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UNIVERSITY OF NORTH BENGAL

B.Sc. Major 4th Semester Examination, 2025

UBOTMAJ24006-BOTANY

PTERIDOLOGY, GYMNOLOGY AND PALAEOBOTANY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any **five** questions from the following: 1×5 = 5
- Name one homosporous pteridophyte.
 - Define archegoniate.
 - What is taphonomy?
 - Give an example of living fossil plant.
 - Name two species of *Cycas* found in India.
 - Define petrification.
 - What is telome?
 - Give two examples of fossil pteridophytes.

GROUP-B

2. Answer any **three** questions from the following: 5×3 = 15
- Define stele. Describe stellar evolution in pteridophytes. 1+4
 - Distinguish between: 2½+2½
 - Apospory and apogamy
 - Pteridophytes and gymnosperms.
 - What is form genera? Write the characteristic features of *Glossopteris*. 2+3
 - Define fossil. Describe the process of fossilization. 1+4
 - Describe the leaf anatomy of *Cycas* with diagram. 5

GROUP-C

3. Answer any **two** questions from the following: 10×2 = 20
- Define the terms spore, sporangia and strobilus. Briefly describe the mode of reproduction and life cycle of *Lycopodium* sp. 3+7
 - Point out some angiospermic characters of *Gnetum*. Describe with diagram the reproductive organs of *Gnetum*. Give some xerophytic features of *Pinus*. 2+6+2
 - Write short notes on: 5+5
 - Rhynia*
 - Spore bearing organ of *Selaginella*.
 - What are the different eras in the geological time scale? How will you determine the age of fossil? Describe in brief. Write short note on TimeTree 5 (2022). 2+5+3

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UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2025

SEC1-P2-BOTANY

Time Allotted: 2 Hours

Full Marks: 60

The figures in the margin indicate full marks.

The question paper contains Paper - I, II, III, IV, V, VI, VII, VIII and IX.

The candidates are required to answer any *one* from *nine* papers.

Candidates should mention it clearly on the Answer Book.

PAPER-I

BIOFERTILIZERS

GROUP-A

1. Answer any *four* questions from the following: 3×4 = 12
- (a) Name three free-living nitrogen fixing bacteria. 1+1+1
- (b) Name three plants that show mycorrhizal association. 1+1+1
- (c) What is green manuring? Give two examples of green manure crops. 1+2
- (d) Name the enzyme that carries out the process of N₂ fixation. Name one N₂ fixing Cyanobacteria. 2+1
- (e) What is the role of *Azolla* in rice cultivation? 3
- (f) What is vermicomposting? Mention its types. 1+2

GROUP-B

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Discuss in detail the type of endomycorrhizal association. 6
- (b) Write short notes on: 3+3
- (i) Carrier based inoculants
- (ii) Importance of mycorrhizal association in phosphorus nutrition.
- (c) Write down the salient features of Cyanobacteria. How are they employed in improving the soil fertility? 3+3
- (d) Mention the benefits and limitations of biofertilizers. 6
- (e) Give an account on the application of *Anabaena-Azolla* association in agricultural practice. 6
- (f) Briefly comment on the process of Mass Multiplication of *Rhizobium*. 6

GROUP-C

3. Answer any *two* questions from the following: 12×2 = 24
- (a) Describe the mechanism of symbiotic nitrogen fixation. Write a short note on the factor affecting growth of Cyanobacteria. 8+4

(b) Differentiate between the following:

4+4+4

- (i) Organic fertilizer and Chemical fertilizer
- (ii) Ectomycorrhizae and Endomycorrhizae
- (iii) Agricultural waste and Industrial waste.

(c) Write the systematic position and characteristic features of *Azospirillum*. Give an account on isolation and the mass multiplication of *Azospirillum*.

6+6

(d) What is VAM fungi? Discuss in detail the isolation and inoculation production of VAM. Give two examples of VAM fungi.

1+9+2

PAPER-II

HERBAL TECHNOLOGY

GROUP-A

1. Answer any **four** questions from the following:

3×4 = 12

- (a) What is herbal medicine? Mention its advantages. 1+2
- (b) What are secondary metabolites? Cite two examples. 1+2
- (c) Write the name of adulterants of black pepper. 3
- (d) What is Ayurveda? Comment on its benefits. 1+2
- (e) Give the scientific name and family of an antirheumatic plant. Mention one active constituent in it. 2+1
- (f) Mention any two medicinal uses for each of Ginger, Fenugreek and Ashoka. 1+1+1

GROUP-B

2. Answer any **four** questions from the following:

6×4 = 24

- (a) Briefly comment on the Phytochemical Screening Test for steroid compounds. 6
- (b) Discuss the analytical profile of *Withania somnifera* and *Catharanthus roseus*. 3+3
- (c) What is drug adulteration? What are the different types of drug adulteration? 2+4
- (d) Mention the active principles and medicinal uses of *Clerodendron phlomoides*. 3+3
- (e) What is Siddha system of medicine? Explain the principles of Siddha system of medicine. 2+4
- (f) Write the scientific name and family of the following: 2+2+2
 - (i) Tulsi
 - (ii) Fenugreek
 - (iii) Indian Gooseberry.

