'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2022

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

1. Answer any ***five*** of the following questions: 1×5 = 5

   (a) What do you mean by core genome pool?
   (b) What is epiphytic fitness?
   (c) What is meant by horizontal gene transfer?
   (d) What are pathogenicity islands?
   (e) Define ORF.
   (f) What is metagenomics?
   (g) What is biofilm?
   (h) Define metabolomics.

2. Answer any ***three*** of the following questions: 5×3 = 15

   (a) Discuss the process of networking of metabolic pathways in bacteria with proper example. 5
   (b) State the mechanism of Hypersensitive response (HR) to plant pathogens. 5
   (c) Why might life in a biofilm be advantageous for microbes? 5
   (d) Discuss TTSS of plant pathogens. 5
   (e) Write short note on $2\frac{1}{2}\times2 = 5$
   (i) Antimicrobial resistance of Biofilm
   (ii) Pangenome.

3. Answer any ***two*** of the following questions: 10×2 = 20

   (a) Why do you think bacteria use quorum sensing to regulate genes needed for virulence? How might this reason be related to the rationale behind using quorum sensing to establish a symbiotic relationship? 5+5

(b) How do plants fight against plant pathogens? 10

(c) Discuss the epiphytic fitness of a plant pathogen and its mechanisms. 10

(d) What are transposons? Write about the characteristics of pathogenicity island responsible for bacterial virulence. 3+7

DSE2

PAPER-IV

MICROBIAL BIOTECHNOLOGY

1. Answer any ***five*** of the following: 1×5 = 5

(a) What is gene silencing technology?

(b) What is the purpose of using expression vector in microbial technology?

(c) What is Mycorrhizae?

(d) What are LMOs?

(e) Name two xenobiotic compounds.

(f) What do you mean by IPR?

(g) Name two organisms involved in biotransformation of steroids.

2. Answer any ***three*** of the following: 5×3 = 15

(a) What is copyright? What rights does copyright comprise? 2+3

(b) How are microbes used in human therapeutics and agriculture? 5

(c) Discuss the steps involved in microbial production of biogas. 5

(d) What are the reasons behind the recalcitrant nature of xenobiotic compounds? Mention some of the hazards from such compounds. $2\frac{1}{2}+2\frac{1}{2}$

(e) How does RNAi silence-specific genes? Does RNAi block transcription or translation? 3+2

3. Answer any ***two*** of the following: 10×2 = 20

(a) Write a short note on trademark and patent. How long is the term of protection of trademarks and patent enjoyed by the owner? 4+4+2

(b) Discuss two mechanisms used by microorganism for steroid biotransformation. State any disadvantage of biotransformation. 6+4

(c) What are main components of lignocellulosic plant material? Write down the steps involved in production of bio-ethanol from lignocellulose waste. 2+8

(d) Write notes on: 5+5

(i) Prokaryotic microorganisms in biotechnological applications.

(ii) Microbial production of bioplastics.

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