[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2996 **H**

Unique Paper Code : 32161402

Name of the Paper : Ecology

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

Semester : IV

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **FIVE** questions in all. Question **1** is compulsory.
3. **All** questions carry **EQUAL** marks.
4. **All** parts of a question MUST be attempted together.

1. (a) Fill in the Blanks : (1×5=5)

   (i) Transition zone between two communities is called _____.

   (ii) _____ is the tendency of a biological

P.T.O.

system to resist change and to maintain itself in a state of stable equilibrium.

(iii) _____ is a process of successful establishment of a species on a bare area.

(iv) _____ is an example of total root parasite.

(v) Pyramid of energy is always _____.

(b) Give **one** word for any **five** of the following : (1×5=5)

(i) Instrument used to measure wind velocity

(ii) Total water present in soil.

(iii) A process of nutrient enrichment in water bodies.

(iv) Light loving plants.

(v) Transition zone between two communities.

(vi) The place where an organism lives.

(c) Define any **five** of the following : (1×5=5)

(i) Pedogenesis

(ii) Autecology

(iii) Carrying capacity

(iv) Abundance

(v) Sciophytes

(vi) Ecosystem

2. Differentiate between any **five** of the following : (5×3=15)

(i) Primary succession and secondary succession.

(ii) Grazing food chain and detritus food chain.

(iii) Autotrophs and heterotrophs.

(iv) Crown fire and surface fire.

(v) Mor humus and mull humus.

(vi) Habitat and ecological niche.

(vii) Primary productivity and secondary productivity.

3. Write short note on any **three** of the following : (3×5=15)

(i) Survivorship curves

(ii) Light as an ecological factor

(iii) Soil texture

(iv) Nitrogen cycle

(v) Raunkiaer's life forms

4. (a) Briefly discuss analytical characters used to study community. (5)

(b) Write an explanatory note on soil profile with the help of a well labelled diagram.

(c) Discuss the various types of interactions among organisms with suitable examples.

5. (a) Describe various forms of water present in the soil.

(b) Briefly comment on the vegetation of Delhi.

(c) Explain the single channel energy flow model in an ecosystem. (5)

6. (a) What are ecological pyramids? Discuss their types with suitable example. (7)

(b) Define ecological succession. Describe the process of succession in xeric environment with the help of suitable diagram. (8)

3107

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

Instructions for candidates

(Write your Roll No. on the top immediately on receipt of this question paper)

All questions carry equal marks

Question No. 1 is compulsory

Attempt five questions in all including Question No. 1

Q1. a) Expand any five of the following: (5x1=5 marks)

i) IBC
ii) CNH
iii) IPNI
iv) R. Br.
v) EU
vi) IAAT

b) Match the following: (5x1=5 marks)

A	B
i) *Pinax theatri botanici*	a. Linnaeus
ii) *Systema naturae*	b. AP de Candolle
iii) *Flora of British India*	c. G. Bentham
iv) *Enquiry into plants*	d. Sir Joseph Dalton Hooker
v) *Theorie elementaire de la botanique*	e. Gaspard Bauhin
	f. Theophrastus

c) Define any five of the following: (5x1=5 marks)

i) Annotation label
ii) Heterobathmy
iii) Homonym
iv) Sibling species
v) Biosystematics
vi) Phenogram

Q 2. Differentiate between any five (5x3= 15 marks)

a) Apomorphy and Plesiomorphy

b) Phenetics and Cladistics
c) Autonym and Tautonym
d) Monograph and Manual
e) Edge-punched cards and body-punched cards
f) Holotype and Paratype

Q 3. Write short notes on **any three:** (3x5= 15 marks)

a) Chemotaxonomy
b) Effective publication
c) Neo-Adansonian Principles
d) Principle of Parsimony

Q4. a) What is classification? Discuss in detail Bentham and Hooker's classification and enumerate its merits and demerits. (1+ 6+ 8 = 15)

Q5. a) Interpret the following: (7)

i. *Cassia grandis* L.f. (1)

ii. *Cynodon dactylon* (L.) Pers. (1)

iii. *Phyllanthus* L. emend Mull. (1)

iv. *Cyanthillium cinereum* (L.) H.Rob. 1990
Conyza cinerea L. 1753 (2)

v. ×*Elyhordeum macounii*
(*Hordeum jubatum* and *Elymus trachycaulus*) (2)

b) Discuss briefly the principles of ICN. (8)

Q6. a) Discuss the importance of botanical gardens in taxonomic studies. Name any two botanical gardens situated in India.
(7)

b) 'Species is the basic unit of classification'. Discuss the statement with the help of any two species concepts you have studied. (8)

Q7. a) Discuss the significance of character weighting and homology assessment in cladistic studies. (7)

b) Explain any two theories explaining the origin of angiosperm flower. (8)

4013 30/5/24

Sr. No. of Question Paper	:	Your Roll No.....
Unique Paper Code	:	2162512401
Name of the Paper	:	Ecology and Evolution
Name of the Course	:	Botany (Life Science)
Semester	:	IV

Duration: 2 Hours Maximum Marks: 60

Instructions for Candidates: Write your Roll No. on the top immediately on receipt of this question paper. All questions carry equal marks. Attempt total four questions including Question No. 1 which is compulsory. All parts of a question must be attempted together. Draw diagrams wherever necessary.

