



‘समानो मन्त्रः समितिः समानी’

UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 4th Semester Examination, 2023

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

BIOFERTILIZER

GROUP-A

1. Answer any *four* questions from the following: 3×4 = 12
- (a) What is VAM Fungi? Give two examples of VAM Fungi. 1+2
- (b) Name two free-living nitrogen fixing bacteria. 1 $\frac{1}{2}$ + 1 $\frac{1}{2}$
- (c) What is actinomyorrhizal symbiosis? Give one example of actinomyorrhiza. 2+1
- (d) What are organic fertilizers? Give two examples. 1+2
- (e) Name two important enzymes that are important to fix atmospheric nitrogen. Name one N₂ fixing Cyanobacteria. 2+1
- (f) Distinguish between organic fertilizer and chemical fertilizer. 3

GROUP-B

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Discuss in detail, the isolation and inoculum production of VAM. 6
- (b) Write short notes on: 3+3
- (i) Role of blue-green algae in rice cultivation
- (ii) Importance of mycorrhizal association in agriculture.
- (c) Write down the salient features of Cyanobacteria. How are they employed in improving the soil fertility? 3+3
- (d) Write short notes on: 3+3
- (i) Classification of biofertilizers
- (ii) Significance of *Azospirillum* sp.
- (e) Mention the advantages and disadvantages of biofertilizers. 6
- (f) Discuss the application of Anabaena-Azolla association in agricultural practice. 6

GROUP-C

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

- (b) Describe the types and method of Vermicomposting. 4+8
- (c) Write notes on: 6+6
- (i) Organic farming
- (ii) Recycling of biodegradable municipal Waste.
- (d) Write the systematic position and characteristic features of *Azotobacter*. Describe the mass multiplication and maintenance of inoculum of *Azotobacter*. 6+6

PAPER-II

HERBAL TECHNOLOGY

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
- (a) What is Herbal Technology and herbal medicine? $1\frac{1}{2} + 1\frac{1}{2}$
- (b) What is Pharmacognosy? What are the applications in Pharmacognosy? 1+2
- (c) Give the scientific name and family of an antirheumatic plant. Mention one active constituent in it. 2+1
- (d) Mention any two medicinal uses for each of Ginger, Tulsi and Fenugreek. 1+1+1
- (e) What are the advantages of herbal drugs? 3
- (f) What is the importance of Ayurveda? 3

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Mention the active principles and medicinal uses of *Withania somnifera*. 3+3
- (b) Explain the principles of Siddha system of medicine. 6
- (c) Briefly comment on the phytochemical Screening Test for phenolic compounds. 6
- (d) Discuss the analytical profile of *Centella asiatica* and *Catharanthus roseus*. 3+3
- (e) What is drug adulteration? What are the different types of drug adulteration? 2+4
- (f) Write the scientific name, family and medicinal uses of the following: 3+3
- (i) Asoka (ii) Indian Gooseberry

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) What are Alkaloids? Write a note on phytochemical screening test for alkaloids. Mention the different types of secondary metabolites. 1+5+6
- (b) Discuss about the harvesting, processing and marketing of medicinal plants. 4+4+4
- (c) Write down the procedure of micropropagation of Neem and Tulsi. 6+6
- (d) Write short notes on: 4×3 = 12
- (i) Future prospects of pharmacognosy
- (ii) Flavonoids
- (iii) Herbal therapy.

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 cabbage. 1+1+1
- (b) What is seed certification system? 3
- (c) Differentiate between sowing and seeding. 3
- (d) Write down the steps of transplanting of seedlings. 3
- (e) Write down the process of treatment of cutting. 3
- (f) Differentiate between shade house and glass house. 3

GROUP-B

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Describe the different methods of seed storage. 6
- (b) What is the role of computer application in landscaping gardening? 6
- (c) Describe the scope and problems of tomato cultivation. 3+3
- (d) Define seed dormancy. Write down the methods for breaking seed dormancy. 1+5
- (e) Describe briefly gardening operations. 6
- (f) (i) Write short note on seed bank. 3+3
(ii) Difference between green house and mist chamber.

GROUP-C

3. Answer any *two* questions from the following: 12×2 = 24
- (a) What are air-layering and cutting? Write the technique of cutting. Mention the rooting medium for cutting procedure. 4+4+4
- (b) Give a detailed account on cultivation of Brinjal. Give the scientific name and family of Brinjal. 10+1+1
- (c) What are the objectives and scope of home gardening? Write an essay on infrastructure of an ideal nursery. 3+3+6
- (d) Write short notes on: 4×3 = 12
(i) Manuring
(ii) Factors effecting seed viability
(iii) Seed Testing.

