



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 5th Semester Examination, 2022

DSE-P1-MICROBIOLOGY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

**The question paper contains two parts DSE1-Paper-I and DSE1-Paper-II.
The candidates are required to answer any *one* from the two parts.
Candidates should mention it clearly on the Answer Book.**

DSE1

PAPER-I

1. Answer any **five** of the following: 1×5 = 5
 - (a) What are auxochromes?
 - (b) What are chromophores?
 - (c) What is the basic principle of centrifugation?
 - (d) What role does TEMED play in SDS-PAGE of proteins?
 - (e) Name two factors responsible for separation of biomolecules in ultracentrifugation.
 - (f) What is the principle of phase contrast microscope?
 - (g) What are the sedimentation coefficients of DNA and RNA?

2. Answer any **three** of the following: 5×3 = 15
 - (a) What is isoelectric point? Explain the process of isoelectric focussing. 1+4
 - (b) Explain ion-exchange chromatography. 5
 - (c) What is the principle of Zymogram analysis? What is the purpose of gelatin zymography? 2+3
 - (d) What are the application of UV-vis spectroscopy in research? 5
 - (e) How does gel filtration chromatography work? Name one mobile phase used in HPLC. 4+1

3. Answer any **two** of the following: 10×2 = 20
 - (a) Describe in detail the process of SDS-PAGE along with its application. 10

- (b) (i) What types of molecules can be separated by ion-exchange chromatography? $2\frac{1}{2} \times 4 = 10$
- (ii) Differentiate between anion and cation exchanger.
- (iii) What do you mean by counter ion?
- (iv) How can biomolecules be eluted from an ion exchange column?
- (c) Schematically explain the working principle of a confocal microscope. Write the advantages of confocal microscopy in cellular imaging.
- (d) Explain the separation of biomolecules using density gradient centrifugation. Explain sucrose density gradient centrifugation.

DSE1

PAPER-II

PLANT PATHOLOGY

1. Answer any **five** of the following questions: 1×5 = 5
- (a) Define disease triangle.
- (b) What are pathogenesis related (PR) proteins?
- (c) Name any one viral disease of plant and its causative agent.
- (d) What is apparent resistance?
- (e) What are the symptoms of Late Blight of Potato?
- (f) What are the symptoms of Loose Smut of Wheat?
- (g) Name a disease caused by phytoplasmas.
- (h) Define plant pathology.
2. Answer any **three** of the following questions: 5×3 = 15
- (a) Explain the concept of constitutive defense mechanism in plants. 5
- (b) Write a short note on antagonistic microbes. 5
- (c) Discuss the symptoms and control of Powdery Mildew of wheat. 5
- (d) Write a note on dissemination of pathogens and perennation. 5
- (e) Write a note on various virulence factors of plant pathogens. 5
3. Answer any **two** of the following questions: 10×2 = 20
- (a) Write about polycyclic and polyetic diseases. Discuss about disease cycle and pathogenicity in plants. 4+6
- (b) Write in detail the causative agent, symptoms, epidemiology and control of Downy Mildew of onion. 10
- (c) How genetic engineering is used to control plant diseases? Explain the effect of pathogen on the process of photosynthesis. 6+4
- (d) Explain in brief the concept of resistance gene and avirulence gene. How are phytoalexins involved in defense mechanism of plants? 5+5

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