) Answer any one question : 2
- (1) Give applications of IEF.
 - (2) Give applications of Density gradient centrifugation.
- (c) Answer any one question : 3
- (1) Describe the principle and applications of Agarose electrophoresis.
 - (2) Discuss in short about rotors.
- (d) Answer any one question : 5
- (1) What are the differences between density gradient centrifugation and differential centrifugation ?
 - (2) What is capillary electrophoresis ? Give advantages and applications of capillary electrophoresis.
- 3 (a) Answer the question : 4
- (1) Gratings in spectrophotometer works on the principle of _____.
 - (2) Infrared spectroscopy provides valuable information about _____.
 - (3) The distance travelled by light as it passes through a cuvette is called _____.
 - (4) X-ray diffraction can only be applied to Solid and _____ materials.
- (b) Answer any one question : 2
- (1) Give Beer Lambert law.
 - (2) What is basic difference between atomic absorption and atomic emission spectroscopy.
- (c) Answer any one question : 3
- (1) Derive Bragg equation. Discuss its importance in X-ray crystallography.
 - (2) What is chemical shift ? Write applications of NMR in biotechnology.
- (d) Answer any one question : 5
- (1) What is spectrophotometer ? Discuss in detail about instrumentation and applications of UV-visible spectrophotometer.
 - (2) Explain Raman spectroscopy in detail.

- 4 (a) Answer the questions : 4
- (1) Full form of HPLC is _____.
 - (2) In ion exchange chromatography molecules separates according to their _____.
 - (3) In normal phase chromatography , the stationary phase is made of _____.
 - (4) In reverse phase chromatography, the stationary phase is made of _____.
- (b) Answer any one question : 2
- (1) What is planar chromatography ?
 - (2) Give two applications of TLC and paper chromatography.
- (c) Answer any one question : 3
- (1) Derive an equation to establish relationship between RCF and RPM.
 - (2) Give applications of affinity chromatography.
- (d) Answer any one question : 5
- (1) Describe principle and applications of HPLC in detail.
 - (2) Explain in detail about principle and applications of GLC.
- 5 (a) Answer the questions : 4
- (1) A patent is granted maximum for _____ years.
 - (2) _____ first used the term nanotechnology.
 - (3) _____ biosensors use the principle of heat released or absorbed by a reaction.
 - (4) _____ biosensors use the movement of electrons produced during redox reactions.
- (b) Answer any one question : 2
- (1) Draw basic flow diagram of biosensor.
 - (2) Define : Fluorescence.
- (c) Answer any one question : 3
- (1) Give principle and applications of nanotechnology.
 - (2) Give ideal characteristics and applications of biosensor.
- (d) Answer any one question : 5
- (1) What is IPR ? Explain types, procedure and importance of IPR.
 - (2) Explain mass spectrophotometer and describe about components and applications of it in Biotechnology.