'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2022

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

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

   (a) What do you mean by coenocytic mycelium?

   (b) Write the function of heterocyst.

   (c) Which plant group is known as amphibians of plant kingdom and why?

   (d) Name the earliest land plant and mention its geological age.

   (e) What is the prophage in the lysogenic cycle?

   (f) Define the term Mycorrhiza.

   (g) What is nannandrium?

   (h) Name one DNA and one RNA virus.

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

   (a) Write short notes on– evolution of stele in pteridophytes 5

   (b) Describe the chemical composition of cell wall of a typical Gram-negative bacterium. 5

   (c) Write on the economic importance of lichens. 5

   (d) Write a short note on male and female cone of *Pinus* with diagram. 5

   (e) Distinguish between (any ***two***): $2\frac{1}{2}\times2 = 5$

      (i) Lytic and lysogenic cycle of virus

      (ii) Ascus and Basidium

      (iii) Gametangial copulation and gametangial contact.

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) With suitable diagram describe the process of generalized transduction in bacteria. How does the process of transduction differ with conjugation? 6+4 = 10

(b) Name two Indian species of *Marchantia*. Discuss the structure of *Marchantia* Sporophyte with diagram. 2+8 = 10

(c) Write short notes on (any ***two***): 5×2 = 10

(i) Economic importance of algae

(ii) TMV virus

(iii) Benefits of mycorrhizal association.

(d) Give an account of morphology and reproductive structures of *Equisetum* with suitable diagrams. 5+5 = 10

PAPER-GE-II

PLANT ECOLOGY AND TAXONOMY

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

(a) In which plant do you find didynamous condition?

(b) Give the full form of ICBN.

(c) Give an example of invested pyramid of biomass.

(d) What is Gross production?

(e) Name a plant endemic to India.

(f) Give one example of Indian herbaria.

(g) What is food chain?

(h) In which family do you find capitulum inflorescence?

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

(a) What is ecological pyramid? Briefly describe the different types of ecological pyramid. 1+4

(b) Briefly discuss the adaptive features of xerophytes. 5

(c) Write short notes on: $2\frac{1}{2}+2\frac{1}{2}=5$

(i) Edge effect

(ii) Shelford law of tolerance.

(d) Enlist the diagnostic features of the family Lamiaceae. 5

(e) What is herbarium? What are its functions? Name one Botanical Garden of India. 1+3+1 = 5

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) Give an account on the different components of an ecosystem. Explain ecological niche and trophic level in an ecosystem with the help of examples. 7+3 = 10

(b) Explain the nitrogen cycle with the help of schematic diagram. 10

(c) What are the principles and rules of ICN? Also explain the principle of priority and its limitations in brief. $2\frac{1}{2}\times4 = 10$

(d) Delineate the salient features of family Asteraceae with floral formula and floral diagram. $7+1\frac{1}{2}+1\frac{1}{2} = 10$

PAPER-GE-III

PLANT ANATOMY AND EMBRYOLOGY

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

(a) Define phylloclade.

(b) What is apomixis?

(c) Cite an example of a dicot plant in which bicollateral vascular bundle is present.

(d) State the function of aerenchyma.

(e) What is phellem?

(f) Name two plants where hydathodes are found.

(g) Define double fertilization.

(h) What is quiescent centre?

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

(a) Mention the characteristic features and functions of vascular cambium. 3+2 = 5

(b) Briefly describe the "Histogen Theory". 5

(c) Differentiate between the anatomical structure of dicot and monocot root. $2\frac{1}{2}+2\frac{1}{2} = 5$

(d) State the anatomical adaptations found in hydrophytic plants. 5

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) Describe the structure of different types of ovule with proper diagram. 10

(b) What are complex permanent tissues? Explain its different types. 2+8 = 10

(c) What is an endosperm? Describe its structure and function. Mention two differences between dicot and monocot embryo. 2+3+2+3 = 10

(d) Write short notes on: 5+5 = 10

(i) Polyembryony

(ii) Structure of typical embryo sac.

PAPER-GE-IV

PLANT PHYSIOLOGY AND METABOLISM

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

   (a) What do you mean by diffusion pressure deficit (DPD)?

   (b) What is Km?

