



'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 2nd Semester Examination, 2023

GE1-P2-BOTANY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

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

PAPER-GE-1

BIODIVERSITY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is peplomer?
 - (b) What is the function of heterocyst?
 - (c) Name one edible fungi.
 - (d) What is the function of peristome teeth?
 - (e) What are eusporangiate ferns?
 - (f) What is ovuliferous scale?
 - (g) Mention the composition of bacterial cell wall.
 - (h) Name one agar producing algae.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Describe the ultrastructure of T.M.V. 5
 - (b) What is nucule? Describe its structure with labelled diagram. 1+4
 - (c) Describe the internal structure of the capsule of *Funaria*. 5
 - (d) What is mycorrhiza? Write the significance of mycorrhiza. 2+3
 - (e) Describe the anatomical features of needle leaves of *Pinus*. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Describe the range of thallus structure of algae with suitable diagrams. 10
 - (b) Distinguish the morpho-anatomical features of *Selaginella* and *Equisetum*. 10
 - (c) Describe the methods of asexual reproduction in *Rhizopus*. Name two Indian species of this genus. 8+2
 - (d) Describe the process of transformation in bacteria with suitable diagram. 10

PAPER-GE-2

PLANT ECOLOGY AND TAXONOMY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Differentiate a food chain from a food web.
 - (b) What is author citation? Give one example.
 - (c) Name a free-living Nitrogen fixing bacteria.
 - (d) What is Principle of Priority?
 - (e) Who coined the term “Ecology”?
 - (f) Name a high altitude Botanical Garden in India.
 - (g) What is ecotone?
 - (h) Write any one important feature of family Asteraceae.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) What is ecological pyramid? Write the different types of ecological pyramids. 1+4
 - (b) What do you mean by effective and valid publication? Write the importance of typification in binomial nomenclature. 3+2
 - (c) Write down the adaptive features of xerophytes with proper examples. 5
 - (d) Mention the functions of herbarium in taxonomic study and researches. 5
 - (e) What is Shelford’s law of tolerance? Differentiate between phenogram and cladogram. 2+3

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What is binomial nomenclature? Describe the rules and principles of ICN with suitable examples. 2+8
- (b) What do you mean by ecological succession? Explain the process of succession with an example. 2+8
- (c) What are the basic differences between natural, artificial and phylogenetic system of classification? Discuss about the Engler and Prantl system of classification. 3+7
- (d) Mention the names of different biotic and abiotic components of an ecosystem. Explain how the energy flow in an ecosystem is unidirectional. 6+4

PAPER-GE-3

PLANT ANATOMY AND EMBRYOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is sunken stomata?
- (b) Define pollinia.
- (c) What do you mean by exarch xylem?
- (d) What are antipodal cells?
- (e) What is entomophily?
- (f) What are growth ring and annual ring?
- (g) What is meant by polyembryony?
- (h) What are lenticels?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Add a short note on different types of endosperm. 5
- (b) What do you mean by secondary growth? Write the difference between sap wood and heart wood. 2+3
- (c) Discuss the structure of ovules with the help of diagram. 5
- (d) Write short notes on: 2½ × 2 = 5
- (i) Triple fusion
- (ii) Adaptation in hydrophytes.
- (e) Compare the anatomical features of monocot and dicot stem. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Describe the different types of embryo sacs in plants with suitable diagrams. Write the functions of endosperm. 7+3
- (b) What is dispersal of seeds? Discuss the different mechanism of abiotic and biotic dispersal of seeds? 2+4+4
- (c) Define intrastelar and extrastelar secondary growth. Discuss the normal secondary growth as found in a dicot stem with labelled diagram. 3+7
- (d) Write short notes on: 2 $\frac{1}{2}$ ×4 =10
- (i) Histogen theory
- (ii) Sclerenchyma
- (iii) Hydathode
- (iv) Cleistogamy.

