[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4521 **E**

Unique Paper Code : 32161401

Name of the Paper : Molecular Biology

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

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.
3. Question No. **1** is compulsory.
4. **All** parts of a question should be answered together.

1. (a) Expand **(any five)** : (1×5=5)

   (i) Rf-C

   (ii) ORC

   (iii) CRP

   (iv) RISC

P.T.O.

(v) TFIID

(vi) PCNA

(b) Write the contributions of (**any five**) : (1×5=5)

(i) A. Korenberg

(ii) M. Meselson and F. Stahl

(iii) Hershey and Chase

(iv) J. Shine and L. Dalgarno

(v) George Gamow

(vi) H. Temin and D. Baltimore

(vii) J. D. Watson

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

(i) Repliosome

(ii) Enhancer

(iii) Okazaki fragment

(iv) Exon

(v) Ribozyme

(vi) Operon

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

   (i) Left handed DNA and Right handed DNA

   (ii) Euchromatin and Heterochromatin

   (iii) Negative and Positive Gene Regulation

   (iv) Denaturation and Renaturation

   (v) Self Splicing and Spliceosome Mediated Splicing

   (vi) Monocistronic and Polycistronic RNA

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

   (i) Organization of DNA in Prokaryotes

   (ii) 5' and 3' modifications in eukaryotic mRNA

   (iii) Telomeric Replication

   (iv) RNA interference

4. (a) Discuss in detail, two majormechanisms of transcription termination in prokaryotes. (9)

   (b) What is Central Dogma? Why RNA virusesdonot follow Central Dogma? (3)

   (c) State the function of the following (**any three**) : (3)

      (i) PCNA

      (ii) Gyrase

      (iii) SSB

      (iv) DNA Polymerase α

5. (a) Describe briefly the *Trp* operon and how it controls the biosynthesis of aminoacid tryptophan. (9)

(b) What is reassociation kinetics and how it can be used to plot cot curve? Also give its implications. (6)

6. (a) With the help of a well labelled diagram, explain the mechanism of initiation of DNA replication in prokaryotes. (6)

(b) Explain the salient features of genetic code. (6)

(c) Write down the consensus sequence for the following (**any three**) : (1×3=3)

(i) 5'splice site

(ii) TATA Box

(iii) Polyadenylation signal

(iv) Kozak Sequence

7. (a) Discuss in detail, the mechanism of initiation of translation in prokaryotes and compare it with that of eukaryotes. (9)

(b) How can a single gene produce multiple protein products? Explain. (6)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4677 **E**

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

1. (a) Define the following terms (Attempt any **five**) : (1×5=5)

   (i) Flora

   (ii) Ecological amplitude

P.T.O.

4677

(iii) Standing crop

(iv) Homeostasis

(v) Primary Productivity

(vi) Pedon

(vii) Population

(b) Write one word answer for each of the following (Attempt any **five**) : (1×5=5)

(i) The fully decomposed organic matter in soil

(ii) Interconnected network of food chains

(iii) The organisms feeding on the dead and decayed matter

(iv) The zone of transition representing a situation of special ecological interest between two different types of communities

(v) The structural and functional unit of biosphere

(vi) Plants living under shade

(c) Match the following : (1×5=5)

(i) Eolian soil	(a) Instrument used to measure light intensity
(ii) *Orobanche*	(b) Soil transported by wind
(iii) Litter	(d) Total water present in soil
(iv) Holard	(f) Root parasite
(v) Luxmeter	(g) Freshly fallen dead matter

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

(a) Analytical Characteristics and Synthetic Characteristics

(b) Autotrophic Succession and Heterotrophic Succession

(c) Mor humus and Mull humus

(d) k-selection and r- selection

(e) Grazing Food Chain and Detritus Food Chain

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

(a) Raunkiaer's life forms

(b) Habitat and ecological niche

(c) Ecological pyramids

(d) Fire as an ecological factor

(e) Survivorship curves

4. (a) What are biogeochemical cycles? Explain any one biogeochemical cycles of your choice along with the labelled diagrams. (5)