GROUP-C

3. Answer any **two** questions from the following:

12×2 = 24

- (a) Give an account on the harvesting, processing, storage and marketing of medicinal plants. 3+3+3+3
- (b) Discuss the history and scope of herbal medicine. Add a note on the marketing and utilization of medicinal plants. 6+6
- (c) What are Alkaloids? Write a short note on phytochemical screening test for alkaloids. Mention the different types of secondary metabolites. 1+5+6
- (d) Write short notes on: 4+4+4
 - (i) Herbal therapy
 - (ii) Future prospects of pharmacognosy
 - (iii) Medicinal plant bank.

PAPER-III
NURSERY AND GARDENING

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
 - (a) Write the botanical name, family and morphological nature of edible part of brinjal. 1+1+1
 - (b) What is seed bank? 3
 - (c) Differentiate between sowing and seeding. 3
 - (d) Write down the steps of management of pests and diseases. 3
 - (e) Write down the process of treatment of transplantation. 3
 - (f) Differentiate between mist chamber and shade root. 3

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
 - (a) What is the role of computer application in landscaping gardening? 6
 - (b) Describe the scope and problems of tomato cultivation. 6
 - (c) Define seed dormancy. Write down the methods for breaking seed dormancy. 1+5
 - (d) Write short notes on: 3+3
 - (i) Seed testing
 - (ii) Difference between Shade house and Glass house.
 - (e) Define Nursery. Explain briefly the infrastructure of an ideal nursery. 1+5
 - (f) What are transplants and direct seeding? Write about the advantages and disadvantages of transplanting. 1+1+2+2

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
 - (a) Briefly explain the cultivation of garlic and tomatoes. Give the scientific name of these vegetables. 5+5+1+1
 - (b) What are air layering and cutting? Write the technique of cutting. Mention the rooting medium for cutting procedure. 4+4+4
 - (c) Write a comparative note on the objectives and scopes of landscape gardening and home gardening. (3+3)×2
 - (d) Write short notes on: 4+4+4
 - (i) Soil Layering
 - (ii) Factors affecting seed viability
 - (iii) Seed certification system.

PAPER-IV
FLORICULTURE

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
 - (a) Define mulching. Why mulching is important in floriculture? 1 1/2 + 1 1/2

- | | |
|--|-----|
| (b) What is Shrubbery? Give one example of Shrubbery plant. | 1+2 |
| (c) Name three pests of ornamental plants. | 3 |
| (d) What is vase life of a flower? Name two ornamental foliage plants. | 1+2 |
| (e) What is routine garden operation? Mention why is this one. | 1+2 |
| (f) What is topiary? Name two plants used in Topiary. | 1+2 |

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- | | |
|---|-----|
| (a) Write short notes on: | 3+3 |
| (i) Hedge (ii) Nursery management. | |
| (b) Discuss the role of plant growth regulators in floriculture. | 6 |
| (c) Discuss the cultivation technique of Chrysanthemum. Name two important diseases of Chrysanthemum. | 4+2 |
| (d) Describe the elements of Japanese garden and Persian garden. | 3+3 |
| (e) Discuss the symptoms of fungal and bacterial diseases of ornamental plants. | 3+3 |
| (f) Briefly discuss the importance of ornamental trees in modern floriculture. | 6 |

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- | | |
|---|------|
| (a) Discuss on "commercial floriculture" describing the method of cultivation of Marigold. | 12 |
| (b) Describe the landscape gardening mentioning its importance in Educational Institute. | 8+4 |
| (c) Define nursery. Discuss in brief about seeds sowing-prickling-shading-defoliation and wintering. | 2+10 |
| (d) Write the importance of floriculture and explain the methods to prolong the vase life of cut flowers. | 4+8 |

PAPER-V

MEDICINAL BOTANY

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
- | | |
|---|-------------------------------|
| (a) Name three medicinal plants of India with their scientific names. | $1\frac{1}{2} + 1\frac{1}{2}$ |
| (b) Mention some applications of ethnomedicine. | 3 |
| (c) Define Panchamahabhutas. | |
| (d) Write down the differences between cutting and grafting. | 3 |
| (e) Define botanical garden. Name two botanical gardens of India. | 1+2 |
| (f) What is Tridosha? | 3 |

