



'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2021

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 ARCHEGONIATE)

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Name one endospore forming bacterium.
 - (b) Name one alga that is the source of commercial iodine.
 - (c) Name a unicellular motile alga.
 - (d) What is vision?
 - (e) Name one homosporous and one heterosporous pteridophyte.
 - (f) What is coralloid root?
 - (g) What do you mean by incipient heterospory?
 - (h) Name the first discovered virus.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Distinguish between gram-positive and gram-negative bacterial cell wall. $2\frac{1}{2} + 2\frac{1}{2}$
 - (b) Draw and describe the structure of bacteriophage. 5
 - (c) With labelled diagram discuss the stem anatomy of *Equisetum*. 2+3
 - (d) Give the salient features of brown algae. 5
 - (e) Briefly discuss the economic importance of Bryophytes. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Describe the sexual reproduction occurring in nannandrous species of *Oedogonium*. 10
- (b) Give a comparative account of structure of sporophytes of *Marchantia* and *Funaria*. 10
- (c) What is genetic recombination? Explain transformation and transduction in bacteria. 2+4+4
- (d) Compare the megasporophyll and microsporophyll of *Cycas* and *Pinus*. 5+5

PAPER-II

PLANT ECOLOGY AND TAXONOMY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Name two limiting factors in an ecosystem.
- (b) Name one hydrophyte where the stomata are confined only to the upper surface of leaf.
- (c) What is a lectotype?
- (d) Who coined the term ecosystem?
- (e) Which biotic component forms the base in an ecological pyramid?
- (f) A plant with square stem, opposite leaf, hairy and aromatic character — Name the family.
- (g) Name the largest Botanical Garden in India.
- (h) Give an example of inverted pyramid.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Describe the composition of soil. 5
- (b) Explain Shelford's law of tolerance. 5
- (c) Explain ecotone and edge effect. $2\frac{1}{2} + 2\frac{1}{2}$
- (d) Define botanical garden. Enumerate the role of Herbarium. 1+4
- (e) Write down the different types of nomenclatural types. 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) What are biogeochemical cycles? What role they play in the ecosystem. Discuss with the help of carbon cycle. 2+8
- (c) Differentiate between artificial and natural system of classification. Schematically represent the Bentham and Hooker system of classification (upto series). 2+8
- (d) What is taxonomic key? With suitable example illustrate how taxonomic key is helpful in identification of plants. Give one example each of flora where bracketed and indented key is followed. 2+6+2

PAPER-III

PLANT ANATOMY AND EMBRYOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Give one example of mesophytic plant (with Botanical name).
- (b) What is velamen?
- (c) What is quiescent centre?
- (d) Where do you find the presence of bulliform cell?
- (e) What is tylosis?
- (f) What are hydathodes?
- (g) Give an example of a plant (scientific name) where aerenchyma are found.
- (h) Name the meristematic tissues that leads to the secondary growth in dicot stem.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Describe the process of double fertilization in flowering plants. 5
- (b) Discuss Histogen theory of shoot apical meristem. 5
- (c) Describe different types of ovules with proper diagram. 5
- (d) Briefly describe the hydrophytic adaptations in plants. 5
- (e) Differentiate between spring wood and summer wood. 2½+2½

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Differentiate between dicot stem and monocot stem. Describe the structure of periderm with diagram. 5+5
- (b) What is stomata? What are the different types of stomata found in angiosperms? 2+8
- (c) Describe the adaptive features of flowers for self and cross pollination. 5+5
- (d) Describe the development of different types of endosperms with proper diagrams. 10

PAPER-IV

PLANT PHYSIOLOGY AND METABOLISM

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Name the first stable product of C₃ cycle.
- (b) Which organelles are associated with photorespiration?
- (c) What is the full form of RUBISCO?
- (d) Name two antitranspirants.
- (e) Give one example of a Short Day Plant.
- (f) What is phytochrome?
- (g) Name two symbiotic nitrogen-fixing bacteria.
- (h) What are trace elements?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Mention the physiological roles of auxins and cytokinins. $2\frac{1}{2} + 2\frac{1}{2}$
- (b) Explain the CAM cycle. 5
- (c) Write short notes on Pressure Flow Model. 5
- (d) Distinguish between transpiration and guttation. Discuss the factors affecting transpiration. 2+3
- (e) Give an account of oxidative pentose phosphate pathway. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Give an account of the biochemical reactions involved in TCA cycle. 10
- (b) What is meant by enzyme inhibition? Discuss the types of enzyme inhibition in detail. 2+8
- (c) Distinguish between— 5+5
- (i) Red light and far-red light.
- (ii) Phloem loading and unloading.
- (d) What is biological nitrogen fixation? Explain the role of *Rhizobium* in nitrogen fixation. 2+8

PAPER-V

ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Write the botanical name of clove.
- (b) Which part of cotton is the source of fibre?
- (c) Give the scientific name of tea.
- (d) What is totipotency?
- (e) Who was the discoverer of Southern blotting?
- (f) When was the center of origin of cultivated plant first identified?
- (g) What is reverse transcriptase-PCR?
- (h) Write the full form of ELISA.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Mention botanical name, family and uses of Black pepper. 1+1+3
- (b) Discuss the methods used for tea processing. 5
- (c) What is micropropagation? Differentiate between androgenesis and gynogenesis. 1+4
- (d) Write a note on embryo culture. What is the application of embryo culture? 4+1
- (e) Write a short note on oil producing plants with special reference to groundnut. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What is hybridoma technology? Give few application of this technique. 5+5
 - (b) What is the importance of haploids in higher plants? Give two methods of haploids production. 5+5
 - (c) What are the different types of blotting techniques? Explain Southern blotting in detail. 3+7
 - (d) What are molecular DNA markers? Describe the RFLP technique, along with its applications. 2+6+2

PAPER-VI

ENVIRONMENTAL BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Write the full form of WCED related to environmental protection.
 - (b) Name the major factor responsible for ozone depletion.
 - (c) Name any molecular techniques used in bioremediation.
 - (d) Give two examples of bio-sensors.
 - (e) Define biomagnification.
 - (f) Give two examples of greenhouse gas.
 - (g) Name the movement introduced against deforestation.
 - (h) What is the motto of Basel convention?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Briefly describe the salient features of Wildlife Protection Act, 1972. 5
 - (b) Write short notes on — 2½ + 2½
 - (i) Bioreactors
 - (ii) Biobleaching.
 - (c) Briefly describe Chipko and Silent Valley movement. 2½ + 2½
 - (d) Discuss the basic principle of activated sludge process for waste water treatment. 5
 - (e) When and where was Stockholm conference held? State the major declarations of Stockholm Conference regarding environment protection. 2+3

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Write short notes on — 5+5
- (i) Narmada Bachao Andolan
- (ii) Acid Rain.
- (b) Define industrial microbiology. Discuss about waste water treatment process. 1+9
- (c) Briefly discuss the various biotechnological approaches used for management of environmental problems. 10
- (d) What are biopesticides? Explain the role of biopesticides in Integrated Pest Management (IPM) with examples. 2+8

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