PAPER-IV

FLORICULTURE

GROUP-A

1. Answer any *four* questions from the following: 3×4 = 12
- (a) What is topiary? Name one plant used in Topiary. 2+1
- (b) Define mulching. Why mulching is important in floriculture? 1+2
- (c) What is landscaping? Mention its significance. 1+2
- (d) What is Shrubbery? Give one example of Shrubbery plant. 2+1
- (e) What is pinching? Name two fungal diseases of ornamental plants. 1+2
- (f) What is routine garden operation? Mention why is this done? 2+1

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Define floriculture. Comment on the role of High-Tech floriculture in income generation for livelihood. 2+4
- (b) Describe the elements of English garden and Persian garden. 3+3
- (c) Compare vegetative and sexual method of propagation. Discuss various methods used for packing of cut flowers. 3+3
- (d) Write short notes on: 3+3
 (i) Hedge, (ii) Bonsai.
- (e) Discuss the symptoms of fungal and bacterial diseases of ornamental plants. 3+3
- (f) Discuss the cultivation technique of Orchids. Name two important diseases of Orchids. 4+2

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Define nursery. Discuss in brief about seeds sowing, pricking, shading, defoliation and wintering. 2+2+2+2+2
+2
- (b) Compare the cultivation technique of the following plants 6+6
 (i) Palms and Cycads
 (ii) Ferns and Selaginellas.
- (c) What is indoor gardening? Mention its scope and importance. Briefly discuss the importance of ornamental trees in modern floriculture. 2+4+6
- (d) Write short notes on: 4+4+4
 (i) Role of plant growth regulators in floriculture
 (ii) Cultivation of Carnation
 (iii) Landscaping of highways and educational institutions.

PAPER-V

MEDICINAL BOTANY

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Cite the uses of greenhouses for the production of Nursery. 3
- (b) Differentiate between budding and grafting. 3
- (c) Describe the Red Data Book. 3
- (d) Explain Sacred grove. 3
- (e) Mention some application of ethnomedicine. 3
- (f) What do you understand by the biosphere reserve? Give example. 2+1

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) What is Ex-situ conservation? Mention the objectives of National Parks. 3+3
- (b) Explain the term ethnoecology. Mention the techniques of propagation through cutting. 3+3
- (c) Discuss the future of pharmacognosy in relation to herbal food. 6

- (d) What are natural products? Mention some applications of natural products, with special emphasis on their use in curing jaundice and diabetes. 1+3+2
- (e) Write notes on: 3+3
- (i) Ethnic communities of India
- (ii) Botanical gardens.
- (f) Discuss the conservational effort of the government on endangered medicinal plants. 6

GROUP-C

3. Answer any *two* questions from the following: 12×2 = 24
- (a) Write notes on: 6+6
- (i) Concept of Unani
- (ii) Folk medicine.
- (b) Explain the different concepts in Ayurveda. Discuss the various plants used in Ayurveda treatments. 4+8
- (c) Briefly describe medicinal plant production through the following: 3×4 = 12
- (i) Layering (ii) Budding (iii) Grafting (iv) Cutting
- (d) Discuss the role of sacred grove in ethnobotany. What is Palaeo-ethnobotany? Write a note on Tridosha. 6+2+4

PAPER-VI

PLANT DIVERSITY AND HUMAN WELFARE

GROUP-A

1. Answer any *four* questions from the following: 3×4 = 12
- (a) Briefly discuss the role of IUCN in management of Biodiversity. 3
- (b) What are cultivated plant taxa? Give examples. 2+1
- (c) What is species diversity? Briefly describe. 3
- (d) Name three avenue trees. 3
- (e) Write down the significance of studying wild taxa. 3
- (f) Write short note on loss of ecosystem diversity. 3

GROUP-B

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Discuss about the varieties of ornamental plant found in India and their effect in biodiversity. 3+3
- (b) What is the full form and function of UNESCO and NBPGR? 3+3
- (c) What do you mean by Ex-situ conservation? How is it different from In-situ conservation? Explain. 2+4
- (d) What is Agrobiodiversity? Write a short note on the loss of agrobiodiversity and genetic diversity. 2+4
- (e) Write short notes on: 3+3
- (i) Social approaches to conservation
- (ii) Ethical and aesthetic values of biodiversity.
- (f) Write down the importance of forestry and their utilization in respect to their commercial aspect. 6

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Discuss the role of WWF and UNEP in management of Biodiversity. 6+6
- (b) What is sustainable development? Give the significance of sustainable development in human welfare. 4+8
- (c) Give an account on the fruit crop with their commercial importance in relation to human welfare. 12
- (d) Write short notes on: 6+6
- (i) Biodiversity Awareness Program
- (ii) Beneficial uses of microbes.