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Write short notes on: 3+3
- (i) Scope of Ayurveda (ii) Biosphere Reserve.
- (b) What is the importance of folk medicine in ethnobotany? 6
- (c) Briefly describe different methods of propagation of medicinal plants. 6
- (d) Write a note on the role of ethnobotany as a tool to protect interests of ethnic group. 6
- (e) Discuss the conservational effort of the government on endangered medicinal plants. 6
- (f) Write a note on National Parks of Assam. 6

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Discuss the objectives of the nursery, its classification and important components of nursery. 4+4+4
- (b) Mention the applications of natural products in: 3+3+3+3
- (i) Blood pressure (ii) Skin diseases (iii) Diabetes (iv) Jaundice.
- (c) Define ethnobotany. Discuss the methods to study ethnobotany. Write a note on the ethnic communities of India. 2+5+5
- (d) Write an elaborate note on polyherbal formulations with reference to Unani System. 12

PAPER-VI**PLANT DIVERSITY AND HUMAN WELFARE****GROUP-A**

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Name three avenue trees. 3
- (b) What is IUCN?
- (c) What is pseudo-extinction?
- (d) Differentiate between cultivated taxa and wild taxa.
- (e) Write the full form and function of NBPGR. 1½+1½

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Write short notes on: 3+3
- (i) Role of WWF (ii) Role of UNESCO.
- (b) What is Agrobiodiversity? Write a short note on the loss of agrobiodiversity and genetic diversity. 2+4
- (c) Discuss different methods of biodiversity conservation. 6

- (d) Write a note on alcoholic beverages. 6
- (e) Write down the importance of biodiversity awareness programme. 6
- (f) What is genetic diversity? Why conservation of genetic diversity is important? 2+4

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) What is a threatened species? Give a brief idea of different threatened species as recognized by Red data Book. 2+10
 - (b) Discuss the role of forestry and ornamental plants in human welfare. 12
 - (c) What is sustainable development? Give the significance of sustainable development. 2+10
 - (d) Discuss In-situ and Ex-situ conservation. Explain with examples. 6+6

PAPER-VII ETHNOBOTANY

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Name any three plants used by tribals as food. 3
 - (b) Mention ethnobotanical uses of *Indigofera tinctoria*. 3
 - (c) Define the term Biopiracy with an example. 2+1
 - (d) Write about sacred grove in short. 3
 - (e) Define traditional knowledge. Give example. 2+1
 - (f) What are the significances of archaeological findings in the field of ethnobotany? 3

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) What are the roles of *Rauvolfia serpentina* and *Withania somnifera* in modern medicine? 3+3
 - (b) Describe the morphology and uses of *Artemisia*. 3+3
 - (c) What is the significance of the habitat and morphology of *Azadirachta indica* in ethnobotanical practices? 3+1½+1½
 - (d) What are endangered taxa? How forest management is related to medico-ethnobotanical studies? 2+4
 - (e) Explain the concept of "sacred groves" and their importance in ethnobotanical studies. 3+3
 - (f) Discuss any three uses of *Gloriosa superba* and *Vitex negundo*. 3+3

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Discuss the legal aspects associated with ethnobotany. Discuss the methods used for collecting ethnobotanical data. 6+6

PAPER-IX
INTELLECTUAL PROPERTY RIGHTS

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
 - (a) What do you mean by Domain Name Protection? 3
 - (b) What is Plant Varieties and Farmers Rights Act, 2001? 3
 - (c) What is industrial design? Give an example. 2+1
 - (d) Write any three objectives of Patenting Biotech Inventions. 3
 - (e) Define the role of "Sui-Generis Regime" in protection of traditional knowledge. 3
 - (f) What is geographical indication? Cite an example. 2+1

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
 - (a) What is the scope of WTO in relation to patent regime? 6
 - (b) What is National Gene Bank? Discuss its role in preserving plant genetic diversity. 2+4
 - (c) Write notes on: 3+3
 - (i) IP
 - (ii) Multilateral treaties.
 - (d) Describe the importance and outcome of Digital Library in present scenario. 3+3
 - (e) Discuss the laws related to protection of semi-conductor chips. 6
 - (f) Write notes on: 3+3
 - (i) Database protection
 - (ii) Passing off of trademarks.

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
 - (a) Explain the objectives, assignments and infringement of Industrial designs. 4+4+4
 - (b) What are the concepts and consequences of traditional knowledge with respect to Bio-Prospersive and Bio-Piracy? 6+6
 - (c) Discuss the concept of Novelty. What are the criteria that needs to be fulfilled by a product to consider it as a novel product? What are the applications for patenting biotech invention? 3+3+6
 - (d) Write notes on: 6+6
 - (i) Protection of goodwill in trademark
 - (ii) Role of Technology in IPR.

