



'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 1st Semester Examination, 2021

GE1-P1-BOTANY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.

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

PAPER-1

BIODIVERSITY

(MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What do you mean by eucarpic fungi?
 - (b) Name two species of *Pinus* found in India.
 - (c) What is the function of peristome teeth?
 - (d) What is Dolipore septum?
 - (e) Define coralloid root.
 - (f) What is Gemma? Mention its function.
 - (g) Name the period where early land plants were originated.
 - (h) What is Pseudoelaters?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Describe heterospory and seed habit in pteridophyte with special reference to *Selaginella*. 5
 - (b) Discuss the cell wall composition of fungus. 5
 - (c) Describe the ecological importance of bryophytes. 5
 - (d) Illustrate the process of sexual reproduction in nannandrous species of *Oedogonium*. 5
 - (e) Write short notes on: 2½×2 = 5
 - (i) Megasporophyll of *Cycas*, (ii) Ovuliferous scale of *Pinus*.

GROUP-C

3. Answer any *two* of the following questions: 10×2 = 20
- (a) Describe in brief, the life cycle of *Puccinia*. 10
 - (b) What is stele? Discuss the different types of stele with suitable diagram. 1+9
 - (c) Compare the sporophytes of *Marchantia* and *Funaria* with suitable diagram. 10
 - (d) Write short notes on: 5+5
 - (i) Heterospory, (ii) Conjugation in bacteria.

PAPER-2

PLANT ECOLOGY AND TAXONOMY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What do you mean by soil profile?
 - (b) Name two Internationally known herbaria.
 - (c) What is nomenclatural types?
 - (d) Define clades.
 - (e) Define ecotone.
 - (f) What do you mean by tetradynamous condition?
 - (g) What is author citation?
 - (h) In which family do you find verticillaster inflorescence?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Explain food chain and food web with suitable examples. $2\frac{1}{2} + 2\frac{1}{2}$
 - (b) Why is pyramid of energy always upright? — Explain. 5
 - (c) What is endemism? Discuss about the different causes of endemism. 1+4
 - (d) Mention the importance of herbaria in taxonomic study and research. 5
 - (e) What do you mean by valid publication? Mention the criteria to be fulfilled by a name to be valid. 1+4

GROUP-C

3. Answer any *two* of the following questions: 10×2 = 20
- (a) With suitable examples, explain the hydrophytic adaptations of plants. 10
 - (b) Give outline of Bentham and Hooker's system of classification. Mention its merits and demerits. 6+4
 - (c) Delineate the salient features of family Solanaceae with floral formula and floral diagram. 8+2

- (d) Write short notes on: 5×2 = 10
 (i) Energy flow in an ecosystem, (ii) Taxonomic ranks.

PAPER-3

PLANT ANATOMY AND EMBRYOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is casparian strip?
 - (b) What is protandry?
 - (c) Who proposed histogen theory to explain shoot apical organization?
 - (d) Name one plant (Botanical name) in which endosperm is watery in nature.
 - (e) Why nucellar embryos are important in plant breeding?
 - (f) How does vascular cambium differ from procambium?
 - (g) What is sunken stomata?
 - (h) What is calyptrogen?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Write a note on the different types of endosperm in angiosperm. 5
 - (b) Give a brief account on the anatomical features related to Xerophytic adaptations. 5
 - (c) Mention the advantages and disadvantages of cross pollination. 5
 - (d) Write short notes on: 2½×2 = 5
 (i) Structure of a typical anther, (ii) Apical cell theory.
 - (e) Differentiate between: 2½×2 = 5
 (i) Orthotropous ovule and Anatropous ovule
 (ii) Heartwood and Sapwood.

GROUP-C

3. Answer any *two* of the following questions: 10×2 = 20
- (a) Give an account of the process of extra stellar secondary growth in dicotyledonous stem. 10
 - (b) Describe the different types of stomata with suitable diagrams. 10
 - (c) Discuss the different methods of seed dispersal mechanism. Mention the significance of seed dispersal. 7+3
 - (d) Write short notes on: 2½×4 = 10
 (i) Cambium, (ii) Bulliform cells, (iii) Double fertilization, (iv) Apomixis.