1. a. **Define the following** (*any five*): 5X1= 5
   i. Homeostasis
   ii. Saprophytes
   iii. Productivity
   iv. Homology
   v. Frequency
   vi. Biome

b. **Fill in the blanks** (*any five*): 5X1= 5

i. .....is the instrument used to measure the velocity of wind
ii. .....is an example of sedimentary cycle.
iii. .....is defined as branch of phylogenetic tree with its ancestor and all its descendants.
iv. The ..... energy flow model separates the grazing food chain and detritus food chain.
v. The modification of a species over many generations by selecting and breeding individuals that possess desired traits by humans is known as.....
vi. The position of a species in community in relation to other species is termed as.....

c. **Give an example of following (any five, Scientific names only)** 5X1= 5

i. Root Parasite plant
ii. Neo-endemic plant
iii. Hydrophyte
iv. Nitrogen fixing bacteria
v. Keystone species
vi. Sciophyte

2. **Differentiate between** (*any five*): 5X3 =15
   a. Pyramid of number and Pyramid of energy
   b. Allopatric and Sympatric Speciation
   c. Density and Abundance
   d. Food chain and Food web
   e. Biological species concept and Phylogenetic species concept
   f. Autotrophic and Heterotrophic succession

3. **Write short Notes on** (*any three*): 3X5 =15
   a. Thermal stratification in water body
   b. Tree of life
   c. Soil Profile
   d. Allelopathy
   e. Shelford's law of tolerance.

4. **Answer the following** (*any two*) 7.5X 2 =15

a. Define Phytogeography. Enlist the phytogeographical zones of India. Discuss any two in detail. 5

b. Illustrate the general process and stages of succession with special emphasis on xerosere. 5

c. Explain the concept of an Ecotone with suitable examples. Also explain the Edge effect. 5

5. a. What are the survivorship curves? Discuss their importance with examples. 5

b. **State true or false. Justify your answer.** 5X2 = 10

i. Orchids and some ferns are examples of epiphytes.
ii. Weathered rock material is known as soil.
iii. Hygroscopic water is available to plants for growth.
iv. Trophic organization is studied as a part of community structure.
v. The amount of nutrients in the soil at any given time is refer to standing crop.

30/5/24

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4093 **H**

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)** : (1.5×6=9)

(i) Ecotone

(ii) Homeostasis

(iii) Humus

P.T.O.

(iv) Natality

(v) Ecological Pyramids

(vi) Sacred Groves

(vii) Ecotypes

(viii) Weathering

(b) Match the following : (1×6=6)

(i) Continental Drift	(a) Tansley
(ii) Life forms	(b) Synthetic character
(iii) Fidelity	(c) Wegener
(iv) Energy Flow Model	(d) Raunkiaer
(v) Ecosystem	(e) Leaching
(vi) Eluviation	(f) Odum

2. Differentiate between **(any five)** : (3×5=15)

(i) Autotrophic Succession and Heterotrophic Succession.

(ii) Paleo-endemism and Neo-endemism.

(iii) Sciophytes and Heliophytes.

(iv) Food Chain and Food Web.

(v) Colluvial and Alluvial soil.

(vi) Primary Production and Secondary Production.

(vii) Density-dependent and Density-independent population regulation.

3. Write short notes on (any three) : (5×3=15)

(i) Forms of water in soil.

(ii) Soil Profile.

(iii) Ecological pyramids.

(iv) Wind related plant adaptations.

(v) Atmospheric moisture.

4. (a) Define the term Phytogeography. List any six Phytogeographical Divisions of India. Give an elaborate account of any one of these.

(1+3+4=8)

(b) Describe the role of Biogeochemical cycles in an ecosystem. Explain the Nitrogen cycle in detail.

(7)

5. (a) Explain the distinction between in situ and ex situ conservation. Discuss why in situ conservation is considered essential for biodiversity conservation. (8)

(b) How do parasitic plants interact with their host plants, and what are the consequences of parasitism for both the host and the parasite? Illustrate your answer with specific examples of parasitic plant species. (7)

1000
5/6/24

05/6/24

Unique Paper Code	: 2162012403
Name of the Paper	: Developmental Biology of Angiosperms: Forms, Anatomy & Function
Name of the Course	: B.Sc. (Hons.) 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 number 1 is compulsory.
3. Attempt four questions in all.
4. All parts of a question must be answered together.
5. Supplement your answer with suitable diagrams

Q1.

