



'समानो मन्त्रः समितिः समानी'

**UNIVERSITY OF NORTH BENGAL**  
B.Sc. Honours 3rd Semester Examination, 2023

**SEC1-P1-BOTANY**

Time Allotted: 2 Hours

Full Marks: 60

*The figures in the margin indicate full marks.*

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

**PAPER-1**

**BIOFERTILIZER**

**GROUP-A**

1. Answer any **four** questions from the following: 3×4 = 12
- (a) What is green manure? Give an example. 2+1
- (b) Name two endophytic cyanobacteria used in rice cultivation. Write down the name of the host associate. 2+1
- (c) What is vermicompost? Name one organism used in producing vermicompost. 2+1
- (d) Write the full form of 'VAM'. Name one VAM fungi and one ectomycorrhiza. 1+2
- (e) What is starter culture? Name one phosphorous mobilizing biofertilizer. 2+1
- (f) Name one free-living and one symbiotic nitrogen fixing microbes. 1  $\frac{1}{2}$  + 1  $\frac{1}{2}$

**GROUP-B**

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Discuss in detail the process of mass multiplication of *Azospirillum*. Write down its application. 4+2
- (b) Define composting. Discuss the different types of composting. 2+4
- (c) What is AM? Write down the different types of AM citing examples of each type. 2+2+2
- (d) Write short notes on: 3+3
- (i) Actinomycorrhizal symbiosis
- (ii) *Anabaena-Azolla* association.
- (e) Distinguish between: 3+3
- (i) Ectomycorrhiza and Endomycorrhiza
- (ii) Agricultural waste and industrial wastes.
- (f) Define biocompost. Describe the method of biocomposting. 2+4

**GROUP-C**

3. Answer any **two** questions from the following: 12×2 = 24
- (a) How preparation of carrier material is done in achieving *Rhizobium* culture? Discuss in detail the isolation of *Rhizobium* from root nodule. Name any two species of *Rhizobium* commercially used. 4+6+2
- (b) Write an account of various species of microbes used as biofertilizers. Discuss the factors that affects the growth of symbionts. 8+4
- (c) What is organic farming? What is the role of vermicompost in organic farming? Discuss the advantages and disadvantages of using vermicompost in farming. 2+4+6
- (d) Write down the systematic position of *Azotobacter*. Write down the salient features. Briefly describe the mass multiplication and maintenance of inoculum. 2+2+5+3

**PAPER-2**

**HERBAL TECHNOLOGY**

**GROUP-A**

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Define Siddha system of medicine. 3
- (b) What is Herbal food? Give examples. 1+2
- (c) Mention the uses of Tulsi in traditional health care system. 3
- (d) Give three examples of drug adulteration. 3
- (e) Write down the full form of AYUSH and ICMR. 1½+1½
- (f) Define triterpenoids. Write down the significance of triterpenoids in herbal drug technology. 1+2

**GROUP-B**

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Write a note on cultivation and storage of medicinal plants. 3+3
- (b) Briefly describe the phytochemical screening tests for flavonoids. 6
- (c) Write the scientific name, systematic position and medicinal uses of (i) Fenugreek and (ii) Ashoka. 3+3
- (d) Describe the analytical profile and utilization of *Centella asiatica*. 6
- (e) Discuss briefly the biological evaluation of drug. 6
- (f) Write a note on scope of herbal medicines. 6

**GROUP-C**

3. Answer any **two** questions from the following: 12×2 = 24
- (a) Define the term phytochemistry. Elucidate different types of drug adulterants. 2+10
- (b) Describe the phytochemical screening tests for identification of steroids and phenolic compounds. 6+6
- (c) Write a note on medicinal plant banks. Describe the role of micropropagation of neem in herbal technology. 4+8
- (d) Give an account on active principles and medicinal uses of following: 4+4+4
- (i) *Clerodendron phlomoides*
- (ii) *Catharanthus roseus*
- (iii) *Withania somnifera*.

