

2025

## BOTANY — HONOURS

Paper : DSCC-5

(Phycology)

Full Marks : 75

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any six* of the following questions :
- |  |     |
|--|-----|
| (a) What is triphasic life cycle? Where is it found?                                 | 1+1 |
| (b) Name the scientific names of two alga used for biofuel production.               | 2   |
| (c) Define palmella stage. Where is it seen?   | 1+1 |
| (d) What are phytoplanktons? Give one example.                                       | 1+1 |
| (e) Name any two notable phycologists from India.                                    | 2   |
| (f) What do you mean by scalariform conjugation? Give example.                       | 1+1 |
| (g) Give example(s) of advanced heterotrichous thallus organization in algae.        | 2   |
| (h) Why Heterokontophyta members so named? Give examples.                            | 1+1 |
| (i) Write down the differences between open raceway pond and closed photobioreactor. | 2   |
2. Answer *any three* of the following questions :
- |   |     |
|---|-----|
| (a) Write a brief note on ultrastructure of algal plastids and their variation.   | 5   |
| (b) Write a short note on the contribution of F.E. Fritsch to the classification of algae and what are the basis of this classification?              | 3+2 |
| (c) Compare between diplontic and haplo-diplontic (isomorphic) mode of life cycle patterns in algae with suitable examples.                           | 5   |
| (d) Describe briefly the ultrastructure of cyanobacterial cell wall. Write a note on the oxygen evolution properties of heterocysts in cyanobacteria. | 3+2 |
| (e) Compare the isogamy, anisogamy and oogamy in algal reproduction with examples. Why oogamy is considered as advanced mode of reproduction?         | 3+2 |

Please Turn Over

(2697)

3. Answer *any four* of the following questions :

- (a) What is the basis of algal classification by Lee (2018)? Write a note on the different phylum of algae as proposed by Lee (2018) based upon chloroplast morphology and evolutionary patterns. Compare between primary and secondary endosymbiosis. 3+6+3
- (b) Describe auxospore formation in Pennales. Write a short note on the role of phytoplanktons in aquatic ecosystem. Name any two algae used as food. 6+4+2
- (c) Differentiate between unilocular and plurilocular sporangium. Write down the sexual reproduction of *Ectocarpus* with labelled sketches. 4+8
- (d) What is photobioreactor? How algae play an important role in CO<sub>2</sub> sequestration? Write down the salient features of Phaeophyceae with examples. 2+5+5
- (e) Write a note on origin and evolution of sex in algae. Enumerate the post-fertilization changes in *Polysiphonia* with suitable labelled sketches. 6+6
- (f) Draw and describe the ultrastructure of flagella. What is the role of algae in wastewater treatment? What is red snow phenomenon? 5+5+2

2025

## BOTANY — HONOURS

Paper : DSCC-6

(Archaeogniates)

Full Marks : 75

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Answer **any six** questions :

- |   |     |
|---|-----|
| (a) Define Columella. State one of its function.                                | 1+1 |
| (b) Name the classes of Bryophyta classified by Renzaglia <i>et.al.</i> (2009). | 2   |
| (c) Differentiate between eusporangiate and leptosporangiate ferns.             | 2   |
| (d) Name two Indian species of <i>Cycas</i> .                                   | 2   |
| (e) Distinguish between Elater and Pseudoelater.                                | 2   |
| (f) What do diplolepidous epicranoid peristome teeth mean? Give an example.     | 1+1 |
| (g) Which geological period is usually considered as the period of land plants? | 2   |
| (h) What is massulae and where is it found?                                     | 1+1 |
| (i) What is carinal canal? In which pteridophyte is it found?                   | 1+1 |

2. Answer **any three** questions :

- |  |     |
|--|-----|
| (a) Briefly discuss the phylogenetic importance of Progymnosperms.                         | 5   |
| (b) Elaborate the homologous theory on origin of alternation of generations in Bryophytes. | 5   |
| (c) Describe the gametophyte of <i>Psilotum</i> with suitable diagram.                     | 3+2 |
| (d) Write a short note on Bryophytes as bio-indicators of pollution.                       | 5   |
| (e) State some economic importance of Pteridophytes.                                       | 5   |

3. Answer **any four** questions :

- |  |         |
|--|---------|
| (a) Mention five angiospermic characters of <i>Gnetum</i> . Give an account of the development of female gametophyte in <i>Ginkgo</i> with suitable illustrations.                                   | 5+(5+2) |
| (b) Give an illustrated account on the structure and development of sporophyte in <i>Anthoceros</i> . State some phylogenetically advanced features present in the sporophyte of <i>Anthoceros</i> . | (5+4)+3 |
| (c) What is heterospory? How heterospory laid the foundation for the evolution of seed? Provide suitable diagram.  | 2+7+3   |

Please Turn Over

(2773)