A. Fill in the blanks (any five) (1x5=5)

1. In _____collenchyma the thickening material is found at intercellular contact points.
2. The rod like sclereids are called _____
3. Cystoliths are enclosed in the idioblastic cells known as _____
4. The later formed phloem is known as _____
5. The wall thickening impregnated with suberin and lignin on the radial and transverse walls of endodermis is called _____
6. Plants growing immersed in water are called _____
7. _____ in roots is responsible for the formation of lateral roots.

B. Define the following terms (any five) (1x5=5)

1. Plasmodesmata
2. Bulliform cells
3. Rhytidome
4. Phellem
5. Hydathodes
6. Transfer cells
7. Lysigenous cavity

C. Match the following (1x5=5 Marks)

a) Sclereids develop from	f) bicollateral vascular bundle
b) Vascular bundles with phloem on both sides of the xylem.	g) ergastic substances
c) Nonspecialized cells that cover the leaf surface	h) parenchyma cells
d) Passage cells are found in	i) endodermis
e) Non-protoplasmic materials found in cells.	pavement cells

Q2. Write short notes on any three (5x3=15)

a. Shoot Chimeras
b. Korper-Kappe theory
c. Origin of lateral root
d. Laticifers

Q3. Differentiate between the following (any five) (3x5=15)

A. Primary plant body and secondary plant body
B. Endodermis and exodermis
C. Ring porous wood and diffuse porous wood
D. Adcrustation and incrustation
E. Dedifferentiation and redifferentiation
F. Protoxylem and metaxylem
G. Tracheids and vessels

Q4. A. Discuss the xeromorphic adaptations found in anatomy of oleander (*Nerium oleander*) leaf with a well labelled diagram. 5

B. Write about the structure and function of shoot apical meristem. Give a brief account of various theories to describe shoot apical meristem. 10

Q5. A. Illustrate secondary growth in a dicot stem using well labeled diagrams 8

B. What is a stoma. Describe the classification of stomata given by Metcalfe and Chalk. 7

Q6. Answer the following:

A. Write about the applications of anatomy in systematics and pharmacognosy. 5

B. Describe seasonal activity of vascular cambium. 5

C. Discuss the structure and importance of Kranz anatomy in leaf. 5

4178

10/6/24

SET A

Sr. No. of question paper-

Your Roll No.....

Unique Paper Code: 2163012004

Name of the Paper: Industrial and Environmental Microbiology

Name of the Course: DSE-Botany (UGCF-NEP)

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 any four questions in all.
3. Questions No. 1 is compulsory
4. All parts of a question must be answered together.
5. Draw well-labeled diagrams wherever necessary.

1. (a) Expand the following (any five) 5x1=5

i. HFCS
ii. GRAS
iii. CZA
iv. ICGEB
v. COD
vi. NDRI
vii. AMP

(b) Fill in the blanks (any five) 5x1=5

i. .....is differential as well as selective medium for microbial research.
ii. Pharmaceutical intermediate 6-aminopenicillanic acid (6-APA) are synthesize using .....from natural penicillins.
iii. The method used to dilute the concentration of a solution sequentially is called .....
iv. ..... is mandatory step in intracellular product recovery.
v. ..... uses high frequency sound waves (>20 kHz) to agitate and lyse the cells.
vi. The yellow colour formation in ONPG test is due to .....
vii. Standard plate count method is used to determine .....

(c) Read the following statements carefully and write True or False (any five) 5x1=5

i. High moisture content in SSF (solid state fermentation) provides a favorable condition for the microbial growth.
ii. Detergent is used to disrupt cells in intracellular product recovery.
iii. COD is mostly higher than BOD in water samples.
iv. Fermentation is a complete oxidation of carbohydrates.
v. Pasteurization of milk uses temperature above 100°C.
vi. Secondary metabolites usually accumulate during idiophase.
vii. *Enterobacter aerogenes* is fecal coliforms.

2. Differentiate between the following (any three) 3x5= 15

i. TDS and COD
ii. Airlift and constantly stirred tank bioreactors
iii. Selective and differential media
iv. Primary and secondary treatment of sewage water
v. Concentration and purification steps of downstream processes

3. Briefly describe the following (any three) 3x5=15

i. Enzyme immobilization
ii. Basic components of bioreactor
iii. Eutrophication
iv. Isolation of soil microbes
v. Cell disruption

4. a. Discuss the uses of microbial enzymes in industrial production. 8
b. State the process of semi-synthetic antibiotics or penicillins generation, and their advantages. 7

5. a. What are coliforms? Discuss the methods of detecting coliforms from potable water. 8
b. Discuss the role of microbes in environment. 7