'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2022

GE2-P1-MICROBIOLOGY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.

The question paper contains GE-Paper-I and Paper-II.
The candidates are required to answer any *one* from *two* courses.
Candidates should mention it clearly on the Answer Book.

GE

PAPER-I

INTRODUCTION AND SCOPE OF MICROBIOLOGY

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

   (a) What are virions? 1

   (b) What is axenic culture? 1

   (c) Define bioremediation. 1

   (d) Define commensalism. 1

   (e) What are primary metabolite? 1

   (f) Name the microbiologist who discovered enrichment culture technique. 1

   (g) What is a Winogradsky column? 1

   (h) Name two agar-agar producing algae. 1

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

   (a) Write short note on the involvement of microorganisms in food-borne infections. 5

   (b) Describe briefly the method of locomotion and reproduction in *Paramecium* sp. 5

   (c) Discuss briefly the germ theory of disease. 5

   (d) Write a short note on secondary metabolites. 5

   (e) Describe the role of microorganisms in bioremediation of hydrocarbon in oil spills. 5

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

   (a) Give a concise account on the contributions of Robert Koch in the establishment of field of bacteriology. 10

   (b) Explain in detail the construction and working principle of fluorescence microscope. 10

(c) Describe in detail the construction and working principle of an aerobic fermenter. 10

(d) Compare and contrast the working principle of SEM and TEM. 10

GE

PAPER-II

MICROBIAL METABOLISM

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

(a) Define generation time. 1

(b) What is a batch culture? 1

(c) Name two psychrophiles. 1

(d) Name one extremophiles. 1

(e) How many NADH and FADH are generated in TCA cycle? 1

(f) Define antiport. 1

(g) How many substrate level phosphorylation steps are there in EMP pathway? 1

(h) Name two free living nitrogen fixing bacteria. 1

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

(a) Describe the effect of temperature on the growth of microorganisms. 5

(b) Describe the effect of oxygen concentration on the growth of microorganisms. 5

(c) Write short notes on: $2\frac{1}{2}+2\frac{1}{2}$

(i) Anaerobic respiration

(ii) Fermentation.

(d) How many ATP are generated during the flow of electrons from NADH and FADH through ATP synthase? 5

(e) Write a concept note on linear and branched fermentation pathways. 5

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

(a) Discuss in detail the process of anaerobic respiration with special reference to dissimilatory nitrate reduction. 10

(b) Describe in detail the various steps involved in the homolactic fermentation. 10

(c) Give a concise account of the mode of action of uncouplers and inhibitors of electron transport chain. 10

(d) With simplified Z-scheme diagram, describe the oxygenic photosynthesis mechanism operative in cyanobacteria. 10

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