**PAPER-3**

**NURSERY AND GARDENING**

**GROUP-A**

- |     |  |                                   |
|-----|--|-----------------------------------|
| 1.  | Answer any <b>four</b> questions from the following:                                 | 3×4 = 12                          |
| (a) | What are the basic principle of selection of cuttings?                               | 3                                 |
| (b) | What is rooting media? Give two examples of rooting media.                           | 1+2                               |
| (c) | What is genetic erosion? Give an example.  | 2+1                               |
| (d) | What are the different methods of testing seed viability?                            | 3                                 |
| (e) | Write the scientific name and family of the following (i) Cabbage and (ii) Tomatoes. | 1 $\frac{1}{2}$ + 1 $\frac{1}{2}$ |
| (f) | What is meant by air-layering? What type of plant is suitable for air-layering?      | 2+1                               |

**GROUP-B**

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|-----|---|----------|
| 2.  | Answer any <b>four</b> questions from the following:  | 6×4 = 24 |
| (a) | Discuss about the diseases and pests of Cabbage. Write down the strategies to deal with them. | 3+3      |
| (b) | Write down the objectives and scope of nursery.   | 2+4      |
| (c) | Write an essay on marketing procedure of seasonal vegetables.                                 | 6        |
| (d) | Describe the storage and preservation of seeds of crop plants.                                | 6        |
| (e) | What is gardening? Write down the different types of gardening.                               | 2+4      |
| (f) | Differentiate between landscape and home gardening.   | 3+3      |

**GROUP-C**

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|-------|--|-----------|
| 3.    | Answer any <b>two</b> questions from the following:  | 12×2 = 24 |
| (a)   | What is landscaping? Discuss the application of computers in landscaping.  | 2+10      |
| (b)   | What is dormancy? Discuss the different types of seed dormancy and methods of breaking seed dormancy.                                    | 2+5+5     |
| (c)   | What is vegetative propagation? Discuss the different types of vegetative propagation. Write down the different types of rooting medium. | 2+7+3     |
| (d)   | Write short notes on:  | 4×3 = 12  |
| (i)   | Hardening of plants  |           |
| (ii)  | Seed production technology   |           |
| (iii) | Post harvest methods.  |           |

**PAPER-4**

**FLORICULTURE**

**GROUP-A**

- |     |  |          |
|-----|--|----------|
| 1.  | Answer any <b>four</b> questions from the following:                 | 3×4 = 12 |
| (a) | Name three commonly used preservatives for the longevity of flowers. | 3        |
| (b) | What is mulching? Mention its significance.                          | 1+2      |
| (c) | Name three famous garden of India.                                   | 3        |

- (d) What is Bonsai? Name two plants suitable for Bonsai. 1+2  
(e) What is routine garden operation? Why is this operation done? 1+2  
(f) Name the plant growth regulator which inhibits apical dominance. What is the oldest form of gardening? 1+2

**GROUP-B**

2. Answer any **four** questions from the following: 6×4 = 24  
(a) Define nursery. Mention the objectives and scope of nursery. 2+4  
(b) Discuss the importance of landscape gardening. 6  
(c) What is wintering? Why is soil sterilization important? Mention the factors affecting flower production. 1+2+3  
(d) Write short notes on: 3+3  
(i) French garden  
(ii) Hedge.  
(e) Describe the cultivation method of Orchids. 6  
(f) Enumerate the advantages of vegetative propagation technique. 6

**GROUP-C**

3. Answer any **two** questions from the following: 12×2 = 24  
(a) Define disease. Describe briefly two commonly occurring diseases of ornamental plants. Write down the preventive measures. 2+5+5  
(b) Describe the role of abscisic acid and gibberellin in floriculture. Name two synthetic auxins. 5+5+2  
(c) Write short notes on: 4×3 = 12  
(i) Indoor gardening  
(ii) British garden  
(iii) Ikebana.  
(d) What are succulents? Give two examples. Discuss the role of Cycads and Palms in landscaping. Write down how these plants are maintained. 2+2+4+4

**PAPER-5**

**MEDICINAL BOTANY**

**GROUP-A**

1. Answer any **four** questions from the following: 3×4 = 12  
(a) What is folk medicine? Mention the names and application of some folk medicine. 1+2  
(b) What is Red Data Book? Write down the examples of endemic medicinal plants. 1+2  
(c) Define the term Naturopathy. 3  
(d) What do you mean by 'Ethnomedicinal Plant Garden'? 3  
(e) State the significance of Nursery for the propagation of medicinal plant. 3  
(f) Explain briefly the concept of Panchabhutas. 3

