



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2023

DSE-P2-MICROBIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

**The question paper contains two parts DSE2-Paper-III and DSE2-Paper-IV.
The candidates are required to answer any *one* from *two* parts.
Candidates should mention it clearly on the Answer Book.**

DSE2-PAPER-III

ADVANCES IN MICROBIOLOGY

1. Answer any **five** of the following: 1×5 = 5
 - (a) Define pangenome.
 - (b) What is Genomic island?
 - (c) What is quorum sensing?
 - (d) State the two types of metagenomics.
 - (e) What is metabolomics?
 - (f) What is HGT?
 - (g) Define epiphytic fitness.
 - (h) Name one autoinducer in gram-negative bacteria.

2. Answer any **three** of the following: 5×3 = 15
 - (a) What is pathogenicity island? State its characteristics. 1+4
 - (b) What is operon? What is the significance of 16S rDNA sequence in microbial genome? 1+4
 - (c) Discuss importance of biofilm in terms of health care and antimicrobial resistance. $2\frac{1}{2}+2\frac{1}{2}$
 - (d) Write down the concept of synthetic biology.
 - (e) What is metagenomics? How does it become important in study of bacterial diversity? 1+4

3. Answer any **two** of the following: 10×2 = 20
 - (a) With suitable diagram discuss epiphytic fitness and its various mechanism in plant pathogens. 10

- (b) What is genome pool? Write the concept of core, flexible and unique genome pool. With a well-labelled diagram discuss the bacterial virulence factors. 2+3+5
- (c) Write notes on the following: 5+5
- (i) Biofilm formation
- (ii) Type III Secretion system.
- (d) Discuss the salient features of sequenced microbial genomes. What was the first genome to be sequenced? 8+2

DSE2-PAPER-IV

MICROBIAL BIOTECHNOLOGY

1. Answer any *five* from the following questions: 1×5 = 5
- (a) Which element is responsible for Minamata disease?
- (b) Name one methanogenic bacteria.
- (c) What is Microfiltration?
- (d) Which is first recombinant vaccine?
- (e) Name two microorganisms involved in biogas production.
- (f) What is biosensor?
- (g) What is biopesticide?
- (h) Expand VAM.
2. Answer any *three* of the following questions: 5×3 = 15
- (a) Describe the process of biodiesel production and mention the role of microorganisms involved in the process. 3+2
- (b) Describe the process of microbial production of Streptokinase. 5
- (c) Explain genetically engineered microbes and mention their applications. 2+3
- (d) What are Xenobiotic compounds? Explain biodegradation pathway of petroleum hydrocarbon. 2+3
- (e) What is PGPR? State its role in promoting growth in plants. 1+4
3. Answer any *two* of the following questions: 10×2 = 20
- (a) Schematically represent different steps of bioethanol production. Explain in detail the role of microbes in bioethanol production. 6+4
- (b) What is immobilised cell culture? Mention the advantages of immobilised cell culture. Mention the applications of Affinity Chromatography. 2+4+4
- (c) Write down the general mechanism of RNAi. State its applications in silencing genes and Drug resistance. 4+6
- (d) Give a detailed account of scope and applications of microbial biotechnology in human therapeutics. Write a note on different types of Mycorrhizae. 6+4

—x—