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B.Sc. Major 4th Semester Examination, 2025

North Bengal St. Xavier's College
Library
Rajshahi, Post Box No.-1
Pin.- 735134, Dist.- Jalpaiguri

UBOTMAJ24007-BOTANY
MORPHOLOGY AND ANATOMY

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.***GROUP-A**1. Answer any *five* questions from the following:

1×5 = 5

- What do you mean by quiescent centre?
- Name a family where a verticillaster inflorescence is found.
- What is pappus?
- Name the component of phloem responsible for translocation.
- What is the major difference between tyloses and tylosoids?
- What is the function of lenticels?
- Define dendrochronology.
- What are hydathodes?

GROUP-B2. Answer any *three* questions from the following:

5×3 = 15

- Explain various types of placentation found in flowering plants.
- Describe root-stem transition in plants.
- Compare the anatomical differences between dicot and monocot leaves.
- Write short notes on:
 - Aestivation
 - Cytodifferentiation.
- Distinguish between:
 - Heartwood and sapwood
 - Adcrustations and incrustations.

5

5

5

 $2\frac{1}{2} + 2\frac{1}{2}$ $2\frac{1}{2} + 2\frac{1}{2}$ **GROUP-C**3. Answer any *two* questions from the following:

10×2 = 20

- Describe the various modifications of roots with suitable diagram and examples.
- Define fruits. Classify fruits with suitable examples and diagrams.
- Write short notes on:
 - Bulliform cells
 - Seasonal activity of cambium.
 - Korper-Kappe theory
 - Scope of morphology and anatomy in pharmacognosy.
- Define primary and secondary growth in plants. Explain the intrastelar secondary growth in plants.

10

10

 $2\frac{1}{2} \times 4 = 10$

4+6

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B.Sc. Major 4th Semester Examination, 2025

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UBOTMAJ24008-BOTANY

TAXONOMY OF ANGIOSPERMS

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

GROUP-A

1. Answer any **five** questions from the following: 1×5 = 5
- Give the full form of ICN.
 - In which family do you find verticillaster inflorescence?
 - Mention the dimensions of a standard herbarium sheet.
 - Write down the floral formula of Liliaceae family.
 - What is Lodicule?
 - Why self-pollination is practically impossible in Asteraceae?
 - What is multi-access key?
 - Write the name of India's oldest herbarium.

GROUP-B

2. Answer any **three** questions from the following: 5×3 = 15
- What is Basionym? Explain it with one suitable example. 1+4
 - Differentiate between: 2½+2½
 - Paratype and Epitype
 - Synonym and Homonym
 - Write the functions of herbaria in taxonomic study and research. 5
 - Write short notes on— 2½+2½
 - Spikelet Inflorescence
 - Principle of Priority
 - Distinguish between: Lamiaceae and Brassicaceae. 5

GROUP-C

3. Answer any **two** questions from the following: 10×2 = 20
- Enumerate various types of homology. Write a brief note on monophyly, paraphyly and polyphyly. 4+(2×3)
 - Give the floral characters of the family Orchidaceae. Why is this family regarded as advanced among monocotyledons? 6+4
 - Briefly describe Bentham and Hooker's system of classification (upto series) with two merits and demerits. 6+2+2
 - Define Publication. Mention the major criteria and rules for effective and valid publication. 2+4+4

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UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2025

CC8-BOTANY**MOLECULAR BIOLOGY**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.***GROUP-A**

1. Answer any
- five*
- questions from the following:

1×5 = 5

- Define ‘Intron’.
- What is lagging strand?
- Name one example of peptide hormone.
- What is okazaki fragment?
- What is gene silencing?
- Name one example of B-type of DNA.
- What are stop codons?
- Which enzyme is used to join nicks in the DNA strand?

GROUP-B

2. Answer any
- three*
- questions from the following:

5×3 = 15

- Discuss the semi-conservative mode of DNA replication. 5
- How will the lengthy linear DNA molecule be accommodate in the nucleus as condensed chromosomal structure? 5
- Briefly describe on the structure of DNA using suitable diagram. 5
- Write note on prokaryotic tryptophan operon. 5
- Differentiate between 5' and 3' end of DNA. 5

GROUP-C

3. Answer any
- two*
- questions from the following:

10×2 = 20

- Draw and label the clover leaf model of t-RNA. Mention its role in protein synthesis. 10
- Describe briefly the Hershey-Chase experiment as DNA is the genetic material. 10
- What is group I and group II intron splicing? Briefly describe spliceosome machinery of removal of Introns. 10
- State the roles specified by structural genes of Lac operon. How does lactose promote transcription of lac operon? 10

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