



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 5th Semester Examination, 2020

DSE1/2-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. State the differences between light microscope and electron microscope. With a ray diagram, explain the working of a transmission electron microscope (TEM). 4+6
2. What is centrifugation? Give a comparative account between differential and density gradient centrifugation with suitable diagram. 2+8
3. What are radioisotopes? Discuss its uses in biological research. 2+8
4. Discuss the principle of spectrophotometry and its application in biological research. 6+4
5. Discuss in detail the working principle of agarose gel electrophoresis. How does the working principle of SDS-PAGE differ from that of AGE? 6+4

Paper-DSE-2

Bioinformatics

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

1. Discuss the aim, scope and research areas of bioinformatics. 10
2. Briefly discuss the role of structural bioinformatics in drug discovery process. 10
3. Describe the classification format of biological databases. 10

4. Write a note on architecture and application of BLAST. 10
5. Write a note on the salient features and application of Swiss Prot. 10

Paper-DSE-3
Stress Biology

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

1. Give a brief account on pathogenesis related (PR) proteins with reference to their role in plant defense mechanism. 10
2. Discuss the phospholipid signalling mechanism involved in stress sensing mechanisms in plants. 10
3. Describe the Hypersensitive reaction occurred in plants during pathogen attack. 10
4. Write a note on Systemic acquired resistance mechanism. 10
5. Write short notes on: 5×2 = 10
 - (i) Physical defense mechanism
 - (ii) Physiological defense mechanism.

Paper-DSE-4
Plant Breeding

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

1. What is meant by hybridization? Describe the hybridization method in self-pollinated plants. 10
2. Discuss different methods of crop improvement and also state the limitations and opportunities of those methods. 10
3. Explain the genetic basis of inbreeding depression. 10
4. What is quantitative inheritance? Explain the mechanism of inheritance of kernel color in wheat and skin color in human beings. 10
5. Write short notes on: 5×2 = 10
 - (i) Achievements and undesirable consequences of plant breeding
 - (ii) Role of biotechnology in crop improvement.

Paper-DSE-5

Natural Resource Management

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

1. Define Biodiversity. Describe the management strategies of Biodiversity. 10
2. Describe various causes of forest depletion and mention its management strategies. 10
3. Describe the national and international efforts in resource management and conservation. 10
4. Describe briefly the various type of renewable and non-renewable sources of energy. 10
5. Write short notes on: 10
 - (i) Carbon footprint
 - (ii) GIS
 - (iii) Types of Biodiversity
 - (iv) Waste management.

Paper-DSE-6

Horticultural Practices and Post-Harvest Technology

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

1. Discuss about the importance of flower shows and exhibitions. 10
2. Do you think that propagation through asexual reproduction should be preferred over sexual ones in horticultural practices? Give reasons to your answer. 10
3. Explain how post-harvest technology plays a vital role in horticulture. 10
4. How can micropropagation and tissue culture techniques be exploited in horticulture? 10
5. Evaluate *Lagerstroemia* as an ornamental flowering trees. 10

Paper-DSE-7

Research Methodology

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

1. What do you mean by Research Methodology? Differentiate between qualitative and quantitative Research. 1+9

2. Classify different types of stains used in biology based on their chemistry. Describe the process of staining a section of stem of an angiosperm. 4+6
3. What do you mean by fixatives and preservatives? Describe the process of dehydration of tissue using different grades of solvents and highlight the importance of it. 4+4+2
4. What is a model organism? How are model organisms useful in research? 2+8
5. How do you prepare following solutions: $2\frac{1}{2} \times 4 = 10$
 - (i) 3% (w/v) solution
 - (ii) 1 Molar solution of NaCl
 - (iii) 1 Molal solution of NaCl
 - (iv) 1 Normal solution of NaCl.

Paper-DSE-8

Industrial and Environmental Microbiology

Answer any four questions from the following each within 300 words

10×4 = 40

1. Differentiate between batch culture and continuous culture. With a labelled diagram describe the different components of a fermenter. 2+8
2. Briefly describe the different sources of water pollution and their consequences. 10
3. Illustrate the Primary and Secondary Treatment of sewage. 10
4. Illustrate the process of establishment of symbiotic relationship between leguminous plant and nitrogen fixers. 10
5. Write short notes on: $2\frac{1}{2} \times 4 = 10$
 - (i) Dissolved Oxygen (D.O.)
 - (ii) Biological Oxygen Demand (B.O.D.)
 - (iii) Chemical Oxygen Demand (C.O.D.)
 - (iv) Total Dissolved Solids (T.D.S.).

Paper-DSE-9

Biostatistics

Answer any four questions from the following

10×4 = 40

1. Point out the different measures of central tendency and differentiate them. Find the mean and standard deviation of the following distribution. 10

Class interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	11	13	14	15	12	9	6

2. Define Correlation. Following data relate to the age of 10 employees and the number of days they were reported sick in a month. Calculate Karl Pearson's co-efficient of correlation and interpret it. 2+8

Employee	1	2	3	4	5	6	7	8	9	10
Age (X)	30	32	35	40	48	50	52	55	57	61
Sick days (Y)	1	0	2	5	2	4	6	5	7	8

3. Define Null hypothesis and Alternate hypothesis. In the Mendelian dihybrid cross, following result was observed: 2+8

- (i) Round yellow seeds: 310
- (ii) Round green seeds: 107
- (iii) Wrinkled yellow seeds: 101
- (iv) Wrinkled green seeds: 32

Calculate the chi-square (χ^2) and interpret the result.

4. What do you understand by frequency and cumulative frequency? How a grouped frequency distribution differs from simple frequency distribution. Arrange the following marks obtained by 50 students in Biology in a frequency distribution, taking classes of uniform width of 10 marks. 2+8

66	62	45	79	32	51	56	60	51	49
25	42	54	54	58	70	43	58	52	50
38	67	50	59	48	65	71	30	46	55
82	51	63	45	53	40	35	56	70	52
67	55	57	30	63	42	74	58	44	45

5. Discuss the merits and demerits of Mean, Median and Mode. 10

—x—