(b) Briefly discuss the different types of age pyramids with suitable examples. (5)

(c) Define biotic interaction. Discuss any two positive interactions among organisms with suitable examples. (5)

5. (a) Define soil profile. Discuss along with the diagram. (5)

(b) Briefly explain the Y shaped energy flow model in an ecosystem. (5)

(c) Comment on light as an ecological factor. (5)

6. (a) What is Phytogeography? Discuss any four phytogeographical divisions of India. (7)

(b) Define Ecological succession. Discuss the type of succession that will occur in a water body with the help of diagrams. (8)

[This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4801 **E**

Unique Paper Code : 32161403

Name of the Paper : Plant Systematics

Name of the Course : **B.Sc. (H.) 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 including Question No. **1** which is COMPULSORY.
3. Attempt all parts of the question together.

1. (a) Expand the following **(any five)** : (5)

   (i) D.C.

   (ii) L.

   (iii) Nom.nud.

P.T.O.

(iv) R.Br.

(v) Hook. *f.*

(vi) et.

(b) Answer the following **(any five)** : (5)

(i) Name a genus commemorating a place

(ii) The alternate name of family Cruciferae

(iii) An example of autonym

(iv) Author of Flora of Delhi

(v) Significance of May 1, 1753

(vi) Type genus of family Fabaceae

(c) Fill in the blanks **(any five)** : (5)

(i) The standard size of a herbarium sheet is _____ .

(ii) _____ is an angiosperm lacking vessels.

(iii) The occurrence of similar features in different species with a common ancestry is known as _____ .

(iv) _____ is an example of journal devoted to taxonomy.

(v) _____ is the Father of genus concept.

(vi) _____ is an International Botanical Garden.

2. Write notes on the following **(any three)** : (5×3=15)

(a) Parallelism and Convergence

(b) APG

(c) Typification

(d) Principles of ICN

3. (a) Give an outline of Bentham and Hooker's **OR** Engler and Prantl system of classification. (6)

(b) "Angiosperm and their pollinators have evolved together". Comment. (4)

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

(i) *Rosa floribunda* 'Blessings'

(ii) *Capparis lasiantha* R.Br. *ex* DC.

(iii) *Stellaria media* (L.) Vill.

(iv) *Delphinium viscosum* Hook. *f. et.* Thomson

(v) *Triticum aestivum* Linn., nom.cons.

(vi) *Salix aurita x S. caprea*

4. (a) Explain the role of semantides in plant systematics with suitable examples? (6)

(b) Explain Principle of Priority citing various examples. (6)

(c) Give endings of the ranks provided by ICN **(any three)** : (3)

(i) Division

(ii) Class

(iii) Order

(iv) Family

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

(i) Homology and Analogy

(ii) Synonym and Homonym

(iii) Indented keys and Bracketed keys

(iv) Flora and Monograph

(v) Taxonomic category and Taxonomic group

(vi) Monophyly and Polyphyly

6. Attempt **any two** of the following :

(a) Explain the Ranalian and Englerian concept of primitive angiosperm. (7.5)

(b) Discuss the role of palynology in plant systematics. (7.5)

(c) What are the roles of herbaria? Name any one national and one international herbarium of repute and briefly highlight their key features. (7.5)

7. (a) What are taxonomic keys? Explain various types of multi-access keys. (9)

(b) What is a species concept and its types? Explain any one of its types in detail. (6)

4801

Or

Write a note on methodology of phenetics.

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4504 **E**

Unique Paper Code : 32161601

Name of the Paper : Plant Metabolism

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

Semester : VI

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. **All** questions carry equal marks.
3. Question No. **1** is compulsory.
4. Attempt **five** questions in all including Question No. **1**.

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

P.T.O.

(i) If respiratory quotient is 1, the respiratory substrate is _____.

(ii) The enzyme first isolated and purified in the crystalline form was _____.

(iii) _____ received the noble prize for tracing the path of carbon in photosynthesis.

