

For lateing

23/5/25

SL NO of QP : 1194

Unique Paper Code: 32161402

Name of the Paper: Ecology (LOCF)

Name of the Course: B. Sc. Hons. Botany (CBCS)

Semester: IV

Time: 3 Hours

Maximum Marks: 75



(Write your University Roll Number on top immediately on receipt of this question paper)

Attempt five questions in all. Question No. 1 is compulsory. All questions carry equal marks. All parts of a question must be answered together.

1. (a) Match the following

1 x 5=5

Column A

- i) Lux meter
- ii) Total stem parasite
- iii) Holard
- iv) Psammocere
- v) Eolian

Column B

- a) Soil transported by wind
- b) Succession occurring on sand
- c) *Cuscuta*
- d) Total water in soil
- e) Light intensity

(b) Define any five of the following

1 x 5=5

- i. Ecotone
- ii. Pedogenesis
- iii. Homeostasis
- iv. Endemism
- v. Community
- vi. Vegetation
- vii. Ecesis

(c) Give one word for the following

1 x 5=5

- i. The partially decomposed organic matter in soil
- ii. Interconnected network of food chains
- iii. Shade loving plants
- iv. Breakdown of parent rock material by any agent into smaller particles
- v. Instrument used to measure wind velocity

2. Differentiate between the following (Attempt any **five**):

3x5=15

- i. Capillary and Hygroscopic water
- ii. Niche and Habitat
- iii. Mor humus and Mull humus
- iv. Primary succession and Secondary succession
- v. Food Chain and Food web
- vi. Natural ecosystem and Artificial ecosystem

3. Write short notes on the following (Attempt any **three**):

5x3=15

- i. Age Pyramids
- ii. Fire as an ecological factor
- iii. Vegetation of India
- iv. Ecological Pyramids

4. (a) Describe various stages of a hydrosere with the help of suitable diagram. 8
(b) Comment briefly on the various types of survivorship curves with proper examples. 7

5. (a) Define soil profile. Discuss along with a diagram. 5
(b) Differentiate between the qualitative and quantitative characteristics of a community. 5
(c) Comment on light as an ecological factor. 5

6. (a) Discuss the various positive and negative interactions amongst organisms with suitable examples. 8
(b) What are biogeochemical cycles? Briefly describe Nitrogen cycle and the microorganisms involved in various transformations. 7

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27/5/25

Unique Paper Code : 32161403
Name of the Paper : Plant Systematics
Name of the Course : B.Sc. (H) Botany Part II
Semester : IV
Duration : 3 hours

Maximum Marks: 75 Marks

Instructions for Candidates

1. Write your Roll No. on top of this question paper immediately on receipt.
2. Attempt any five questions in all.
3. Question No. 1 is compulsory.
4. All questions carry equal marks.
5. Attempt all parts of a question together.



1. a) Give one word for the following: (Any five)

(1X5=5)

- i. A specimen cited in a protologue/publication, but that is neither a holotype, isotype, or syntype.
- ii. A label affixed to an herbarium specimen that verifies or changes the identity of a specimen or that documents the removal of plant material from the specimen.
- iii. One of the two or more forms of a character.
- iv. A monophyletic group, consisting of a common ancestor and all lineages arising from that common ancestor.
- v. The principle which states that the cladogram exhibiting the fewest number of evolutionary steps is accepted as the best estimate of phylogeny.
- vi. The study of spores and pollen grains.

b) Expand the following: (Any five)

(1X5=5)

- i. ICNCP
- ii. *nom. cons.*
- iii. APG
- iv. *cv.*
- v. BSI
- vi. IAPT

c) Define the following: (Any five)

(1X5=5)

- i. Species cover
- ii. Lectotype
- iii. Basionym
- iv. Monograph
- v. Sibling species
- vi. Paraphyly

2. Differentiate between: (Any five)

(3X5=15)

- i. Phenogram and Cladogram
- ii. Edge-punched and Body-punched cards
- iii. Natural classification and Phylogenetic classification
- iv. Apomorphy and Plesiomorphy
- v. Autonym and Tautonym
- vi. Isotype and Syntype

3. Write short notes on: (Any three)

(5X3=15)

- i. Valid publication
- ii. Basal angiosperms
- iii. Roles of botanical gardens
- iv. APG classification

4. a) Explain any one type of the species concept you have studied.

