



'समानो मन्त्रः समितिः समानी'

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

**GE2-P2-BOTANY**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.*

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

**PAPER-GE-I**

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

**GROUP-A**

1. Answer any **five** questions from the following: 1×5 = 5
- (a) What is alteration of generation?
  - (b) Define archegoniates.
  - (c) What is the basic difference between zoospores and oospores?
  - (d) What is peristome teeth?
  - (e) Define heterospory.
  - (f) Name one nitrogen fixing symbiotic bacteria.
  - (g) What do you mean by heterothallism?
  - (h) Define lytic cycle.

**GROUP-B**

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Define Mycorrhiza. Write the benefits of mycorrhizal association. 1+4
  - (b) What are Pili and fimbriae? Write the importance of it. 2+3
  - (c) Write notes on: 2  $\frac{1}{2}$  + 2  $\frac{1}{2}$ 
    - (i) Gametangial contact and Gametangial copulation
    - (ii) Economic importance of *Sphagnum*.
  - (d) Illustrate the sporophyte of *Funaria* with proper diagram. 5
  - (e) Write a note on ecological and economic importance of Pteridophytes. 5

**GROUP-C**

3. Answer any **two** questions from the following: 10×2 = 20
- (a) What is the causal organism of black stem rust of wheat? Give a general account on the life cycle of that organism with proper diagram. 2+8

- (b) Write notes on: 5+5  
 (i) Thallus organisation in algae  
 (ii) Types of Lichens.
- (c) Give a comparative account on the reproduction of *Cycas* and *Pinus*. Name one Indian species of *Cycas* and *Pinus*. 8+2
- (d) Schematically represent the process of conjugation in bacteria in all possible combinations. 10

**PAPER-GE-II**  
**PLANT ECOLOGY AND TAXONOMY**

**GROUP-A**

1. Answer any **five** questions from the following: 1×5 = 5
- (a) Define author citation.  
 (b) Give one example of artificial system of classification.  
 (c) What is food web?  
 (d) Define endemism.  
 (e) What is soil profile?  
 (f) Give the full form of OTUS.  
 (g) Give one example of internationally known herbaria.  
 (h) What is sporopollenin?

**GROUP-B**

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Briefly discuss the adaptive features of hydrophytes. 5  
 (b) Discuss the importance of botanical garden. Name one botanical garden outside India. 4+1  
 (c) Differentiate between phenograms and cladogram. Write short note on character coding. 2+3  
 (d) Briefly discuss the energy flow in ecosystem. 5  
 (e) What is biogeochemical cycle? Mention its significance. 2+3

**GROUP-C**

3. Answer any **two** questions from the following: 10×2 = 20
- (a) Discuss Bentham and Hooker's system of classification and mention its merits and demerits. 7+3  
 (b) What is plant succession? Discuss how succession takes place in barren land. 2+8  
 (c) What is typification? Discuss the different nomenclatural types. 2+8  
 (d) Write notes on: 2½ × 4 = 10  
 (i) Binomial nomenclature  
 (ii) Edge Effect  
 (iii) Flora  
 (iv) Inverted pyramid in ecosystem.

**PAPER-GE-III**

**PLANT ANATOMY AND EMBRYOLOGY**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is apospory?
  - (b) Define Parthenocarpy.
  - (c) What is tylosis?
  - (d) What are bulliform cell?
  - (e) What do you mean by endarch vascular bundle?
  - (f) What is herkogamy?
  - (g) What is hemianatropus ovule with example?
  - (h) What is pappus?

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Distinguish between Heart wood and Sap wood. 5
  - (b) Discuss the advantages and disadvantages of cross pollination. 5
  - (c) Discuss the different types of endosperm. 5
  - (d) Illustrate the ultrastructure of dicot embryo. 5
  - (e) Write notes on (i) Periderm (ii) Sclerenchyma tissue.  $2\frac{1}{2} + 2\frac{1}{2}$

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Define stomata. Discuss the different types of stomata in detail. 2+8
  - (b) Discuss the both intrastellar and extrastellar secondary growth in dicot stem. 10
  - (c) Briefly discuss the seed dispersal mechanism with diagram. 10
  - (d) Write notes on: (i) Double fertilization (ii) Apomixis. 5+5

**PAPER-GE-IV**

**PLANT PHYSIOLOGY AND METABOLISM**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is root pressure?
  - (b) Name one micronutrient and one macronutrient.
  - (c) What is critical day length?
  - (d) Name one antitranspirant.