(iv) Bacteroids are surrounded by _____ membrane in nodules.

(v) _____ number of molecules of Acetyl Co A are produced after β-oxidation of 14 carbon fatty acid.

(vi) The breakdown of complex molecules into simpler molecules with the release of energy is called _____ .

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

(i) Absorption spectrum

(ii) Isoenzymes

(iii) Uncouplers

(iv) Triglycerides

(v) Hill reaction

(vi) Anaerobic respiration

(c) State True or False **(any five)** (5×1=5)

(i) Pepsin is a non-proteinaceous enzyme.

(ii) Manganese is the central atom in the porphyrin head of the chlorophyll molecule.

(iii) Starch biosynthesis begins with production of ADP glucose.

(iv) Oxidative phosphorylation occurs in inner membrane of mitochondria.

(v) The nitrate reductase is an inducible enzyme.

(vi) Glycolate cycle is also known as EMP pathway.

2. Write explanatory notes on **(any three)**

(3×5=15)

(a) Cyanide resistant respiration

(b) Sucrose synthesis in plants

(c) Enzyme classification

(d) Tricarboxylic acid

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

(3×5=15)

(a) Synthesis and degradation of fatty acids

(b) CAM and C4 cycle

(c) Competitive and Non competitive inhibition

(d) Respiration and Photorespiration

4. Write short notes on the following **(any five)** (5×3 15)

(a) Emerson enhancement and its significance

(b) Effect of pH on enzyme activity

(c) Leghemoglobin

(d) Role of acetyl CoA in cellular metabolism

(e) Nitrate assimilation

(f) Kranz anatomy

5. (a) Explain β-oxidation pathway of breakdown of fatty acids? (7)

(b) Explain the process of rhizobial infection and root nodulation in legumes. (8)

6. (a) What is gluconeogenesis ? Write an account of the glyoxylate pathway. (7)

(b) Explain the structure and mechanism of action of ATP synthase. (8)

7. (a) Schematically represent and explain Z-scheme of electron transport. (7)

(b) Give the contributions made by the following scientists **(any four)** (4×2=8)

(i) Blackman

(ii) Hans Krebs

(iii) Emil Fischer

(iv) Beijerinck

(v) Peter Mitchell

(vi) Stephen Hales

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4784 **E**

Unique Paper Code : 32161602

Name of the Paper : Plant Biotechnology

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

Semester : VI

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.
3. Question No. **1** is compulsory.

1. (a) Expand the abbreviations **(any five)** : (1×5=5)

(i) PAGE

P.T.O.

(ii) Ti-plasmid

(iii) scFv

(iv) PEG

(v) BAC

(vi) Taq

(b) Define **(any five)** (1×5=5)

(i) Superbug

(ii) Phagemid

(iii) Somaclonal variations

(iv) Genetically modified crop

(v) Probe

(vi) Restriction endonucleases

(c) Fill in the blanks **(any five)** (1×5=5)

(i) Synthetic insulin developed using recombinant DNA technology was called _____ .

(ii) The bacterial cells which are modified for the uptake of foreign DNA are called _____ cells.

(iii) The gene which was silenced in Flavr Savr^{R} is _____ .

(iv) _____ is an example of biofortified transgenic crop.

(v) The plant-based antibodies developed for dental caries is against bacteria _____ .

(vi) High cytokinin and low auxin ratio promotes _____ production in plant tissue culture.

2. Draw labelled diagrams of **(any three)** (5×3=15)

(a) Gene gun

(b) Polymerase chain reaction

(c) Gene construct of Golden rice

(d) BAC

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

(a) Selectable marker gene and reporter gene

(b) Somatic Hybridization and cybridization

(c) Haploid and Triploid plantlets

(d) cDN library and genomic DNA Library

(e) Primary and Secondary metabolites

(f) RAPD and RFLP

(g) Zygotic and somatic embryogenesis

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

(a) Molecular markers

(b) Anther culture

(c) Round Up ready Soyabean

(d) Applications of tissue culture

5. (a) What are osmoprotectants? Provide examples of any two osmoprotectants and their role in abiotic stress tolerance in plants. (5)

(b) Discuss the role of plants as bioreactors from the view point of production of biopolymers. (5)

OR

A linear molecule of DNA was cut with the following restriction enzymes : (5)

EcoRI – 2 fragments produced – 3.7 kb, 2.3 kb

SmaI – 3 fragments produced – 4.3 kb, 1.2 kb, 0.5 kb

P.T.O.