(5)

b) Interpret the following:

- i. *Desmodium gangeticum* (L.) DC. 1825.
Hedysarum gangeticum L. 1753.

(2)

OR

Andropogon aromaticus Sieber ex Schult.

- ii. $\times$ *Pyronia*
- iii. *Myosotis* L. emend. R. Br.
- iv. *Hosta* 'Decorata'

(1)

(1)

(1)

a) Give a short account on flora as a tool in plant identification. Give suitable examples of different types of flora – one each from local, regional and continental flora

(2+3)

5. a) Enumerate and discuss the various steps involved in preparation of a herbarium specimen. Give one example each of an international and national herbarium along with the places where they are situated.

(5+3)

b) Explain Principle of Priority and discuss its limitations.

(7)

6. a) Explain the role of phytochemistry OR cytology as source of evidence in plant taxonomy with the help of any two examples.

(3)

b) Discuss the role of taxonomic keys in plant identification? Explain any two types of single-access keys.

(2+3)

8

7. a) Outline the classification system of Bentham and Hooker OR Engler & Prantl and discuss its merits and demerits. (4+4)

b) Explain any two theories which explain the origin of angiosperm flower. (7)

OR

Define numerical taxonomy. Enumerate the principles based on which numerical taxonomy operates. (1+6)

[This question paper contains 2 printed pages.]

90
May 2025
Your Roll No.....

Sr. No. of Question Paper : 5525

Unique Paper Code : 2162012401

Name of the Paper : Mycology

Name of the Course : B.Sc. (Hons.) Botany

Semester : IV – DSC

Duration : 2 Hours

Maximum Marks : 60



Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all. **First** question is compulsory.
3. **All** parts of questions must be answered together.

1. (a) Define the following citing an example (**any five**). (1×5=5)

- | | |
|-----------------------|-----------------------|
| (i) Capillitium | (ii) Soredia |
| (iii) Rhizomorph | (iv) Biotrophic fungi |
| (v) Crozier formation | (vi) Dolipore septa |
| (vii) Haustoria | |

- (b) Fill in the blanks. (0.5×10=5)

- (i) Parasexuality was discovered by _____ .
- (ii) _____ is also known as the Drosophila of the fungus world.
- (iii) Amphigynous antheridial development is seen in the genus _____ .
- (iv) Perfect stage of *Penicillium* is _____ .
- (v) Spore bearing layer of fungal tissue is called _____ .
- (vi) Potato wart is caused by _____ .
- (vii) *Neurospora* is commonly known as _____ .
- (viii) _____ is an example of fungus that forms fairy rings.
- (ix) _____ is the most common fungicide for control of fungal disease in plants.
- (x) _____ is a common fungus used for myco-remediation.

- (c) Match the following. (1×5=5)

- | | |
|--------------------------|----------------------------|
| (i) Nematophagous fungus | <i>Trichoderma</i> |
| (ii) Mycoparasite | <i>Penicillium</i> |
| (iii) Edible Ascomycete | <i>Arthrobotrys</i> |
| (iv) Blue mould | <i>Rhizopus stolonifer</i> |
| (v) Fumaric acid | <i>Morchella</i> |

P.T.O.

2. Draw a well labeled diagram of the following (**any three**) : (5×3=15)
- (i) Sectional view of sexual reproductive structure of *Peziza*.
 - (ii) An enlarged view of sporangium of *Stemonitis*.
 - (iii) Section through basidiocarp of *Agaricus* showing enlarged view of gills.
 - (iv) V.S. of leaf showing asexual reproductive stage in *Albugo*.
 - (v) *Saccharomyces* vegetative cell - Electron micrograph.
3. Write notes on any **three** of the following. Draw proper diagrams wherever necessary. (5×3=15)
- (i) Hyphal modifications in fungi.
 - (ii) Mushroom cultivation.
 - (iii) Bioluminescence.
 - (iv) Sexual reproduction in *Rhizopus* sp.
 - (v) Mycotoxin.
4. Differentiate between the following (**any three**) : (5×3=15)
- (i) Cleistothecium and Perithecium
 - (ii) Zygosporangium and Oosporangium
 - (iii) Holocarpic and Eucarpic Fungi
 - (iv) Ectomycorrhizae and Endomycorrhizae
 - (v) Unstratified and stratified thallus in Lichens
5. (a) "Black Stem Rust Disease" caused by a fungus, completes its life cycle on two different host plants. Elaborate with the help of illustrations. Write the name of the fungus, its two different host species (Botanical name), symptoms and all the spore stages. Write the main reason for the re-occurrence of wheat rust in India? (10)
- (c) Write a short note on different species of edible mushrooms in reference to their nutrition value. (5)
6. (a) Elaborate the role of fungi in pharmaceutical industry. (5)
- (b) Explain the vegetative state of myxomycetes and its various types with examples. (5)
- (c) Oomycetes are considered as a separate group of organisms from the true fungi? Elaborate. (5)

[This question paper contains 4 printed pages.]