**GROUP-B**

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Mention the objectives of National Parks. What do you understand by ex-situ conservation? 3+3
- (b) What is Siddha medicine? Mention the plants used in Siddha medicine. 1+5
- (c) Write a short note on endangered medicinal plants with examples. 6
- (d) Briefly describe the application of Ethnobotany in Modern Era. 6
- (e) Elucidate the technique of propagation through cutting. 6
- (f) Discuss the significance of sacred groves in the conservation of plant genetic resources. 6

**GROUP-C**

3. Answer any *two* questions from the following: 12×2 = 24
- (a) Who is known as Father of Indian Ethnobotany? What are the different methods used to study ethnobotany? Explain briefly any two such methods. 1+3+4+4
- (b) What is Ayurveda? Explain the different concepts in Ayurveda. What are the various plants used in Ayurvedic treatments? 2+6+4
- (c) Write short notes on: 6+6
- (i) Unani medicine
- (ii) Folk medicine.
- (d) Discuss the application of natural products in the treatment of 4+4+4
- (i) Jaundice
- (ii) Diabetes
- (iii) High blood pressure.

**PAPER-6**

**PLANT DIVERSITY AND HUMAN WELFARE**

**GROUP-A**

1. Answer any *four* questions from the following: 3×4 = 12
- (a) What is the importance of NBPGR in biodiversity conservation? 3
- (b) What is Red data book? What is its importance? 2+1
- (c) What are avenue trees? Write the names of two avenue trees. 1+1+1
- (d) Write the full form of IUCN and UNESCO. 1  $\frac{1}{2}$  + 1  $\frac{1}{2}$
- (e) With suitable example define genetic diversity. 1+2
- (f) Define sustainable development. Write down the components of sustainable development. 2+1

**GROUP-B**

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Differentiate between In-situ and Ex-situ conservation with example. 4+2
- (b) What is agrobiodiversity? Discuss the role of agroforestry for the human welfare. 2+4

- (c) Give an account of beneficial uses of microbes. 6
- (d) What is species diversity? Explain why conservation of species diversity is important. 2+4
- (e) Write short notes on:
- (i) Ornamental plants
- (ii) Alcoholic beverages.
- (f) Discuss the importance of forestry on the basis of commercial aspect.

**GROUP-C**

3. Answer any *two* questions from the following: 12×2 = 24
- (a) Define Biodiversity. Discuss the values of threat to loss of biodiversity. 2+5+5
- (b) Who coined the term sustainable development? Write down the united Nations Sustainable Development Goals (SDGs) by 2030. 2+10
- (c) Discuss the roles of awareness program in conservation of biodiversity. Citing example write down the social approaches to conservation. 6+6
- (d) Discuss the contribution of ornamental plants and fruit crops in the Indian Economy. 6+6

**PAPER-7**

**ETHNOBOTANY**

**GROUP-A**

1. Answer any *four* questions from the following: 3×4 = 12
- (a) State any three major objectives of ethnobotany. 3
- (b) Define the term “tribes”. Name one major and minor Indian ethnic group. 1+1+1
- (c) Mention the importance of archaeological findings in the study of Ethnobotany. 3
- (d) Give any three ethnomedicinal uses of *Vitex negundo*. 3
- (e) Name any two ancient literature related to Ethnobotany. 1½ + 1½
- (f) Give the full form of IPR. Mention its importance in traditional knowledge. 1+2

**GROUP-B**

2. Answer any *four* questions from the following: 6×4 = 24
- (a) What do you mean by sacred grove? Explain how sacred grove is important for conservation of plant genetic resources. 2+4
- (b) Write the scientific names of plants belonging to the following categories used by the tribal people: 1½ × 4 = 6
- (i) Intoxicants (ii) Beverages (iii) Resins (iv) Oils
- (c) Discuss the role of Traditional Knowledge in modern medicine. 6
- (d) Write short notes on: 3+3
- (i) Ethnobotanical significance of *Gloriosa superba*
- (ii) Biopiracy.
- (e) Write the significance of *Cassia auriculata* in ethnobotanical practices. 6
- (f) Give a brief account on ethnobotanical endangered taxa. 6

