



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 6th Semester Examination, 2021

DSE3/4-BOTANY

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.

The paper contains Paper-DSE-1, DSE-2, DSE-3, DSE-4, DSE-5, DSE-6, DSE-7, DSE-8 and DSE-9.

The candidates are required to answer any *two* from the *nine* papers and candidates should mention it clearly on the Answer Book. Two separate answer scripts should be used for *two* DSE paper options.

PAPER-DSE-1

ANALYTICAL TECHNIQUES IN PLANT SCIENCES

Answer any *four* questions from the following each within 300 words 10×4 = 40

1. What are the different types of electron microscopes? Explain the various techniques used in the sample preparation of electron microscope. 10
2. What are the different types of chromatography? Explain any one type with proper diagrams. 10
3. Explain the working of spectrophotometer with reference to the Beer-Lambert law. What are the applications of UV and visible spectrophotometer? 10
4. Explain the working principle of Electrophoresis. Mention the various factors governing it. 10
5. What is sampling? Why sampling is essential in biostatistics? Calculate the Arithmetic Mean and Standard Deviation from the following Data: 10

Plant height (cm)	0-10	10-20	20-30	30-40	40-50	50-60
Numbers of Varieties	8	11	21	27	18	15

PAPER-DSE-2

BIOINFORMATICS

Answer any *four* questions from the following each within 300 words 10×4 = 40

1. Give a detailed account of BLAST and its types. 10
2. Give an account on National Centre for Biotechnology Information (NCBI), and the tools and databases of NCBI. 10
3. How can you build a phylogenetic tree for a set of related sequences? Explain it with an appropriate example. 10

4. Write a note on the database and resources of Protein Information Resource (PIR). 10
5. What are the major resources of DNA Data Bank of Japan (DDBJ) and briefly described them? 10

PAPER-DSE-3

STRESS BIOLOGY

Answer any four questions from the following each within 300 words 10×4 = 40

1. Briefly describe the mechanism of ROS production and scavenging. 10
2. Write notes on: Hypersensitive reaction and PR proteins. 10
3. Write a general account of different types of stresses affecting plants. 10
4. Give an account of various adaptation mechanisms of plants against environmental stress. 10
5. Briefly discuss phospholipids signalling mechanism. 10

PAPER-DSE-4

PLANT BREEDING

Answer any four questions from the following each within 300 words 10×4 = 40

1. What is the purpose of pure line selection? Discuss the method of pure line selection mentioning its merits and demerits. 10
2. Define heterosis. Write down the causes of heterosis. How is the phenomenon utilized in plant breeding? 10
3. Describe hybridization methods for cross pollinated plants. Briefly discuss different methods of emasculation. 10
4. Discuss the different modes of reproduction of crop plants and mention their significance in plant breeding technique. 10
5. Write notes on: 10
 - (i) Inbreeding depression.
 - (ii) Polygenic Inheritance.

PAPER-DSE-5

NATURAL RESOURCE MANAGEMENT

Answer any four questions from the following each within 300 words 10×4 = 40

1. List the names of various natural resources available in India. Discuss in brief any two of them. 10
2. Discuss different factors responsible for soil degradation. 10
3. Briefly elaborate the goals and objectives of solid waste management. 10
4. Describe general objectives and principles of the Convention of Biological Diversity (CBD). 10
5. Explain the concepts and approaches of sustainable utilization of natural resources. 10

PAPER-DSE-6

HORTICULTURAL PRACTICES AND POST-HARVEST TECHNOLOGY

Answer any four questions from the following each within 300 words 10×4 = 40

1. Explain the IPM strategies to control horticultural plants' diseases in commercial purpose. 10
2. Discuss the role of micropropagation and tissue culture techniques in developing varieties and cultivars of various horticultural crops. 10
3. Write in detail different propagation methods of horticultural crops and their limitations. 10
4. Describe different irrigation methods applied in horticultural practices and their importance. 10
5. Write notes on: 10
 - (i) Urban horticulture and ecotourism
 - (ii) Weed control strategies.

PAPER-DSE-7

RESEARCH METHODOLOGY

Answer any four questions from the following each within 300 words 10×4 = 40

1. Give a brief account of common toxic chemicals used in laboratory. Also discuss the safety measures to be taken while handling them. 10
2. Discuss the Model organisms used for experiments in Plant physiology and Cell biology. 10

3. Give an account of the different methods of studying various cell and tissue structures in different parts of a dicotyledonous plant. 10
4. What is serial dilution technique? Describe in detail the protocol of preparing a dilution series up to 10^{-6} starting from a stock solution of 1 mg/ml. Explain in detail the final concentration of each dilution. 10
5. Write notes on: 10
 - (i) Literature review
 - (ii) Plagiarism.

PAPER-DSE-8

INDUSTRIAL AND ENVIRONMENTAL MICROBIOLOGY

Answer any four questions from the following each within 300 words 10×4 = 40

1. Define fermentation. Clearly differentiate between stationary and submerged fermentation technology. 10
2. Elaborate on the various steps in downstream processing. 10
3. Write an essay on “Distribution of Microbes in Air — outdoor and indoor” 10
4. “Microorganisms are the indicators of water quality” — Justify the statement. 10
5. Describe the process of arbuscular mycorrhizal colonization in plant roots with proper diagrams. 10

PAPER-DSE-9

BIOSTATISTICS

Answer any four questions from the following each within 300 words 10×4 = 40

1. Following data is the number of petals present in 100 different flowers. Construct the frequency distribution table and find the arithmetic mean, median and mode. 10

15 19 15 28 26 20 23 28 23 26
 23 26 35 30 26 15 35 28 17 28
 30 20 26 20 30 26 17 35 23 17
 23 20 35 30 28 30 28 30 30 28
 35 20 17 35 17 20 28 20 23 17
 19 17 35 19 32 26 35 26 30 26
 28 32 28 32 28 35 19 20 32 20
 23 30 23 30 26 23 28 32 23 32
 23 19 32 26 32 26 32 28 26 20
 30 23 19 15 26 19 32 15 26 19

2. Define sampling. Determine the standard deviation from the following classified data on spike length (cms) of wheat plant given below: 10

Spike length	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22
No. of Plants	35	40	48	100	125	87	43	22

3. The following data relate to the pod length and the number of seeds per pod is given below. Calculate the Karl Pearson's coefficient of correlation and interpret it. 10

Pod length (cms)	4.5	4.0	5.2	4.6	5.2	5.2	4.3	4.0	4.5	5.5
No. of seeds/pod	5	5	6	6	6	7	4	4	5	6

4. The average number of fruits borne by the tree in the past was 100. This time the number of fruits borne by 15 trees after the supplementation of a fertilizer was as follows: 10

90, 110, 95, 120, 150, 130, 90, 140, 130, 140, 150, 125, 145, 155 and 100

Perform a t-test to test whether the fertilizer is effective in increasing the number of fruits borne by the trees (Given, value of $t = 1.761$ at 14 degree of freedom).

5. Write notes on: 10

(i) Null hypothesis

(ii) Primary data and Secondary data.

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