



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2022

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) Mention the composition of bacterial cell wall.
 - (b) Name a lichen having medicinal importance.
 - (c) What is coenobium?
 - (d) What is shower of sulfur?
 - (e) What is paraphyses?
 - (f) What are elaters?
 - (g) Which pigment is present in red algae?
 - (h) Name an ecological indicator species of bryophyte.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Differentiate between ectomycorrhiza and endomycorrhiza. 5
 - (b) Describe the morpho-anatomical features of *Funaria* capsule with labelled diagram. 5
 - (c) Briefly describe the lysogenic cycle of virus. 5
 - (d) What is Nucule? Describe its structure with well labelled diagram. 5
 - (e) Give an account on the anatomical features of *Cycas* leaflet. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Describe the process of conjugation in bacteria. Name two beneficial bacteria. 8+2
 - (b) Describe the sporophyte of *Marchantia* with well labelled diagram. Write a brief note on the spore dispersal mechanism of bryophytes that you have studied. 6+4
 - (c) Mention some primitive features of *Cycas*. Distinguish between the reproductive structures of *Cycas* and *Pinus*. 3+7
 - (d) Describe the morpho-anatomical features of any heterosporous pteridophyte with well labelled diagram. What is coralloid root? 7+3

PAPER-II

PLANT ECOLOGY AND TAXONOMY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is edge effect?
 - (b) Name one Indian herbarium.
 - (c) Name a plant exhibiting vivipary.
 - (d) What is multi-access key?
 - (e) Define net primary productivity.
 - (f) Define ecotone.
 - (g) What is lectotype?
 - (h) State the Shelford law of tolerance.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Define taxonomic hierarchy. What are the mandatory ranks in taxonomic hierarchy recognized by ICN? 1+4
 - (b) Explain food chain and food web with suitable examples. $2\frac{1}{2}+2\frac{1}{2}$
 - (c) Write short notes on:
 - (i) Phenogram
 - (ii) OTUs
 - (d) Briefly explain nitrogen cycle. 5
 - (e) Mention the importance of herbaria in taxonomic study and research. 5

GROUP-C

3. Answer any *two* of the following questions: 10×2 = 20
- (a) Distinguish between artificial, natural and phylogenetic system of classifications. State the merits and demerits of phylogenetic system of classification. 6+4

- (b) What do you mean by ecological pyramid? What are the different types of ecological pyramids? Characterize them. 1+3+6
- (c) What do you mean by ecological succession? Explain the process of succession with an example. 2+8
- (d) State the principle of priority and explain it with example. What are the limitations of this principle? 2+6+2

PAPER-III

PLANT ANATOMY AND EMBRYOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is Cystolith?
- (b) Name the only dead element in phloem tissue.
- (c) Write the function of Suspensor.
- (d) What is phylloclade?
- (e) Define Xenogamy.
- (f) What is lenticel?
- (g) What are the components of periderm?
- (h) Give one example of cleistogamous flower.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Differentiate between ring porous wood and diffuse porous wood. $2\frac{1}{2}+2\frac{1}{2}$
- (b) Who discovered double fertilization in angiosperms? Describe in brief double fertilization in angiosperms. 1+4
- (c) Write the different adaptive features for allogamy. 5
- (d) Differentiate between fascicular and interfascicular cambium. What do you mean by multiple annual ring? 3+2
- (e) Differentiate between: $2\frac{1}{2}+2\frac{1}{2}$
- (i) Protoxylem and metaxylem (ii) Tracheid and Trachea

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Briefly describe the secondary growth in monocot stem. Differentiate between early wood and late wood. 7+3
- (b) Describe the seed dispersal mechanisms with suitable examples. 10
- (c) Write a comparative account on the anatomy of a dicot stem and a monocot stem with suitable diagrams. 5+5

- (d) Write a brief account on the types of endosperm. Mention the functions of endosperm. What is perisperm? 6+2+2

PAPER-IV

PLANT PHYSIOLOGY AND METABOLISM

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- Name one gaseous plant hormone.
 - What is the water potential of pure water at atmospheric pressure?
 - What is guttation?
 - In which kind of plants dumb bell shaped guard cells are found?
 - What is florigen?
 - Name one SDP plant.
 - Name a plant growth regulator which is highly effective in fruit ripening.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- What is Kranz anatomy? Discuss its significance in C₄ plants. 1+4
 - State the deficiency symptoms of nitrogen and manganese. 2½+2½
 - What is photoperiodism? Distinguish between long day and short day plants. 1+4
 - Give a brief outline of classification of enzymes with suitable examples. 5
 - Differentiate between Photosystem I and Photosystem II.

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- What are the various steps involved in the biological nitrogen fixation in plants? Name one symbiotic nitrogen fixing bacteria. 9+1
 - Define water potential. How is transpiration associated with absorption of water in plants? Why is transpiration referred as “necessary evil”? 2+6+2
 - What are the major components of phloem sap? Describe the pressure flow hypothesis explaining movement of sap through sap. Discuss the mechanism of phloem loading. 2+3+5

PAPER-V

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 RFLP.
 - (b) What are monoclonal antibodies?
 - (c) Write the scientific name of clove.
 - (d) What is rhizogenesis?
 - (e) Mention the importance of pollen culture.
 - (f) What is meant by haploid protoplast?
 - (g) How does southern analysis differ from western blotting?
 - (h) What is the family of soybean?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Briefly describe the process of embryo culture. 5
 - (b) Briefly describe the centres of origin of cultivated plants and their importance with reference to Vavilov's work. 5
 - (c) Write short notes on: 2 $\frac{1}{2}$ +2 $\frac{1}{2}$
 - (i) Micropropagation
 - (ii) Human gene therapy
 - (d) Mention the scientific names of gram and black pepper. Give a general account on spices. 2+3
 - (e) Briefly describe the Maxam-Gilbert method of DNA sequencing. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Briefly describe the PCR technique. Mention the practical applications of this technique. 7+3
 - (b) Mention the botanical name and family of tea. Describe the processing of tea in detail. 2+8
 - (c) What is endosperm culture? Describe the process of endosperm culture with suitable diagram. 2+8
 - (d) Write short notes on: 5+5
 - (i) ELISA
 - (ii) Hybridoma

PAPER-VI
ENVIRONMENTAL BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Write the full name of WTO.
 - (b) What is Chipko Movement?
 - (c) Name two greenhouse gases.
 - (d) Mention the functions of rotating discs in waste water treatment.
 - (e) What is biosensor?
 - (f) What is Kyoto Protocol?
 - (g) What is sustainable development?
 - (h) Name one enzyme which is used in treatment of toxic compound and mention its function.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) What is acid rain? Discuss the impact of acid rain on the environment. 1+4
 - (b) Write short notes on the types of pollution and sources of water. 3+2
 - (c) Briefly discuss the role of NGO's in bringing environmental awareness. 5
 - (d) Briefly describe the National Environmental Policy, 2006. 5
 - (e) Write a short note on biotechnology for air pollution abatement and odour control. 3+2

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Discuss the bioremediation strategies of xenobiotic compounds. 10
 - (b) Write short notes on: 5+5
 - (i) Rio Earth Summit (1992)
 - (ii) Ramsar Convention (1971)
 - (c) What is environmental pollution? Briefly discuss the types, sources and effects of pollution. 2+8

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