- (d) Discuss the evolution of stelar structure in Pteridophytes. Mention the morphological nature of Synangium in *Psilotum*. 8+4
- (e) Discuss the significance of Telome concept on the origin of different groups of Pteridophytes. Compare the structure of gametophytes in *Lycopodium* and *Selaginella*. 6+6
- (f) Briefly elucidate the development of gametophyte in *Cycas* and *Pinus*. Describe the reproductive structure of *Archaeopteris*. 8+4
-

2025

## BOTANY — HONOURS

Paper : DSCC-7

(Palaeobotany and Palynology)

Full Marks : 75

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer **any six** questions from the following :
- |  |     |
|--|-----|
| (a) Name the periods of 'Palaeozoic Era' in ascending chronological order.         | 2   |
| (b) Define Ichnofossil. Give an example.   | 1+1 |
| (c) Mention the criteria for establishing an Index fossil.                         | 2   |
| (d) Distinguish between coal and coal ball.  | 2   |
| (e) What is radiometric dating?  | 2   |
| (f) Which geological period is called the 'Age of Ferns'? Why?                     | 1+1 |
| (g) Distinguish between sexine and nexine.   | 2   |
| (h) Draw the polar view of a tricolporate pollen grain and mention its NPC number. | 1+1 |
| (i) What do you mean by unifloral honey?   | 2   |
2. Write brief answer of **any three** of the following : 5×3
- |  |  |
|--|--|
| (a) Comment on the gametophyte of <i>Rhynia</i> .  |  |
| (b) Give a brief account of principles for reconstruction of fossil plants.              |  |
| (c) Briefly discuss the role of fossil phytoliths in reconstructing past climate.        |  |
| (d) Comment on pollen-pistil interaction and its significance in plant reproduction.     |  |
| (e) Draw and describe different exine ornamentations in modern angiosperm pollen grains. |  |
3. Answer **any four** questions from the following :
- |   |         |
|---|---------|
| (a) Discuss the different modes of preservation of plant fossils as proposed by Schopf (1975).  | 12      |
| (b) Name the different organ genera of the reconstructed plant <i>Lepidodendron</i> mentioning its geological occurrence and geographical distribution. Give an account of anatomical details of the stem of <i>Lepidodendron</i> with labeled diagrams. Define apoxogenesis. | 2+2+6+2 |

Please Turn Over

(2702)

- (c) Mention the different organ genera of the reconstructed plant *Williamsonia seawardiana* Sahni. Describe its male and female fructifications with suitable diagrams. 2+5+5
- (d) Give an account of the three-fold division of Indian Gondwana System and mention major megafossil assemblages of each division. Mention the index plant fossil of each division. 9+3
- (e) Give an illustrated account of the aperture types found in modern angiosperm pollen grains. Distinguish between tectate and atectate pollen grains. 10+2
- (f) What is forensic palynology? Why is pollen considered an important evidence in forensic investigations? Write a note on the applications of melissopalynology. Name two common Indian bee plants. 2+3+5+2

2025

**BOTANY — HONOURS**

Paper : DSCC-8

(Pharmacognosy and Ethnobotany)

Full Marks : 75

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any six* questions : 2×6
- What is Pharmacopoeia? Give an example.
  - Give example of an antihypertensive drug and name its source plant.
  - Distinguish between probiotics and prebiotics.
  - Name one volatile plant secondary metabolite.
  - What do you mean by dietary fibre?
  - Name the basic unit of steroids.
  - Name two naturally occurring PUFAs.
  - What do you mean by the term 'functional foods'?
  - Alkaloids are synthesized via which metabolic pathway in plants?
2. Answer *any three* of the following :
- What is polyherbal formulation? Cite an example of polyherbal formulation effective against a particular disease. 3+2
  - Classify drugs on the basis of its chemical nature. Mention the advantage of the classification. 3+2
  - Write a short note on sacred grove. Give two examples of plant species found in sacred groves across India. 3+2
  - Define secondary metabolites. Schematically give a brief outline of Mevalonate pathway. 1+4
  - Define Ethnobotany. Briefly describe the methods to study Ethnobotany. 2+3
3. Answer *any four* of the following :
- What are organized and unorganized crude drugs? Cite one example and use of each. Write a brief note on organoleptic and chemical evaluation of plant drugs. 2+2+4+4

Please Turn Over

(2924)

- (b) Discuss the importance of ethnomedicine in modern science. Briefly describe the different strategies of conservation of endangered and endemic medicinal plants. 4+8
- (c) Mention the source plant, parts used, therapeutic application and the chemical nature of the following drugs :
- (i) Digitoxin
  - (ii) Taxol
  - (iii) Catechin
  - (iv) Gingerol
  - (v) Atropine
  - (vi) Capsaicin. ( $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$ ) $\times$ 6
- (d) What is folk medicine? Name two ethnic communities of North-East India. Write some natural remedies for the treatment of (i) jaundice, (ii) infertility and (iii) cardiac disorder. 1+2+3+3+3
- (e) Write briefly the principles of 'Siddha' system of medicine. Explain the role of pharmacognosy in the field of modern medicines. 6+6
- (f) Define antioxidants. Briefly state the classification of nutraceuticals. Give the importance of mineral supplements and health drinks. 2+6+(2+2)