'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2021

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: 1×5 = 5

   (a) What are two component regulatory systems?
   (b) What are transposons?
   (c) Define open pangenome with example.
   (d) What is meant by pathogenicity island?
   (e) What is quorum sensing?
   (f) What are autoinducer?
   (g) What is meant by epiphytic fitness?
   (h) What are phytoalexins?

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

   (a) Write down the regulatory mechanism of quorum sensing with suitable example. 5
   (b) State the salient features of sequenced microbial genomes. 5
   (c) Discuss type three secretion systems in pathogens. 5
   (d) Explain various types of genetic interactions in 'gene-for-gene' model. 5
   (e) How does metaproteomics help to determine the functional diversity in bacteria? 5

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

   (a) Write short notes on: 5×2 = 10
      (i) Horizontal gene transfer (HGT)
      (ii) Core genome pool.
   (b) Discuss, in detail, about the future implications of synthetic biology with respect to bacteria and viruses. Discuss briefly about the basis of synthesis of poliovirus in laboratory. 6+4

(c) What is metagenomics? How does this technique help to reveal the microbial diversity in an environmental sample? Write its advantages over conventional 16s rRNA sequenced based approach to understand bacterial diversity. 2+6+2

(d) What is biofilim? Write a note on its formation and significance on virulence and antimicrobial resistance development. 2+4+4

DSE2

PAPER-IV

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

(a) Give examples of recombinant vaccines.

(b) Which microorganisms are used for preparation of microbial biosensors?

(c) What is biodiesel?

(d) State the mode of action of Streptokinase.

(e) Give examples of two microorganisms that are used in Bioremediation.

(f) State the function of siRNA.

(g) What are copyrights?

(h) Name two biopesticides.

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

(a) Explain with flow diagram the production of high fructose syrup. 5

(b) Write short note on microbial production of bio-pesticides. 5

(c) Write down the properties and applications of PGPR. 5

(d) Describe in detail the biotransformation of steroids. 5

(e) Explain, in brief, the principle of filtration. 5

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

(a) Describe the production of recombinant Hepatitis B vaccine. What is the usefulness of such vaccine over traditional ones? 6+4

(b) How does whole cell immobilization are done using entrapment method with calcium alginate? How can heavy metals be removed from aqueous effluents using microbes? 6+4

(c) How does RNAi inhibit gene expression? Write briefly the application of microbial biotechnology in human therapeutics. 6+4

(d) Write short notes on: 5+5

(i) Degradation of Xenobiotics

(ii) Production of Cocoa butter substitute.

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