PAPER-GE-4

PLANT PHYSIOLOGY AND METABOLISM

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is 'Emerson effect'?
- (b) What is meant by micronutrient? Cite one example.
- (c) Name the first stable products of C3 and C4 cycles of photosynthesis.
- (d) What do you mean by feedback inhibition?
- (e) What is guttation?
- (f) Name one denitrifying bacteria.
- (g) What is Florigen?
- (h) Why is the Krebs's cycle referred to as an amphibolic cycle?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Describe the pressure-flow model of translocation in the phloem. 5
- (b) Differentiate between: 2 $\frac{1}{2}$ ×2 = 5
- (i) Photophosphorylation and oxidative phosphorylation
- (ii) PS-I and PS-II
- (c) Discuss about the different factors affecting transpiration. 5

- (d) Give a brief outline of enzyme classification with suitable examples. 5
- (e) What is Photoperiodism? Write a short note on vernalization. 1+4

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What are auxins? Discuss the physiological roles of auxin in plants. Name two naturally occurring cytokinins. 1+7+2
- (b) Explain C4 cycle. Write its significance. 7+3
- (c) Elucidate the process of biological nitrogen fixation. Write the full form of GS and GOGAT. 8+2
- (d) Discuss about the different membrane proteins involved in the membrane transport. Differentiate between active and passive transport. 7+3

PAPER-GE-5

ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Name one high yielding variety of Wheat.
- (b) Write down the essentiality of DNA sequencing.
- (c) Write down the role of Taq polymerase.
- (d) Write down the scientific name of soybean.
- (e) Write the full form of RFLP.
- (f) Write down the morphological nature of cotton.
- (g) Define annealing temperature.
- (h) Write one use of groundnut.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Write a short note on northern blotting. 5
- (b) Write the scientific name, family, parts used and uses of clove. 1+1+1+2
- (c) Write down the application of ELISA. 5
- (d) Write the scientific name, family and morphology of black pepper. 1+1+3
- (e) Differentiate between androgenesis and gynogenesis. According to you which technique is more efficient and why? 4+1

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Illustrate the concept of centres of origin with reference to Vavilov's Work. 10
- (b) Write the scientific name and family of tea plant. Briefly describe the processing of tea. 1+1+8
- (c) Write short notes on: 5+5
- (i) RAPD
- (ii) Molecular diagnosis of human disease.
- (d) Write down the scientific name, family and usage of (1½+1½+2)×2 = 10
- (i) cotton and (ii) gram.

PAPER-GE-6

ENVIRONMENTAL BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is acid rain?
- (b) What is Chipko movement?
- (c) Write the full form of DDT.
- (d) What do you mean by organic pesticides?
- (e) What is the full form of CFC related to pollution?
- (f) What are the harmful effects of UV-B?
- (g) Cite two example of waterborne bacterial human disease.
- (h) Define surfactants.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Briefly discuss the causes of soil pollution and its consequences. 2½+2½
- (b) What is bio-sensor? Sketch a labelled diagram of any one bio-sensor. 2+3
- (c) What was the key objective of the Basal Convention (1989)? Discuss the role of Basal Convention for sustainable future. 1+4
- (d) How does biomagnification differ from bio-accumulation? Discuss the effects of biomagnification on environment. 2+3
- (e) What is biomining? What are the advantages of biomining? 2+3

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Explain the treatment schemes of waste water in tannery industry with a flow diagram. 7+3
- (b) Write short notes on: 2 $\frac{1}{2}$ ×4 =10
- (i) Forest Conservation Act (1980)
- (ii) Overexploitation of Natural resources
- (iii) Corporate Social Responsibility in sustainable development
- (iv) Role of women in environmental protection.
- (c) What is bioremediation and why is it important? Discuss in brief the role of microorganisms in bioremediation. (2+2)+6
- (d) Briefly discuss the various biotechnological approaches used to control environmental pollution. 10

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