   (c) Name one LDP.

   (d) What is prosthetic group?

   (e) What are deficiency symptoms of nitrogen (N) in plants?

   (f) Name two free living bacteria, which can fix nitrogen.

   (g) Which plant hormone delayes senescence in plants?

   (h) Write down the full form of 2, 4-D.

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

   (a) What is transpiration? Mention its significance. 2+3 = 5

   (b) Differentiate between active transport and passive transport. Define symport with example. 3+(1+1) = 5

   (c) Write short notes on nitrogenase enzyme and leghaemoglobin. $2\frac{1}{2}+2\frac{1}{2}$ = 5

   (d) Describe the role of phytochrome in flowering. 5

   (e) Give a brief outline of classification of enzymes with suitable examples. 5

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

   (a) What is Emerson enhancement effect? Schematically represent the 'Z' scheme of photosynthetic electron transport with brief description. 2+8 = 10

   (b) Write down the composition of phloem sap. Explain the pressure flow model of phloem translocation. 3+7 = 10

   (c) Give an outline diagram of Krebs Cycle with brief description. Why TCA Cycle is called an amphibolic pathway? 7+3 = 10

   (d) Briefly describe the physiological roles of Auxin and Gibberellins in plants. 5+5 = 10

PAPER-GE-V

ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

   (a) Name one fibre yielding plant with scientific name.

   (b) Which part of soybean is used for oil extraction?

(c) Write the full form of RFLP.
(d) Comment on the morphology of clove.
(e) Define micropropagation.
(f) Name one alkaloid present in tea.
(g) Who discovered PCR?
(h) Define hybridoma.

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

(a) Discuss the morphology, botanical name, family and uses of cotton. 2+1+1+1= 5

(b) What are the advantages of micropropagation technique over conventional breeding systems? 5

(c) Write short notes on: $2\frac{1}{2}+2\frac{1}{2}=5$
(i) Androgenesis
(ii) Monoclonal antibodies.

(d) What is western blotting? Discuss the process of detection of protein using western-blotting technique. 1+4 = 5

(e) Briefly describe the centres of origin of cultivated plants and their importance with reference to Vavilov's work. 5

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) What is RAPD? Compare between RAPD and RFLP. State the advantages and disadvantages of both the processes. 2+4+4 = 10

(b) Discuss in detail the method of PCR. Differentiate between PCR and reverse transcriptase PCR. 8+2 = 10

(c) Mention botanical name, family, plant parts used and uses of the following: $2\frac{1}{2}\times4=10$
(i) Black pepper
(ii) Tea
(iii) Wheat
(iv) Soybean.

(d) What is DNA sequencing? Describe the process of DNA sequencing by chain termination method. 2+8 = 10

PAPER-GE-VI

ENVIRONMENTAL BIOTECHNOLOGY

GROUP-A

1. Answer any ***five*** questions from the following: 1×5 = 5

(a) Define bioremediation.
(b) What is activated sludge?
(c) What do you understand by greenhouse effect?

(d) What are cry proteins?

(e) What is Montreal Protocol?

(f) Name two bacteria used in bioleaching.

(g) Write the name of any one plant used as biofuel.

(h) Write two applications of bioreactors.

GROUP-B

2. Answer any ***three*** questions from the following: 5×3 = 15

(a) Briefly discuss about Chipko movement. 5

(b) State the salient features of Wild Life Protection Act 1972. 5

(c) Discuss ozone depletion and its consequences. 5

(d) Write a short note on Brundtland report (1987). 5

(e) What are polycyclic aromatic hydrocarbons? Briefly describe their role in bringing environmental pollution. 1+4 = 5

GROUP-C

3. Answer any ***two*** questions from the following: 10×2 = 20

(a) Discuss the bioremediation of xenobiotic compounds. Write two advantages of using biopesticides. 8+2 = 10

(b) Write short notes on: 5+5 = 10

(i) Biosensors

(ii) Sanitary landfill.

(c) Discuss the roles of central and state Pollution Control Boards for prevention and control of water pollution. 5+5 = 10

(d) What is ‘biomining’? Explain the roles of biopesticides in Integrated Pest Management (IPM) with examples. 3+7 = 10

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