Double digestion with both enzymes – 4 fragments produced: 2.5 kb, 1.8 kb, 1.2 kb, 0.5 kb

(i) What is the size of DNA? (0.5)

(ii) Draw a gel profile from the data provided (1)

(iii) Make a restriction map (2)

(iv) What can you conclude from this data? (1.5)

(c) Describe the mechanism of action of cry gene in Bt cotton. What were the advantages of Bt crop over the traditionally grown crops? (5)

6. Answer the following :

(a) Describe the *Agrobacterium*-mediated method of gene transfer in plants with the help of suitable illustrations (binary and co-integrate methods). (5)

(b) Give a detailed account of purpose and strategy used in developing Golden rice. (5)

(c) Provide any one (Key) application of following : (1×5=5)

(i) Lipase

(ii) Cryopreservation

(iii) Meristem culture

(iv) Recombinant DNA technology

(v) Phytohormones in Plant tissue culture

7. (a) Give a brief account of any two prokaryotic vectors. (8)

(b) Describe the biosafety and bioethical concerns in development of transgenic plants. (7)

OR

4784

Give role of genetic transformation in changing the floral characters in carnations. (7)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1195 F

Unique Paper Code : 2162011201

Name of the Paper : Microbiology and Plant - Microbe Interactions

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

Semester : II

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. Question No. 1 is compulsory.
4. Attempt all parts of a question together.

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

(i) Outside a living cell, virus particle is known as a _____

(ii) _____ was the first scientist to crystallize a virus.

P.T.O.

1195

(iii) _____ and _____ discovered process of conjugation ?

(iv) Bacterial cell wall is made up of _____

(v) Azolla and _____ constitute an example of symbiotic association

(vi) _____ is known as father of microbiology

(b) Select the True False statement (any five) (5×1=5)

(i) SARS-CoV-2 is a novel, positive-sense, single-stranded RNA virus

(ii) Cell lysis occur during the lysogenic cycle

(iii) Cell to cell contact is required in bacterial transduction

(iv) Binary fission is the common mode of reproduction in bacteria

(v) Heterocysts are biological fertilizers

(vi) Mycorrhiza promotes bacterial activity

(c) Expand the following (any five) : (5×1=5)

(i) HIV (ii) ICTV

(iii) NAG (iv) PPLO

(v) PGPR (vi) IARI

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

(i) Lytic cycle and lysogenic cycle

(ii) Viroids and Prions

(iii) Archaebacteria and Eubacteria

(iv) Gram positive bacteria and Gram negative bacteria

(v) Ectomycorrhiza and Endomycorrhiza

(vi) Synthetic media and Differential media

(vii) Photolithoautotrophs and Chemolithoautotrophs

3. Draw a well labelled diagram (any Three) : (3×5=15)

(i) Bacteriophage

(ii) Bacterial Growth curve

(iii) Disease cycle of citrus canker

(iv) Formation of root nodule

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

(i) Baltimore's Classification

(ii) Wall-less forms of bacteria

(iii) Griffith's Experiment

(iv) Role of *Rhizobium* in soil

5. Answer any **two** of the following : (2×7.5=15)

(i) Briefly describe the symptoms, casual organism and control measures of any viral plant disease.

(ii) Bacteria are an integral part of our daily life. Prove this statement with suitable examples from agriculture, fermentation processes, and medicine.

(iii) How do Mycorrhiza colonize the host? Describe various benefits of Mycorrhiza.

