



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 2nd Semester Examination, 2019

GE2-BOTANY

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

**The question paper contains Part-I, Part-II, Part-III, Part-IV, Part-V and Part-VI.
Candidates are required to answer any *one* from the six Part and
they should mention it clearly on the Answer Book.**

PART-I
BIODIVERSITY
(MICROBES, ALGAE, FUNGI AND ARCHEGONIATE)

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is synzoospore?
 - (b) What are coralloid roots?
 - (c) What is peplomer?
 - (d) Name a lichen having medicinal importance.
 - (e) What do you mean by heteroecious macrocyclic life cycle?
 - (f) What are leptosporangiate ferns?
 - (g) What is transfusion tissue?
 - (h) Mention the geological age of *Rhynia*.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Elucidate sexual reproduction in *Vaucheria* with labelled diagrams. 5
 - (b) Describe different types of stele found in pteridophytes with proper examples. 5
 - (c) Give an account on morpho-anatomical features of *Funaria* with labelled diagrams. 5

- (d) Describe the anatomical features of needle leaves of *Pinus*. 5
- (e) Classify the lichens with examples based on their thallus structure. 5

GROUP-C

3. Answer any **two** questions from the following: $10 \times 2 = 20$
- (a) Describe the process of transformation and conjugation in bacteria. Name two beneficial bacteria. $8 + 2 = 10$
- (b) Differentiate Ascomycota and Basidiomycota. Describe the structure and mode of development of basidiocarp in *Agaricus*. $3 + 7 = 10$
- (c) Distinguish the morpho-anatomical features of *Selaginella* and *Equisetum*. 10
- (d) Distinguish the reproductive structures of *Cycas* and *Pinus* with suitable diagrams. State some primitive features of *Cycas*. $7 + 3 = 10$

PART-II

PLANT ECOLOGY AND TAXONOMY

GROUP-A

1. Answer any **five** questions from the following: $1 \times 5 = 5$
- (a) Name a plant endemic to India.
- (b) Differentiate a food chain from a food web.
- (c) What are lentic and lotic ecosystems?
- (d) Name a free living nitrogen fixing bacterium.
- (e) Name a plant exhibiting vivipary.
- (f) What is principle of priority?
- (g) What is multi-access key?
- (h) Name a high altitude Botanical Garden in India.

GROUP-B

2. Answer any **three** questions from the following: $5 \times 3 = 15$
- (a) Briefly describe the flora of the subtemperate regions of the Eastern Himalaya. 5
- (b) Briefly explain the phosphorus cycle. 5
- (c) Write short notes on: $2\frac{1}{2} \times 2 = 5$
- (i) Rule of priority
- (ii) Age pyramid.

- (d) Briefly discuss the adaptive features of hydrophytes. 5
(e) Write a short note on typification. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) With the help of a flow diagram, describe the energy flow through an ecosystem. 10
(b) Compare the classification as proposed by Bentham and Hooker with that of Engler and Prantl. 10
(c) Define phenogram and cladogram. Give a brief account on numerical taxonomy. 3+7 = 10
(d) Give an account on the different components of an ecosystem. Explain ecological niche and trophic level in an ecosystem with help of examples. 7+3 = 10

PART-III

PLANT ANATOMY AND EMBRYOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is procambium?
(b) Define 'heartwood'.
(c) What is the importance of medullary bundles?
(d) What is 'apomixis'?
(e) Define pollinia.
(f) What is entomophily?
(g) What is periderm?
(h) Write the names of two types of mesophyll tissue of a dicot leaf.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Differentiate between monosporic and bisporic embryo sac development. 5
(b) Compare the anatomical features between a monocot and dicot stem. 5
(c) State the adaptive features of wind pollinated flowers. 5
(d) Give a brief account of morphological and anatomical features related to hydrophytic adaptation. 5
(e) Add a short note on different types of endosperm. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Define intrastelar and extrastelar secondary growth. Discuss the normal secondary growth as found in a dicot stem with labelled diagram. 3+7 = 10
- (b) Describe the different types of embryo sacs in plants with suitable diagrams. Write the functions of endosperm. 7+3 = 10
- (c) Describe briefly the different components of Vascular tissue with neat sketch. 10
- (d) Write short notes on: $2\frac{1}{2} \times 4 = 10$
- (i) Pollyembryony
 - (ii) Orthotropous ovule
 - (iii) Tripple fusion
 - (iv) Sclerenchyma.

