UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 6th Semester Examination, 2022

DSE-P4-BOTANY (PRACTICAL)

Time Allotted: 2 Hours   Full Marks: 20

The figures in the margin indicate full marks.

The paper contains Paper-1, Paper-2, Paper-3, Paper-4, Paper-5, Paper-6, Paper-7, Paper-8 and Paper-9. The candidates are required to answer any *one* from the *nine* papers except the one attempted at DSE3. Candidates should mention it clearly on the Answer Book.

PAPER-1

ANALYTICAL TECHNIQUES IN PLANT SCIENCES

1. Write the principle and explain the figure of the experimental results given below. (Photograph of SDS-PAGE to be given)   2+4 = 6

    OR

    Write the name, major requirements of the experiment (Photograph of Western Blotting to be given) and comment on the result of the experiment.   1+2+3 = 6

2. Determine the concentration of supplied protein sample. (Standard curve to be provided) (Principle = 2, requirements = 2, Experiment = 3 and result = 2)   9

3. Submission of laboratory note book   2

4. Viva-voce   3

PAPER-2

BIOINFORMATICS

1. Answer the questions based on the provided database and query:

    Database: NCBI Nucleotide Database search for Query: *Arabidopsis thaliana* rubisco large subunit gene (rbcL)

    (a) What are the different parameters that you used to narrow down to a single search result?   3+2 = 5

    (b) How do you save the search result?

2. Using the Accession Number AAB68400.1, perform Protein BLAST. In the graphic summary, what are the specific conserved domain hits and what are the superfamily hits? Also, mention whether the specific conserved domain hit overlaps completely on the query sequence or not.   2+1+1+1=5

3. Search for the pdb structure of 5IU0 in PDB. Mention the classification of 5IU0.   1×5 = 5
    Download the pdb file from PDB. What software other than RASMOL can you
    use to view the molecular structure? If you open the pdb file using notepad or
    wordpad what TITLE do you see?

4. Submission of laboratory note book   2

5. Viva-voce   3

PAPER-3

STRESS BIOLOGY

1. Describe procedure for the quantitative estimation of peroxides activity in the   5
    seedling in the absence and presence of salt stress.

2. Describe the principle of gel electrophoresis zymography.   5

    OR

    Mention the procedure and requirement for the quantitative estimation of   5
    superoxide activity in the seedling in the absence and presence of salt stress.

3. Describe the procedure for the zymographic analysis of superoxide dismutase   5
    activity with the help of the supplied photograph.

4. Submission of laboratory note book   2

5. Viva-voce   3

PAPER-4

PLANT BREEDING

1. Describe the floral structure of any cross-pollinated crop with proper drawing   5
    and labelling. (Drawing and labelling-2; Description-3)

2. Describe the Emasculation Technique in a self-pollinated crop by mentioning its   5
    principle, requirements and procedure with suitable illustration.
    (Principle-1; Requirements-2; Procedure-2)

3. Write down the principle, procedure and requirements for Artificial Pollination   5
    in any self-pollinated crop.
    (Principle-1; Requirements-2: Procedure-2)

4. Submission of laboratory note book   2

5. Viva-voce   3

PAPER-5

NATURAL RESOURCE MANAGEMENT

1. Describe the procedure to estimate the biodegradable solid waste generated by a domestic system.   5

OR

Describe the impact of non-biodegradable solid waste in land degradation with suitable example.   5

2. Describe DBH method. How is it useful in measuring dominance of woody species?   5

3. Discuss ecological modelling with suitable examples.   5

4. Submission of laboratory note book   2

5. Viva-voce   3

PAPER-6

HORTICULTURAL PRACTICES AND POST-HARVEST TECHNOLOGY

1. Identify the experiment-A from the photograph and write down the principle, requirements and procedure on it. (Identification and principle = 2, requirement = 1, procedure = 2).   5

2. Write down the name of the insect-pest from the photograph-B and mention its symptoms and disease management. (Name = 1, symptoms = 2, disease management = 2).   5

3. Characterize the specimen-C1 and specimen-C2 from the photographs mentioning the causal organism and name of the disease. (Characterization = 1.5, causal organism = 0.5, name of disease = 0.5). $2\frac{1}{2} \times 2 = 5$

4. Submission of laboratory note book   2

5. Viva-voce   3

PAPER-7

RESEARCH METHODOLOGY

1. Prepare a semi-permanent slide (A1) using the peeling method of the supplied leaf specimen.   5

OR

Prepare a semi-permanent slide (A2) following Squash Technique of the supplied root/bud specimen.   5

2. Prepare 10 ml 0.1 M glucose solution or Prepare 0.01% sucrose solution.   5

3. Prepare the graph (line graph/bar graph/pie chart/histogram) from the supplied data. 5

4. Submission of laboratory note book 2

5. Viva-voce 3

PAPER-8

INDUSTRIAL AND ENVIRONMENTAL MICROBIOLOGY

1. Mention the working principles and identify the laboratory instruments (centrifuge, autoclave, incubator etc., photographs of any four to be given). $(1+1)\times4 = 8$

2. Describe the requirements and procedure for media preparation for isolating fungi/bacteria (any one). (Requirements-3; Procedure-4) 7

3. Submission of laboratory note book 2

4. Viva-voce 3

PAPER-9

BIOSTATISTICS

1. Calculate the Arithmetic Mean from the following data: 5

Plant height (CM)	0-10	10-20	20-30	30-40	40-50	50-60
Number of Varieties	5	10	25	30	20	10

2. Data recorded on the length of panicle and the number of grains per panicle in a variety of rice. Calculate the Correlation Coefficient and find out its level of significance. 5

Length of Panicles	10.5	12.0	15.5	12.5	15.0	11.0	16.0	14.0	16.5	13.5
No. of Grains	75	80	85	108	110	85	105	110	112	107

3. Calculate the Standard Deviation from the data given below: 5

No. of Pods	15-17	18-20	21-23	24-26	27-29	30-32	33-35	36-38	39-41
No. of Plants	5	6	8	12	22	18	15	9	5

4. Submission of laboratory note book 2

5. Viva-voce 3

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