Your Roll No. 29/5/25 R

Sr. No. of Question Paper : 5585

J

Unique Paper Code : 2162012402

Name of the Paper : Ecology and Conservation

Name of the Course : **B.Sc. (H) Botany**

Semester : IV

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Attempt four questions in all.
3. Question No. 1 is compulsory.
4. All parts of a question should be answered together.

1. (a) Define the following (any six) : (1.5x 6=9)

(a) Pedogenesis

P.T.O.

- (b) Carrying capacity
- (c) Photoperiodism
- (d) Water table
- (e) Sacred groves
- (f) Continental drift
- (g) Field capacity
- (h) Phytogeography

(b) Match the following : (1x6=6)

- | | |
|---------------------|----------------------------------|
| (i) Ecotone | (a) Cryopreservation |
| (i) Gene banks | (b) Genetically fixed variations |
| (iii) Ecotypes | (c) Partially decomposed litter |
| (iv) Mortality rate | (d) Mangroves |
| (v) Duff | (e) Edge effect |
| (vi) Halophytes | (f) Survivorship curves |

2. Differentiate between (any five) : (3x5=15)

- (a) Primary productivity and secondary productivity

- (b) Food chain and food web
- (c) Artificial and natural ecosystems
- (d) Heliophytes and sciophytes
- (e) Gravitational water and capillary water
- (f) Palaeoendemics and neo-endemics
- (g) Alluvial and colluvial soil

3. Write short notes on the following (any three) :
(5x3=15)

- (a) Theory of tolerance
- (b) Synthetic characters of a community
- (c) In situ and ex situ conservation strategies
- (d) Negative biotic interactions
- (e) Thermal stratification in water bodies

4. (a) What is ecological succession? Explain the general process of succession. (7)
- (b) What is soil profile? Explain the various horizons with the help of a suitable diagram. (8)

5. (a) Give a brief account on regulation of population density. Discuss in detail r-selected and k- selected populations. (3+4=7)
- (b) What are biogeochemical cycles? What roles biogeochemical cycles play in an ecosystem? Discuss carbon cycle in detail with the help of a well labelled outline diagram. (1+2+5=8)

[This question paper contains 2 printed pages.]

03/6/25

Your Roll No.....

Sr. No. of Question Paper : 5664

J

Unique Paper Code : 2162012403

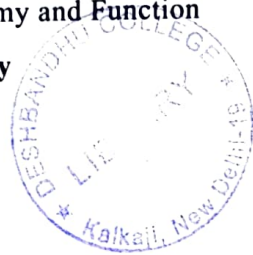
Name of the Paper : Developmental Biology of Angiosperms: Form, Anatomy and Function

Name of the Course : Botany

Semester : IV

Duration : 2 Hours

Maximum Marks : 60



Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Four** questions in all. **All** questions carry equal marks.
3. **All** parts of questions must be attempted together.
4. Question No. 1 is compulsory.
5. Draw well labelled diagrams wherever necessary.

1. A. Fill in the blanks (any **five**):

- (a) _____ is a commonly used clearing agent.
- (b) Sclereids with dilated ends resembling bones are called _____.
- (c) Lateral roots originate from _____.
- (d) Histogen theory was given by _____.
- (e) Sugarcane leaves show special type of anatomy known as _____.
- (f) Water secretion from margins of leaves occur through pores called _____.
- (g) _____ is a specialized parenchyma cell which is associated with a sieve tube element and arises from the same mother cell. (5×1=5)

B. Define the following (any **five**):

- (a) Transfer cells
- (b) Rhytidome
- (c) Bulliform cells
- (d) Phloem wedges
- (e) Periderm
- (f) Maceration
- (g) Quiescent centre (5×1=5)

P.T.O.

