



'समानो मन्त्रः समितिः समानी'

**UNIVERSITY OF NORTH BENGAL**

B.Sc. Honours 3rd Semester Examination, 2023

**GE2-P1-BOTANY**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.*

**The question paper contains Paper-I, Paper-II, Paper-III, Paper-IV, Paper-V and Paper-VI. Candidates are required to answer any *one* from the *six* Papers and they should mention it clearly on the Answer Book.**

**PAPER-I**

**BIODIVERSITY (MICROBES, ALGAE, FUNGI AND ARCHEGONIATES)**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is a coralloid root? 1
  - (b) What do you mean by Incipient heterospory? 1
  - (c) Name one agar producing algae. 1
  - (d) Define foliose lichen with example. 1
  - (e) Name one poisonous and one edible mushroom. 1
  - (f) Define heterocyst. 1
  - (g) Define indusium. Give one example. 1
  - (h) Give one example of *ectomycorrhiza* and *endomycorrhiza*. 1

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Describe the structure of bacteriophage with labelled diagram. 5
  - (b) Enumerate the economic importance of Bryophytes. 5
  - (c) Describe the anatomical features of *Equisetum* stem with suitable diagram. 4+1  
Name one leptosporangiate pteridophyte.
  - (d) Briefly describe the phenomenon of transduction in bacteria. 5
  - (e) With diagrammatic representation describe the anatomy of needle leaves of *Pinus*. 5

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Give an account on the various stages of life cycle of *Puccinia graminis*. 10
- (b) Name one true fungi. Differentiate between isogamy and anisogamy. Describe the life cycle pattern of *Penicillium* with suitable illustration. 1+3+6
- (c) Describe the sporophyte of *Funaria* with well labelled diagram. Comment on the function of elaters in spore dispersal. 8+2
- (d) Write short notes on: 5+5
- (i) Cell wall of gram (+ve) and gram (-ve) bacteria
- (ii) Types of Lichen thallus.

**PAPER-II**

**PLANT ECOLOGY AND TAXONOMY**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Define  $\alpha$ -taxonomy. 1
- (b) Name one symbiotic nitrogen fixing bacterium. 1
- (c) Who coined the term ecosystem? 1
- (d) Name one endemic plant species. 1
- (e) Give the full form of IUCN. 1
- (f) What is phylloclade? 1
- (g) Who first proposed binomial system of nomenclature? 1
- (h) Name one Herbarium located in West Bengal. 1

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Define typification. Discuss the different types of typification in brief. 1+4
- (b) Explain Shelford's Law of tolerance. 5
- (c) Write short notes on: 2 $\frac{1}{2}$ +2 $\frac{1}{2}$
- (i) Single access
- (ii) Rule of Priority.
- (d) Explain ecotone and edge effect. 2 $\frac{1}{2}$ +2 $\frac{1}{2}$
- (e) Briefly discuss the adaptive features of Xerophytes. 5

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What is Lindeman's 10 percent law? Explain the energy flow in an ecosystem. 2+8
- (b) Define phenogram and cladogram. Give a brief account of numerical taxonomy. Comment on valid publication. 2+2+6
- (c) What is biogeochemical cycle? What role do they play in the ecosystem? Discuss with the help of Carbon cycle. 2+4+4
- (d) Write a detailed note on Bentham and Hooker system of classification (up to series). What is valid publication? 8+2

**PAPER-III**

**PLANT ANATOMY AND EMBRYOLOGY**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Define procambium. 1
- (b) Write the function of spongy aril. 1
- (c) What are tyloses? 1
- (d) What is annual ring? 1
- (e) Give an example of Ornithophilous flower. 1
- (f) Mention the characteristics of vascular bundle in dicot stem. 1
- (g) How does sieve plate differ from sieve-tube? 1
- (h) Give the function of periderm. 1

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Write the anatomical adaptive features of hydrophytes. 5
- (b) Describe biosporic type of embryo sac development. 5
- (c) Describe briefly the typical structure of an ovule with a suitable diagram. 5
- (d) Compare simple tissue with complex tissue. 5
- (e) Write short note on: Quiescent Centre. 5

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Write the importance of dispersal of seeds. What is pro-embryo? Write a short note on Helobial type of endosperm development. 3+2+5
- (b) What is apomixis? Write the causes of apomixis. 2+8

- (c) Define secondary growth. Discuss how it occurs in a stem. 2+8
- (d) Write short notes on: 5+5
- (i) Polyembryony
- (ii) Seed structure appendages.