**GROUP-C**

3. Answer any *two* questions from the following: 12×2 = 24
- (a) Give the full form of IUCN. Classify threatened categories of plant taxa. Describe the criteria for threatened categories. 2+3+7
- (b) Explain in detail how “Sharing of Wealth Concept” developed in India. Give two examples. 8+2+2
- (c) Write down the scientific name, families, uses and parts used of the following: 6+6
- (i) Neem
- (ii) Ashwagandha.
- (d) What is herbarium? Write the role of herbaria in ethnobotanical studies. Give two examples of medico-ethnobotanical sources. 2+8+2

**PAPER-8**

**MUSHROOM CULTURE TECHNOLOGY**

**GROUP-A**

1. Answer any *four* questions from the following: 3×4 = 12
- (a) Give the scientific names of two edible and one poisonous mushrooms. 1+1+1
- (b) Mention the composition of PDA. 3
- (c) State the importance of drying in the storage of mushroom. 3
- (d) What is fairy-ring? Which mushroom species forms fairy-ring? 2+1
- (e) Write the names of equipments used for mushroom culture. 3
- (f) Name the sterilization techniques. 3

**GROUP-B**

2. Answer any *four* questions from the following: 6×4 = 24
- (a) Describe the composting techniques in mushroom production. 6
- (b) Enumerate the various pests and pathogens associated with button mushroom production. 6
- (c) Define pure culture. What are the factors that affects the mushroom bed preparation? 2+4
- (d) Discuss the structure of an ideal mushroom house. 6
- (e) Write short notes on: 3+3
- (i) Poisonous mushroom
- (ii) Nutritional value of mushroom.
- (f) What is a spawn? Describe the morphological nature of spawn? Write the precautionary measures in spawn preparation. 2+2+2

**GROUP-C**

3. Answer any *two* questions from the following: 12×2 = 24
- (a) Describe the process of cultivation of *Agaricus bisporous*. Write down the different types of food prepared from *Agaricus* sp. 8+4
- (b) Describe the various techniques employed in mushroom storage. 12
- (c) Explain how various environmental factors play a critical role in production of good quality mushroom yield. 12

- (d) Write short notes on: 4×3 = 12
- (i) Mushroom research center in India
  - (ii) Mushroom marketing in India
  - (iii) Sterilization technique.

**PAPER-9**

**INTELLECTUAL PROPERTY RIGHT (IPR)**

**GROUP-A**

1. Answer any **four** questions from the following: 3×4 = 12
- (a) Mention the objectives of Intellectual Property Rights. 3
  - (b) Write the full form of TRIPS and WIPO. 1½+1½
  - (c) What is benefit sharing? Which international protocol emphasises benefit sharing? 2+1
  - (d) What do you understand by protection of good-will? 3
  - (e) What is the impact of IPR protection on a company? 3
  - (f) What are the basic criteria for patenting an invention? 3

**GROUP-B**

2. Answer any **four** questions from the following: 6×4 = 24
- (a) Discuss the objectives of design infringement. 6
  - (b) What is trademark? Write down the different types of trademark with examples. 2+4
  - (c) What is resale right protection? Write the conditions of eligibility for resale royalties. 2+4
  - (d) What is meant by geographical indicator? Write about the geographical indicators of India. What are the recent addition from India? 2+2+2
  - (e) Write down the process for application of patent in India. 6
  - (f) Write down the characteristic features of intellectual property. Give two examples of non-patentable invention. 4+2

**GROUP-C**

3. Answer any **two** questions from the following: 12×2 = 24
- (a) What is 'non-obviousness' while granting patents? Enumerate the procedure for registration of copyright. Give the objectives of copyrights. 2+6+4
  - (b) What are the economic implications of IPR at global context? Enumerate the types of IPR's. 4+8
  - (c) Comment on the protection of semi-conductor chips. What is semi-conductor integrated circuit layout design in IPR? 8+4
  - (d) Write short notes on: 4×3 = 12
    - (i) Traditional knowledge in IPR
    - (ii) Farmers' Right Act 2001
    - (iii) Data protection.

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