PAPER-4

PLANT PHYSIOLOGY AND METABOLISM

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Give full form of CAM.
 - (b) Name one gaseous hormone.
 - (c) What is guttation?
 - (d) Define vernalization.
 - (e) Name one short day and one long day plants.
 - (f) Name two symbiotic N₂ fixing bacteria.
 - (g) Why is PPP also known as hexose monophosphate shunt?
 - (h) What is solute potential?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Write down the properties of enzyme.
 - (b) Schematically represent the various steps involved in Glycolysis.
 - (c) Define transpiration. Discuss the factors affecting transpiration.
 - (d) Briefly describe the role of photosystem I and photosystem II in photosynthesis.
 - (e) Briefly describe the role of phytochrome in flowering.

GROUP-C

3. Answer any *two* of the following questions: 10×2 = 20
- (a) Define micro and macro element in plant nutrition. Write in brief about the role and deficiency symptoms of Zn, Mn, N, and P in plants. 2+8
 - (b) Briefly discuss the biological N₂ fixation in plants. 10
 - (c) Derive the Michaelis-Menten equation of enzyme catalysed reaction. Write down the significance of K_m.
 - (d) Define RQ. What are the cases where RQ values are changed? State the significance of RQ. 1+7+2

PAPER-5

ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Mention the full form of RAPD and PCR.
 - (b) What is androgenesis?

- (c) Give one utility of indirect-ELISA.
- (d) Give botanical name and family of a popular beverage-yielding plant.
- (e) Comment on the morphology of clove.
- (f) Mention the source of Taq polymerase.
- (g) How does monoclonal antibody differ from polyclonal one?
- (h) Mention the importance of pollen culture.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Mention the botanical name, family and uses of clove and ground nut. $2\frac{1}{2} \times 2 = 5$
 - (b) Define hybridoma. Mention the advantages of RFLP. 1+4
 - (c) Briefly describe the process of embryo culture. 5
 - (d) Mention the practical application of embryo and endosperm culture. $2\frac{1}{2} \times 2 = 5$
 - (e) Write short notes on: $2\frac{1}{2} \times 2 = 5$
 - (i) Gynogenesis, (ii) Human gene therapy.

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Describe the centres of origin of cultivated plants and their importance with reference to Vavilov's work. 10
 - (b) Define micropropagation. Mention its significance and possible roles in crop improvement. 2+8
 - (c) Mention the botanical name and family of tea. Describe the process of processing of tea in detail. 2+8
 - (d) Briefly describe the PCR technique. Who discovered the technique? Mention the practical application of PCR technique. 7+1+2

PAPER-6

ENVIRONMENTAL BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Write full form of CFC.
 - (b) What is e-waste?
 - (c) Write two effects of acid rain.
 - (d) Name two bacteria used in bioleaching.
 - (e) Name two chemical pesticides.

- (f) What is eutrophication?
- (g) Mention two salient features of Wildlife Protection Act, 1972.
- (h) What is biomagnification?

GROUP-B

2. Answer any **three** questions from the following: 5×3 = 15
- (a) Write a note on bioremediation. 5
 - (b) Write down the role of NGO in bringing environmental awareness. 5
 - (c) Differentiate between biopesticide and chemical pesticide. 5
 - (d) Write notes on: 2½×2 = 5
 - (i) BOD
 - (ii) Silent Valley Movement.
 - (e) Briefly describe the concept of Rio Earth Summit – UNCED, 1992. 5

GROUP-C

3. Answer any **two** questions from the following: 10×2 = 20
- (a) What is environmental pollution? Briefly discuss the types, sources and effects of pollution. 2+8
 - (b) Define enhanced greenhouse effect. Where do greenhouse gases come from? How long do they stay in the atmosphere? Briefly describe the Ozone Layer Protection Act. 2+3+1+4
 - (c) Write short notes on: 2½×4 = 10
 - (i) Kyoto Protocol – 1997
 - (ii) Chipko Movement
 - (iii) Ramasar Convention, 1971
 - (iv) National Environmental Policy – 2006.
 - (d) Briefly discuss the various biotechnological approaches for the management of environmental problems. 10

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