**PAPER-IV**

**PLANT PHYSIOLOGY AND METABOLISM**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is facilitated diffusion? 1
- (b) Define vernalization. 1
- (c) Name a stress hormone. 1
- (d) What is the function of phytochrome? 1
- (e) Name one symbiotic nitrogen fixing bacteria. 1
- (f) Give the full form of RUBISCO. 1
- (g) Name any two synthetic auxins used in agriculture. 1
- (h) What kind of reaction does the enzyme 'hydrolases' and 'lyases' catalyze? 1

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Explain photolysis of water in brief. Why is it also known as Hill reaction? 3+2
- (b) Explain in brief the various steps involved in the biological nitrogen fixation in plants. 5
- (c) Describe the C2 cycle with suitable diagram. 5
- (d) Write down the physiological role of gibberellin. 5
- (e) Discuss the factors affecting rate of transpiration. 5

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What are macronutrients? List out the source, role and deficiency symptoms of potassium, phosphorus and magnesium. 1+3+3+3
- (b) Explain CAM pathway with proper diagram. 10
- (c) Give a brief account of the different types of reversible enzyme inhibition that you have studied mentioning their application. 10
- (d) Write short notes on: 5+5
- (i) Distinguish between oxidative phosphorylation and substrate level phosphorylation.
- (ii) Active and Passive transport.

**PAPER-V**  
**ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Define totipotency.
  - (b) Write the scientific name of black pepper.
  - (c) Name any two oil – yielding plants.
  - (d) Give the full form of ELISA.
  - (e) What is RT-PCR?
  - (f) What is the importance of haploid culture in agriculture?
  - (g) Define explant.
  - (h) What is micropropagation?

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) What is the scientific name and family of groundnut? Give the process of extraction of groundnut oil in brief. 2+3
  - (b) Briefly describe production of haploids through androgenesis. 5
  - (c) Comment on the morphology, origin and uses of wheat. 5
  - (d) Give the scientific name, part used and uses of cotton. 5
  - (e) Write down the difference between Southern and Northern Blotting. 5

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What is anther culture? Describe the process of anther culture with a suitable diagram. 2+8
  - (b) What is DNA fingerprinting? How can the molecular markers be used to establish DNA polymorphism between two individuals? 2+8
  - (c) Briefly describe the Sanger's Method of DNA sequencing. What are its application? 8+2
  - (d) Define centre of origin. Distinguish between primary and secondary centres of origin. What is microcentre? 2+6+2

**PAPER-VI**

**ENVIRONMENTAL BIOTECHNOLOGY**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Define surfactant. 1
  - (b) What is acid rain? 1
  - (c) Give two examples of water borne bacterial human disease. 1
  - (d) What is Xenobiotic Compounds? 1
  - (e) What are the harmful effects of UV-B? 1
  - (f) What is bioremediation? 1
  - (g) What is the full form of CFC? 1
  - (h) Define organic pesticide. 1

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Define anthropogenic activities. Briefly discuss their impacts on the environment. 1+4
  - (b) What is biomining? What are the advantages of biomining? 2+3
  - (c) How does biomagnification differ from bio-accumulation? Discuss the effects of biomagnification on environment. 2+3
  - (d) Briefly discuss the impacts of ozone depletion. 5
  - (e) What is bio-sensor? Sketch a labelled diagram of any one bio-sensor. 2+3

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Briefly discuss the different treatment schemes for waste water of antibiotic industries. 10
  - (b) Briefly discuss the following: 5+5
    - (i) Wildlife Act, 1972
    - (ii) Forest Conservation Act, 1980.
  - (c) Discuss the various sustainable approaches that can be employed to control different forms of pollutions in the environment. 10
  - (d) Write short notes on: 5+5
    - (i) Bioremediation
    - (ii) Role of women in the protection of environment.

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