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1233 **F**

Unique Paper Code : 2162011203

Name of the Paper : Plant Systematics

Name of the Course : **B.Sc. (Hons.) Botany – DSC–5**

Semester : II

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 including question no. **1** which is compulsory.
3. Attempt all parts of the questions together.

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

   (i) _____ is known as the Father of Genus Concept.

   (ii) _____ is the author of *Theorie elementaire de la botanique*.

P.T.O.

(iii) The occurrence of similar features in different species with common ancestry is known as _____.

(iv) The standard size of a herbarium sheet is _____.

(v) The starting date of Botanical Nomenclature is _____.

(vi) The binomial with identical generic name and specific epithet is known as _____.

(vii) Takhtajan represented his system of classification in the form of a _____ diagram.

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

(i) nom. nud.

(ii) APG

(iii) OTU

(iv) ICNCP

(v) IAPT

(vi) sp. nov.

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

(i) Example of generic name derived from name of a planet.

(ii) Place where first International Botanical Congress was held in 1867.

(iii) Genera plantarum was authored by?

(iv) Type genus of the family Arecaceae

(v) The alternate name of the family Graminae

(vi) Sexual system of classification was proposed by?

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

(i) Herbaceous origin theory of angiosperms

(ii) Principles of ICN_{afp}

(iii) Valid publication of names

(iv) Importance of Flora in the field of plant systematics

(v) Contributors of phylogenetic systems of classification

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

(i) Sibling species and Compilospecies

(ii) Holotype and Lectotype

(iii) Apomorphy and Plesiomorphy

(iv) Homology and Analogy

(v) Phenogram and Cladogram

(vi) Taxonomic category and taxonomic group

4. (a) Discuss the role of Palynology in plant systematics with 2 suitable examples. (5)

(b) Discuss Biological species concept. (5)

(c) Discus coevolution of angiosperm and animals with 2 suitable examples. (5)

5. (a) Outline the system of classification proposed by Benthem and Hooker (Up to series). (5)

(b) Define a Clade. What are the major clades in APG IV classification? (5)

(c) Interpret the following **(any five)** : (5×1)

(i) X *Triticosecale*

(ii) *Delphinium viscosum* Hook. et. Thomson

(iii) *Acacia nilotica* (L.) Delile ssp. *nilotica*

(iv) *Gossypium tomentosum* Nutt. *ex* Seem.

(v) *Rosa floribunda* 'Blessings'

(vi) *Perityle vigilans* Spellenb. & A.M. Powell, *sp. nov.*

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1214 F

Unique Paper Code : 2162011202

Name of the Paper : Plant Resources and Economic Botany

Name of the Course : B.Sc. (Hons) Botany - DSC - 4

Semester : II

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 including.
3. Question No. 1 which is compulsory.
4. All parts of a question must be answered together.
5. All questions carry equal marks.
6. Draw diagrams wherever required.

P.T.O.

1. (a) Give the Botanical name and family of the following (**any 5**) : (1×5=5)

(i) Rice

(ii) Pigeon pea

(iii) Coconut

(iv) Saffron

(v) Tea

(vi) Potato

(b) Expand the following (**any 5**) : (1× 5=5)

(i) IARI

(ii) CIMAP

(iii) IRRI

(iv) NBPGR

(v) FRI

(vi) CDRI

(c) Match the following (any 5) : (1×5=5)

(i) Citrus fruit	(a) Bast fibre
(ii) Millet	(b) Hesperidium
(iii) Jute	(c) Caryopsis
(iv) Wheat	(d) Ragi
(v) Coffee	(e) Groundnut
(vi) Gynophore	(f) Rubiaceae

2. Draw well labelled diagrams of the following : (any 3) (3×5=15)

(i) L.S. of Clove Bud

(ii) L.S. of Cotton seed

(iii) L.S. of Rice grain

(iv) T.S. of Potato tuber

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

(i) Centre of Origin concept by Vavilov

(ii) Processing and uses of rubber

P.T.O.

