'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2021

DSE-P1-MICROBIOLOGY

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
All symbols are of usual significance.

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

INSTRUMENTATION & BIOTECHNIQUES

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

   (a) What is isopycnic centrifugation?

   (b) What is angular velocity?

   (c) Name one anion and one cation exchanger.

   (d) What is RCF?

   (e) What is hypochromic shift?

   (f) Define isoelectric point.

   (g) State the Abbe's equation.

   (h) What is the role of SDS in SDS-PAGE?

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

   (a) A bright field microscope operated in an environment where refractive index is 1.5, λ = 600 nm and θ = 30°, calculate its resolving limit. Why the magnification power of electron microscope is much higher than light microscope? 3+2

   (b) Give the working principle of a confocal microscope with proper ray diagram. 5

   (c) Discuss about the principle and application of affinity chromatography. 5

   (d) What are chromophores and auxochromes? Give examples of two intrinsic and two extrinsic fluorescent molecules. 3+2

   (e) Differentiate between fixed angle and swinging bucket rotors. Arrange the following molecules in ascending order based on their sedimentation coefficient also mention their respective sedimentation coefficient: DNA, RNA, cellular organelle. 3+2

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

(a) State the Beer-Lambert's law and derive the equation. Write its limitations. What are the applications of UV-Vis spectroscopy? 4+3+3

(b) Write down the principle of separation of a protein using size exclusion chromatography and SDS-PAGE. 5+5

(c) What are preparative and analytical centrifugation? State the equation that relates RCF and RPM. Briefly describe the process of separation of biomolecules using density gradient centrifugation. 3+2+5

(d) Write short notes on: 5×2

(i) Isoelectric focussing

(ii) Ion-exchange chromatography.

DSE1

PAPER-II

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

(a) Define quarantine.

(b) Name a fungal plant disease and its causative agent.

(c) Define phytoalexins.

(d) What is oxidative burst?

(e) Name one viroidal plant disease with its causative agent.

(f) What are suppressive soils?

(g) What is polyetic disease?

(h) What are the symptoms of Ergot of rye?

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

(a) Write down the role played by Stakman in the field of plant pathology. 5

(b) Discuss about systemic acquired resistance in plant. 5

(c) Discuss the symptoms and epidemiology of Black Stem rust of wheat. 5

(d) How biocontrol is used in controlling plant diseases? 5

(e) Write a note on various virulence factors in viruses in causing plant diseases. 5

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

(a) Discuss about the gene for gene hypothesis. How can a plant become resistance against plant pathogene? 5+5

(b) Describe the effects of pathogens on plant growth and reproductive system. Write a short note on economic losses occurred due to plant diseases. 6+4

(c) Write about monocyclic and polycyclic diseases. Describe the colonization and dissemination processes occurred during the development of plant diseases. 4+6

(d) Describe the pathophysiology and control of Rice tungro disease. 6+4

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