PART-IV

PLANT PHYSIOLOGY AND METABOLISM

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Why is the Krebs cycle referred to as an amphibolic cycle?
 - (b) What are antitranspirants?
 - (c) Name one gaseous plant hormone.
 - (d) What is red drop?
 - (e) What is guttation?
 - (f) Define critical day length.
 - (g) What does Km signify?
 - (h) What is florigen?

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Give a brief outline of classification of enzymes with suitable examples. 5
 - (b) Briefly discuss the factors that affect the rate of absorption of water by plants. 5
 - (c) What is Kranz anatomy? Discuss its significance in C₄ plants. 1+4 = 5
 - (d) What is photoperiodism? Distinguish between long day and short day plants. 1+4 = 5
 - (e) State the role and deficiency symptoms of iron and zinc. $2\frac{1}{2} \times 2 = 5$

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) How does anaerobic respiration differ from fermentation? Describe the biochemical steps of EMP pathway of glycolysis. 2+8 = 10
- (b) What are the major components of phloem sap? Describe the pressure flow hypothesis explaining movement of sap through phloem. Discuss the mechanism of phloem loading. 2+3+5 = 10
- (c) What are auxins? Discuss the physiological roles of auxin in plants. Name two naturally occurring cytokinins. 1+7+2 = 10
- (d) Define water potential. How is transpiration associated with absorption of water in plants? Why is transpiration referred to as 'necessary evil'? 2+6+2 = 10

PART-V

ECONOMIC BOTANY AND PLANT BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) What is micropropagation?
- (b) Write the botanical name and family of clove.
- (c) Which part of cotton is the source of fibre?
- (d) Write the full form of RAPD.
- (e) Define hybridoma.
- (f) When was the center of origin of cultivated plant first identified?
- (g) What is the source of Taq polymerase?
- (h) Give the scientific name of tea.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Mention botanical name, family and uses of the following: $2\frac{1}{2} \times 2 = 5$
- (i) Black pepper
- (ii) Ground nut.
- (b) What is artificial seed? Differentiate between androgenesis and gynogenesis. 1+4 = 5

- (c) What is Western Blotting? Discuss the process of detection of protein using Western blotting technique. 1+4 = 5
- (d) Discuss the methods used for tea processing. 5
- (e) What is RFLP marker? Mention its applications. Why are these markers co-dominant? 1+2+2 = 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) What is monoclonal antibody? Discuss the process of monoclonal antibody production through hybridoma development. Mention applications of these antibodies. 2+5+3=10
- (b) What is DNA sequencing? Describe the process of DNA sequencing by chain termination method. 2+8 = 10
- (c) Mention general morphology and uses of the following: 4+4+2 = 10
- (i) Clove
- (ii) Cotton.
- Give a general account on beverages.
- (d) Write brief notes on cultivation and uses of soybean and gram. 5+5 = 10

PART-VI

ENVIRONMENTAL BIOTECHNOLOGY

GROUP-A

1. Answer any *five* questions from the following: 1×5 = 5
- (a) Name one free-living nitrogen fixing bacteria.
- (b) Write the name of any one plant used as biofuel.
- (c) Define biopesticides with an example.
- (d) What are biosurfactants?
- (e) Write the full form of CFC related to pollution.
- (f) What is acid-rain?
- (g) Give two examples of xenobiotic compounds.
- (h) Name any organisation working for conservation of wild-life.

GROUP-B

2. Answer any *three* questions from the following: 5×3 = 15
- (a) Discuss on the 'environmental ethics' emphasizing on conservation of environment. 5
 - (b) What is bio-sensor? Sketch a labelled diagram of any one bio-sensor. 2+3 = 5
 - (c) Discuss the major Declarations of Rio Earth Summit (1992). 5
 - (d) How does biomagnification differ from bio-accumulation? Discuss the effects of biomagnification on environment. 2+3 = 5
 - (e) Describe in brief the impacts of construction of dams which cause environmental degradation. 5

GROUP-C

3. Answer any *two* questions from the following: 10×2 = 20
- (a) Write short notes on: 5+5 = 10
 - (i) Chipko Movement
 - (ii) Kyoto Protocol (1997).
 - (b) Discuss the roles of Central and State Pollution Control Boards for prevention and control of water pollution. 5+5 = 10
 - (c) What is 'biomining'? Explain the roles of biopesticides in Integrated Pest Management (IPM) with examples. 3+7 = 10
 - (d) Write short notes on: 2½ × 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.

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