- (e) What is solute potential?
- (f) Name the CO<sub>2</sub> acceptor molecule during dark reaction of photosynthesis.
- (g) Name one plant having Kranz anatomy.
- (h) Write the full form of NADP.

**GROUP-B**

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Define water potential. Mention the different components of water potential and comment on their relationship. 2+2+1
  - (b) Schematically represent the steps of EMP pathway in detail. 5
  - (c) Distinguish between micronutrients and macronutrients. 5
  - (d) Among C<sub>3</sub> and C<sub>4</sub> plants, which one is more efficient in terms of CO<sub>2</sub> fixation during daytime and why? Explain. 5
  - (e) What is photoperiodism? Distinguish between short day and long day plants. 2+3

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What is meant by photophosphorylation? Describe the pentose phosphate pathway in detail. 2+8
  - (b) Discuss the role of abscissic acid and ethylene in plants. 5+5
  - (c) Write short notes on: 5+5
    - (i) Vernalization
    - (ii) Phytochrome.
  - (d) Schematically represent the symplastic and apoplastic phloem loading pathway in source leaves. Discuss the importance of P-protein in phloem translocation. Name the components translocated through phloem. 6+3+1

**PAPER-GE-V**

**ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY**

**GROUP-A**

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Write down the full form of *ELISA*.
  - (b) Name the Scientist who discovered Southern Blotting.
  - (c) Write down the family name of Cotton.
  - (d) Distinguish between Black Pepper and White Pepper.
  - (e) What are monoclonal Antibodies?
  - (f) Name one fibre-yielding plant.
  - (g) Mention the scientific name of Tea.
  - (h) What is RT-PCR?

**GROUP-B**

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Briefly describe the processing and utilization of tea.  $2\frac{1}{2} + 2\frac{1}{2}$
- (b) Schematically represent the Process of DNA fingerprinting. 5
- (c) Define embryo culture. Mention its types. 2+3
- (d) Write down the scientific name, family, and uses of (1+ $\frac{1}{2}$ +1)×2  
(i) *Clove* (ii) *Gram*.
- (e) Schematically represent the steps of *Northern Blotting*. 5

**GROUP-C**

3. Answer any **two** questions from the following: 10×2 = 20
- (a) Write short notes on: 5+5  
(i) Hybridoma technology  
(ii) Human gene therapy.
- (b) Briefly discuss the process of gynogenesis. What is haploid culture? Discuss the economic importance of Groundnut in Botany. 5+1+4
- (c) Write down the morphology of Wheat. Discuss the importance of SNPs — as DNA marker in Plant Biotechnology. 5+5
- (d) What is endosperm culture? Describe the different stages of endosperm culture. 2+8

**PAPER-GE-VI**

**ENVIRONMENTAL BIOTECHNOLOGY**

**GROUP-A**

1. Answer any **five** questions from the following: 1×5 = 5
- (a) Define Ecosystem. 1
- (b) What is BOD? 1
- (c) What is Acid rain? 1
- (d) State the expanded form of WCED. 1
- (e) Who initiated the Chipko movement and when? 1
- (f) What is geomagnification? 1
- (g) Define Anthropogenic pollution. 1
- (h) In which year and where first Earth Summit was held? 1

**GROUP-B**

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Write a short note on Green house effect. 5
- (b) Briefly discuss the causes of Soil pollution and its consequences. 3+2
- (c) Discuss the biotechniques use for reduction air pollution level. 5

- (d) Discuss about the bioremediation of Xenobiotic compound in environment. 5
- (e) Write a short note on biopesticides. 5

**GROUP-C**

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Discuss the concept of sustainable development. 10
- (b) Write notes on (i) Kyoto Protocol (ii) Forest Conservation Act. 5+5
- (c) Discuss the salient features of Wildlife Protection Act 1972. How does the extinction of species affect the environment? 8+2
- (d) Describe in detail about 5+5
- (i) Silent Valley Movement
- (ii) Narmada Bachao Andolan.

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