Seat No. _____

HA-003-1016012

B. Sc. (Sem. VI) Examination

April - 2023

Biotechnology : BT-602

(Analytical Techniques in Biotechnology)

Faculty Code : 003
Subject Code : 1016012

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

Instructions :

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

1 (a) Answer the questions : **4**

(1) A _____ can provide an indirect measure of radioactivity because radiation has a property of ionization.
(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 least penetrating of the three common types of nuclear radiation is the _____.

(b) Answer any one question : **2**

(1) What is radioactivity ?
(2) Name radioisotopes of hydrogen.

(c) Answer any one question : **3**

(1) What is the principle of Scintillation counter ?
(2) Explain about units of radioactivity.

(d) Answer any one question : **5**

(1) What is radioactive decay ? Discuss in short about types of radioactive decay.
(2) Discuss about applications of radioactivity in biological science.

2 (a) Answer the questions : **4**

(1) Agarose is co polymer of _____ and _____.
(2) Full form of SDS is _____.
(3) The separation technique of particle under the influence of centrifugal force is called _____.
(4) What is the first stage of the 2D gel electrophoresis ?

(b) Answer any one question : **2**

(1) Give application of 2D gel electrophoresis.

(2) Give application of differential centrifugation.

(c) Answer any one question : **3**

(1) Discuss properties of Agarose as support media in electophoresis.

(2) Discuss in short about basic components of centrifuge.

(d) Answer any one question ; **5**

(1) What is electrohporesis ? Describe in detail about electrophoresis and its applications in biotechnology.

(2) What are the differences between density gradient centrifugation and differential centrifugation ?

3 (a) Answer the questions : **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) State Beer Lambert law.

(2) What is basic difference between atomic absorption and atomic emission spectroscopy ?

(c) Answer any one question : **3**

(1) Give application of electromagnetic spectrum in biotechnology.

(2) Write a brief note on IR spectroscopy.

(d) Answer any one question : **5**

(1) What is spectrophotometer ? Discuss in detail about instrumentation and applications of UV-visible spectrophotometer.

(2) Explain X-ray crystallography in detail.

4 (a) Answer the questions : **4**

(1) Full form of FPLC is _____.

(2) In gel filtration chromatography molecules separates according to their _____.

(3) In cation exchange chromatography, stationary phase is _____.

(4) In reverse phase chromatography, the stationary phase is made of _____.

(b) Answer any one question : **2**

(1) Give applications of size exclusion chromatography.

(2) What is planer chromatography ?

(c) Answer any one question : **3**

(1) Write a note on principle and examples of affinity chromatography.

(2) Discuss properties of support phase used in chromatography.

(d) Answer any one question : **5**

(1) Discuss in detail about principle and applications of GLC.

(2) Give principle, instrumentation, and applications of HPLC.

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) Give principle of mass spectroscopy.

(c) Answer any one question ; **3**

(1) Give principle and applications of nanotechnology.

(2) Give applications of mass spectroscopy.

(d) Answer any one question : **5**

(1) Write a detailed note on ideal characteristics and applications of Biosensor.

(2) What is IPR ? Explain types, procedure and importance of IPR.
