

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2023
(Fourth Semester)

Branch - MICROBIOLOGY

BIOINSTRUMENTATION

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- Which of the following relationships between absorbance and %Transmittance is incorrect?
(i) $A = \log_{10} 100 / \%T$ (ii) $A = 2 - \log_{10} \%T$
(iii) $A = \log_{10} 1 / \%T$ (iv) $\%T = \log_{10} 100/A$
- Differential centrifugation is based on the differences in _____ of biological particles of different _____.
(i) Size, density (ii) Sedimentation rate, Sizes and density
(iii) Size, structure (iv) Mass, Size
- In anion exchange chromatography,
The column contains negatively charged beads where positively charged proteins bind
(ii) The column contains positively charged beads where negatively charged proteins bind
(iii) The column contains both positive and negatively charged beads where proteins bind depending on their net charge
(iv) Both (i) & (ii)
- The polymerization of gel used in PAGE occurs between polyacrylamide and
(i) bisacrylamide (ii) PEG
(iii) N-N - acrylamide (iv) N, N- methylene bisacrylamide
- Geiger-Muller tube is filled with an inert noble gas; because,
(i) To provide chemical stability during repeated ionization
(ii) They are cheap
(iii) For directing ionizing radiations
(iv) Both (i) & (iii)

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- a. Elaborate the principles of Beer-Lambert's law with a neat sketch.
OR
b. Explain the components of a biosensor with a neat sketch.
- a. Describe the working mechanism of ultracentrifugation.
OR
b. Highlight any three differences between analytical and preparatory centrifugation processes.
- a. Account on the mechanism of Adsorption chromatography.
OR
b. State the principle behind HPLC.

Cont...

- 9 a. Describe the role of chemical components used in Immuno electrophoresis.
OR
b. What is gel electrophoresis? Explain.
- 10 a. What is radioactivity? Name 3 radioactive molecules.
OR
b. Draw the block diagrams of solid-liquid scintillation counter.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a. Elaborate on UV-Visible spectrophotometry with an illustration.
OR
b. Demonstrate the working principle behind pH meter with a neat sketch.
- 12 a. Account on the principles and instrumentation of various centrifuges.
OR
b. Detail the working principle of differential centrifugation with suitable illustration.
- 13 a. Explain the concept of Gel-permeation chromatography.
OR
b. Describe the principle of affinity chromatography with a suitable illustration.
- 14 a. Describe the factors affecting gel electrophoresis.
OR
b. Compare and contrast two different types of gel electrophoresis
- 15 a. Describe the various applications of radioisotopes in biology.
OR
b. Describe the working principle and advantages of Geiger-Muller counter with a neat sketch.

Z-Z-Z

END