C. Give one word for the following (any **five**):

- (a) Needle shaped crystals of calcium oxalate found in many plants.
- (b) The time interval between the formation of one leaf primordium and the next
- (c) In wood, elements of xylem are blocked by balloon-like ingrowths.
- (d) Vascular bundles with phloem on either side of xylem.
- (e) A multicellular epidermal layer found around orchid roots consisting of dead cells with lignified secondary cell walls.
- (f) Suberin thickening bands in endodermal cells.
- (g) Phloem patches enclosed within secondary xylem. (5×1=5)

2. Write short notes on the following (any **three**):

- (a) Classification of stomata by Metcalfe and Chalk
- (b) Seasonal activity of cambium
- (c) Secretory system in plants
- (d) Korper-Kappe theory
- (e) Application of Plant Anatomy in Forensics (3×5=15)

3. Differentiate between the following (any **three**):

- (a) Monocot and dicot stem
- (b) Tracheids and Vessels
- (c) Sapwood and Heartwood
- (d) Stratified and Non-stratified Cambium (3×5=15)

4. Draw well labelled diagrams of the following (any **three**):

- (a) V.S. *Zea mays* leaf
- (b) T.S. *Helianthus* root
- (c) V.S. of *Ficus* leaf showing lithocyst
- (d) L.S. of Root Apex (3×5=15)

5. (a) Describe the structure and function of simple tissues with well labelled diagrams. (8)

(b) Discuss secondary growth in dicot stem along with suitable diagrams. (7)

6. (a) What are the characteristic features of meristematic cells? Give a brief account of any three theories for the organization of Shoot Apical Meristem. (8)

(b) Give a detailed account of anatomical adaptations in stem of a xerophytic plant with well labelled diagram. (7)

[This question paper contains 2 printed pages.]

04/6/25

Your Roll No.....

J

Sr. No. of Question Paper : 8048

Unique Paper Code : 2163012004

Name of the Paper : Industrial and Environmental Microbiology

Name of the Course : **DSE – Botany**

Semester : IV

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question No. 1 is compulsory.
3. Attempt any **four** questions in all.
4. Attempt **all** parts of the question together.
5. Draw diagrams wherever required.

1. (a) Fill in the blanks : (**any five**) (1×5=5)

- (i) _____ processing involves a series of steps to recover, concentrate, and purify a product from fermentation broth.
- (ii) Microorganisms play a vital role in _____ treatment of wastewater by breaking down organic matter.
- (iii) The process of obtaining pure cultures from natural sources is known as _____.
- (iv) In _____ fermentation, the culture is not disturbed until the end of the process.
- (v) _____ is a technique used to separate components based on their size and density by spinning them at high speed.
- (vi) Enzyme immobilization can increase the _____ of the enzyme, making it more resistant to environmental changes like temperature and pH.

(b) Define the following (**any five**) (1×5=5)

- (i) Lyophilization
- (ii) CSTR
- (iii) Serial Dilution
- (iv) GRAS
- (v) Immobilization
- (vi) Coliforms

P.T.O.

(c) Match the followings :

(1×5=5)

Column A	Column B
A. Protease	1. Concentrating and purifying proteins by size exclusion
B. Agricultural Runoff	2. Breaking open cells to release intracellular products
C. Industrial microbes	3. Enhances protein breakdown in detergent formulations
D. Ultrafiltration	4. Uses upward gas flow for mixing
E. Cell Disruption	5. Microorganisms utilized for product synthesis and bioprocessing.
F. Air-Lift Fermenter	6. Source of water pollution from fertilizers and pesticides

2. Differentiate between the following (**any three**) (5×3=15)
- (i) Batch and Continuous Fermentation.
 - (ii) BOD and COD.
 - (iii) Upstream and Downstream processes.
 - (iv) Stationary and submerged liquid-state fermentations.
 - (v) Selective and Differential media.
3. Write short notes on **any three** of the following : (5×3=15)
- (i) Basic components of Bioreactors.
 - (ii) Scope and importance of microbes in the environment.
 - (iii) Applications of industrially important enzymes.
 - (iv) Cell disruption.
 - (v) solid-state fermentation and its applications.
4. (a) Describe the scope of microbiology in industry and the environment. Give examples of how microbes are utilized for human benefit. (8)
- (b) Explain in detail the industrial production of Amylase. (7)
5. (a) Write a comprehensive note on the advantages of enzyme immobilization in industrial processes. How does immobilization improve enzyme performance? (8)
- (b) Discuss the stages of wastewater treatment and the role of microbes in each stage. (7)