PAPER-VII

ETHNOBOTANY

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Name two ancient literature related to Ethnobotany. $1\frac{1}{2} + 1\frac{1}{2}$
- (b) Mention any three uses of *Ocimum sanctum*. 3
- (c) What do you mean by Intellectual Property Rights? 3
- (d) Mention the significance of traditional knowledge. 3
- (e) Define Sacred grove. Give two examples of Sacred groves. 2+1
- (f) What is Biopiracy? 3

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Comment on the role of Ethnobotany in modern medicine. 6
- (b) Write the scientific name and uses of the following categories of plants used by the tribal people: 2+2+2
- (i) Oils
- (ii) Beverage
- (iii) Food plants.
- (c) Mention the role of Ethnic group in conservation of plant genetic resources. 6
- (d) Discuss any three uses of *Gloriosa superba* and *Vitex negundo*. 3×2=6
- (e) How does biopiracy affect traditional knowledge? Write notes on major Ethnic tribe of India. 3+3
- (f) Mention the significance of the following in modern medicine. 3+3
- (i) *Rauwolfia serpentina*
- (ii) *Artemisia vulgaris*.

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Discuss the morphology and Ethnobotanical uses of the following 6+6
- (i) *Azadirachta indica*
- (ii) *Pongamia pinnata*.

- (b) Discuss the role of ethnic group in conservation of endangered taxa and forest management. 6+6
- (c) Write short notes on: 4×3=12
- (i) Scope and objective of Ethnobotany
- (ii) Ethnobotanical use of *Indigofera tinctoria*
- (iii) Herbarium.
- (d) Discuss the legal aspects associated with ethnobotany. Discuss the methods used for collecting ethnobotanical data. 6+6

PAPER-VIII

MUSHROOM CULTURE TECHNOLOGY

GROUP-A

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Name three species of mushroom widely cultivated in India. 3
- (b) What are the different types of sterilization techniques? 3
- (c) Give a list of some locally available substrates for mushroom cultivation. 3
- (d) Is it possible to distinguish between poisonous and edible mushroom? Name two poisonous mushroom. 1+2
- (e) Give the scientific name of three edible mushrooms. 3
- (f) Write a short note on various types of medium used in pure culture of mushroom. 3

GROUP-B

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Describe the process of spawn preparation of Oyster mushroom. 6
- (b) What are the various methods for long term storage techniques of mushroom? 6
- (c) Define composting. Write a note on the process of composting in mushroom cultivation. 1+5
- (d) Give the significance of nutritional and medicinal value of mushroom. 3+3
- (e) Briefly describe the history of mushroom cultivation in India. 6
- (f) Write short note on: 3+3
- (i) Structure of mushroom fruit body
- (ii) Ideal mushroom house.

GROUP-C

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Describe the process of cultivation of *Agaricus bisporus* and *Volvariella volvacea*. 6+6
- (b) Describe the infrastructure needed for mushroom cultivation unit. What is the difference between long term and short term storage of mushroom? 8+4
- (c) Describe the various types of mushroom bed preparation. What are the various factors that affect the mushroom bed preparation and its quality? 8+4
- (d) Write short notes on: 6+6
- (i) Mushroom marketing in India and abroad
- (ii) Mushroom Research Centres at National and Regional level.

PAPER-IX
INTELLECTUAL PROPERTY RIGHTS

GROUP-A

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|----|---|----------|
| 1. | Answer any <i>four</i> questions from the following: | 3×4 = 12 |
| | (a) What is WTO? What is its role in Intellectual Property Rights? | 1+2 |
| | (b) How can copyright infringement be prevented? | 3 |
| | (c) What is Plant Varieties and Farmers Rights Act 2001? | 3 |
| | (d) Differentiate between copyright and patent. | 3 |
| | (e) Define the role of Sui-Generis regime in protection of traditional knowledge. | 3 |
| | (f) Write the objectives of geographical Indication. | 3 |

GROUP-B

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|----|--|----------|
| 2. | Answer any <i>four</i> questions from the following: | 6×4 = 24 |
| | (a) What do you mean by domain name? Discuss how can domain name be protected. | 2+4 |
| | (b) Discuss the procedure of obtaining patents, with examples. List the items which can not be patented under the Indian Patent Act. | 3+3 |
| | (c) How does protection of plant varieties take place in India? | 6 |
| | (d) What is National Gene Bank? Discuss its role in preserving plant genetic diversity. | 2+4 |
| | (e) What is Industrial Design? What are the objectives of it? | 2+4 |
| | (f) What are the objectives of Traditional knowledge? What is Traditional Knowledge Digital Library? | 2+4 |

GROUP-C

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|----|--|-----------|
| 3. | Answer any <i>two</i> questions from the following: | 12×2 = 24 |
| | (a) Discuss the concept of Intellectual Property Rights with examples. Explain the different types of IPR. | 6+6 |
| | (b) Discuss the concept of Novelty. What are the criteria that needs to be fulfilled by a product to consider it as a novel product? Discuss the objectives of patenting Biotech Inventions. | 3+3+6 |
| | (c) What is copyright? Discuss its purpose. Give an account on the types of works protected under Copyright Law. | 2+4+6 |
| | (d) Write short notes on: | 4×3 = 12 |
| | (i) Bioprospecting | |
| | (ii) Biopiracy | |
| | (iii) Difference between TRIPS and WIPO. | |

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