

**B.Sc. Semester - 4 (CBCS) Examination**  
**March/April-2025 [NEW COURSE]**  
**BioTechnology-BT401(Core)**

**Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
  2. Figures to the right indicate marks.
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- Que-1 (A) Answer the following. (Any one Out of Two) (07)
- 1) Explain the different models of population growth with examples.
  - 2) Describe the detailed note on biodiversity.
- Que-1 (B) Attempt any one. (Out of Two) (04)
- 1) Differentiate between freshwater and marine ecosystems.
  - 2) What is the significance of the sulfur cycle in the environment?
- Que-1 (C) Attempt any three. (Out of Five) (03)
- 1) The nitrogen cycle involves processes like nitrogen fixation, nitrification, and denitrification. (True/False)
  - 2) Exponential population growth occurs when resources are limited. (True/False)
  - 3) Name any two factors affecting biodiversity.
  - 4) What is the primary role of decomposers in the carbon cycle?
  - 5) The two main types of aquatic biomes are \_\_\_\_\_ and \_\_\_\_\_ ecosystems.
- Que-2 (A) Answer the following. (Any one Out of two) (07)
- 1) Explain the biodegradation process of DDT and its environmental significance.
  - 2) Discuss the major conventional air pollutants and their impact on the environment.
- Que-2 (B) Attempt any one. (Out of two) (04)
- 1) Differentiate between bioremediation and biomagnification.
  - 2) How does nitrobenzene biodegradation occur in the environment?
- Que-2 (C) Attempt any three. (Out of Five) (03)
- 1) Bioremediation is a process that utilizes microorganisms to clean up environmental pollutants. (True/False)
  - 2) Acid rain is caused by the excessive release of oxygen into the atmosphere. (True/False)
  - 3) Name one bacterial species involved in the biodegradation of hydrocarbons.
  - 4) What is the primary environmental concern associated with acid mine drainage?
  - 5) The accumulation of toxic substances in organisms at higher trophic levels in a food chain is known as \_\_\_\_\_.
- Que-3 (A) Answer the following. (Any one Out of two) (07)
- 1) Explain the primary, secondary, and tertiary treatment processes of wastewater.
  - 2) Discuss the process of bioleaching and its applications in metal recovery.
- Que-3 (B) Attempt any one. (Out of two) (04)
- 1) Differentiate between anaerobic digestion and composting.
  - 2) How do biofertilizers improve soil fertility?
- Que-3 (C) Attempt any three. (Out of Five) (03)
- 1) Secondary wastewater treatment primarily involves physical separation of solids. (True/False)
  - 2) Bioplastics are biodegradable polymers derived from renewable resources. (True/False)
  - 3) The process of using microorganisms to extract metals from ores is called \_\_\_\_\_.
  - 4) Name one biological property of water.
  - 5) What is the role of composting in solid waste management?

- Que-4 (A) Answer the following. (Any one Out of two) (07)
- 1) Explain the measures of central tendency and their applications, merits, and demerits.
  - 2) Describe the measures of dispersion and their significance in statistical analysis.
- Que-4 (B) Attempt any one. (Out of two) (04)
- 1) Differentiate between population and sample in biostatistics.
  - 2) What are the advantages of using the median over the mean in data analysis?
- Que-4 (C) Attempt any three. (Out of Five) (03)
- 1) The \_\_\_\_\_ is the middle value of an ordered dataset.
  - 2) The standard deviation measures the \_\_\_\_\_ of data points from the mean.
  - 3) A sample is a subset of a population selected for statistical analysis. (True/False)
  - 4) The arithmetic mean is always greater than or equal to the geometric mean. (True/False)
  - 5) What is the main purpose of data presentation in biostatistics?
- Que-5 (A) Answer the following. (Any one Out of two) (07)
- 1) Explain the Student's t-test and its application in biological research.
  - 2) Describe the analysis of variance (ANOVA) and its significance in data analysis.
- Que-5 (B) Attempt any one. (Out of two) (04)
- 1) Differentiate between correlation and regression analysis.
  - 2) State two properties of the binomial distribution.
- Que-5 (C) Attempt any three. (Out of Five) (03)
- 1) In a normal distribution, the mean, median, and mode are always equal. (True/False)
  - 2) The Student's t-test is used to compare the means of more than two groups. (True/False)
  - 3) Define skewness in a probability distribution.
  - 4) What does a chi-square test measure in biological studies?
  - 5) Define: Probability.

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