

**Bachelor of Science B.Sc. Semester—V Examination  
(Old & New)**

**MICROBIOLOGY  
(Molecular Biology & Bioinstrumentation)**

**Optional Paper—2  
(New)**

Time : [Three Hours]

[Maximum Marks : 50]

**Note :—**(1) All questions are compulsory and carry equal marks.

(2) Draw diagrams wherever required.

1. Discuss the mechanism of induced mutation in detail. 10  

**OR**

Describe process of Lac-Operon in detail. 10
2. Describe bacterial conjugation with example. 10  

**OR**

Explain in detail, generalized transduction. 10
3. Describe in detail, principle, working and application of UV-visible Spectrophotometer. 10  

**OR**

Describe principle, procedure and applications of Agarose gel-electrophoresis. 10
4. Give principle, working and application of thin layer chromatography. 10  

**OR**

Discuss detection and measurement of radioactive isotope by scintillation counter. 10
5. Attempt any **TEN** :
  - (1) Define Cistron.
  - (2) Define silent mutation.
  - (3) What are spontaneous mutations ?
  - (4) What are competent cells ?
  - (5) Define Auxotrophs.
  - (6) What are transposones ?
  - (7) What is Svedberg unit ?
  - (8) What is TEMED ?
  - (9) Give any two applications of SDS-PAGE.
  - (10) Give two applications of gel filtration chromatography.
  - (11) What is Rf value ?
  - (12) Give two names of radioactive isotope. 1×10=10

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1×10=10

Preliminary Examination

Winter - 2023

B.Sc. Sem-V

Subject: Microbiology

Paper: II

Time: Three Hours

Max. Marks: 50

Note:

- 1) All questions are compulsory and carry marks as indicated.
- 2) Draw neat and well labelled diagram wherever necessary.

- Q.1. Discuss the mechanism of induced mutation in detail. 10
- OR
- A) Explain the concept of gene within gene. 21/2
- B) Write note on physical mutagens. 21/2
- C) What is photoreactivation? Discuss about exciting radiations. 21/2
- D) Explain intergenic suppression along with examples. 21/2
- Q.2. Describe the process of transduction in detail. 10
- OR
- A) Write a note on types of recombination. 5
- B) Explain in detail the concept of transformation. 5
- Q.3.A) Explain the principle & applications of UV-Visible spectroscopy. 5
- B) Explain the principle & applications of differential centrifugation. 5
- OR
- C) Explain the principle & applications of agarose gel electrophoresis. 5
- D) Explain the principle & applications of analytical centrifugation. 5
- Q.4.A) Explain the method & application of isotope tracer technique. 5
- B) Describe in detail gel filtration chromatography. 5
- OR
- C) Explain the concept of ion exchange chromatography in detail. 5
- D) Discuss the types and applications of scintillation counter. 5
- Q.5. Solve any **Ten** of the following:
- I) What is site specific recombination? 1
- II) Define IS elements? 1
- III) What is Frame shift mutation? 1
- IV) Define spontaneous mutation. 1
- V) What are base analogues? 1
- VI) Define Beer Lambert's Law. 1
- VII) What is PAGE? 1
- VIII) What is isotope? 1
- IX) Define centripetal force & centrifugal force. 1
- X) What do you mean by *R<sub>f</sub> value*? 1
- XI) Define episome. 1
- XII) Give two factors affecting electrophoresis mobility. 1

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**NRT/KS/19/2148**

**Bachelor of Science (B.Sc.) Semester—V Examination**  
**MOLECULAR BIOLOGY AND BIOINSTRUMENTATION**

**Optional Paper—2**  
**(Microbiology)**

Time : Three Hours]

[Maximum Marks : 50

- N.B. :—** (1) All questions are compulsory and carry equal marks.  
(2) Draw diagrams wherever necessary.

1. (a) Explain Intragenic suppression with suitable example. 5  
(b) Explain the mechanism of mutation caused by alkylating agent and structural analogues. 5
- OR**
- (c) Explain mis-sense and non-sense mutations with examples. 5  
(d) Describe positive control of Lac operon. 5
2. Describe the process of transduction in detail. 10
- OR**
- Describe in detail Bacterial Transformation. 10
3. Describe SDS-PAGE technique in detail with its applications. 10
- OR**
- What is electrophoresis ? Discuss various factors affecting electrophoretic mobility in detail. 10
4. (a) Give principle and application of gel filtration chromatography. 2½  
(b) Write a note on Anion exchanger. 2½  
(c) Write a short note on Mass spectrometry. 2½  
(d) Write a note on GM Counter. 2½
- OR**
- (e) State the principle of HPLC. 2½  
(f) Give the principle of thin layer chromatography. 2½  
(g) Write a note on cation exchanger. 2½  
(h) Explain briefly how measurement of radioactive isotope can be done by using Liquid Scintillation Counter. 2½
5. Solve any **TEN** :
  - (i) Define inducer. 1
  - (ii) Define gene within gene. 1
  - (iii) What is spontaneous mutation ? 1
  - (iv) What are transposons ? 1
  - (v) Name any two donor cells in conjugation. 1
  - (vi) Name the scientist who discovered transposable elements. 1
  - (vii) What is buoyant density ? 1
  - (viii) What is monochromator ? 1
  - (ix) State Beer's Law. 1
  - (x) Give two names of stable isotopes. 1
  - (xi) Define  $R_f$  value. 1
  - (xii) What is half-life of isotopes ? 1