(iii) Economic importance of spices

(iv) Opium and its derivatives

(v) Processing of Jute

4. (a) What is cane sugar? Explain the processing and commercial production of sugarcane. What are the by-products of cane industry? (10)

(b) What are the essential oils? Mention the procedure of extraction of essential oils? (5)

5. (a) What are therapeutic drugs? List three medicinal plants with Botanical name, family, their constituents and uses in curing diseases. (10)

(b) Fruits and Vegetables are essential components of a balanced diet. Comment. (5)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4705 **E**

Unique Paper Code : 32167601

Name of the Paper : DSE-III (Industrial and Environmental Microbiology)

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

Semester : VI

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 including Question number **1** which is compulsory.
3. **All** parts of a question must be answered together.
4. Draw well labelled diagrams wherever necessary.

1. (a) Expand the following **(any five)** : (1×5=5)

(i) BOD (ii) MPN (iii) UASB (iv) HFCS

(v) PDA (vi) CFU

P.T.O.

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

(i) In trickling filters _____ forms a slime matrix, that can accommodate heterogenous microbial community.

(ii) _____ are plates in the bioreactor that enhance aeration efficiency and prevent vortexing.

(iii) _____ fungi catalyses the breakdown of cellulose.

(iv) Process of fermentation was first described by _____

(v) _____ is a methodused to reduce the concentration of a substance in a solution by repeatedly diluting it with a solvent.

(vi) _____ fungal species are used for alcohol production as they can tolerate high levels of alcohol.

(c) Read the following statements carefully and write *True ox False.* (1×5=5)

(i) Gravimetric method is used to measure TOC.

(ii) Millipore filters are used for sterilization.

(iii) α-Amylase is an endogenous enzyme of *Bacillus subtilis*.

(iv) In liquid state surface fermentations, no agitation is carried out and thus the moulds grow as mycelial mats on the surface of the medium.

(v) Cell disruption is a mandatory step in intracellular product recovery.

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

(i) Components of a Bioreactor

(ii) Isolation of microbes from Air/water

(iii) GRAS

(iv) Algal Blooms

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

(i) Enrichment medium and differential medium

(ii) Solid state fermentation and Liquid state fermentation

(iii) COD and BOD

(iv) Lyophilization and Spray drying

(v) Extracellular microbial enzymes and Intracellular microbial enzymes

(vi) Laminar air flow and Autoclave

4. (a) Discuss in detail the production and estimation of amylase using microorganisms. (8)

(b) Discuss various methods of down stream processing. (7)

5. (a) What do you understand by enzyme immobilization? What are the different methods of enzyme immobilization? (8)

(b) What is the industrial importance of glucose isomerase? What are the advantages of semisynthetic penicillin over natural penicillin? (7)

6. (a) What are coliforms? Discuss methods (any three) for detecting coliforms in drinking water. (8)

(b) Discuss the secondary methods for treatment of sewage water. (7)

7. (a) Discuss the scope of microbes in Industry. (8)

(b) What are the different components of synthetic culture media? (7)

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper	:	**5708**	**E**
Unique Paper Code	:	42161201	
Name of the Paper	:	Plant Ecology and Taxonomy	
Name of the Course	:	**B.Sc. (Prog.)**	
Semester	:	II	

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 **Section-A and B** on SEPARATE SHEETS.
3. Question No. **1** of both sections is COMPULSORY.
4. Attempt **three** questions from **Section A** and **three** questions from **Section B** including question number **1** from both the sections.
5. Attempt **all** parts of a question together.

SECTION – A

1. (a) Define **any five** of the following: (5x1=5)
   i. Edge effect
   ii. Holard
   iii. Autogenic succession
   iv. Thermocline
   v. Community
   vi. Abundance

   (b) Fill in the blanks: (5x0.5=2.5)
   i. Instrument used to measure light intensity is called.....
   ii. .....is the process of breakdown of parent rock material.
   iii. ..... are organisms that feed on plants.
   iv. ..... is an example of a xerophytic plant.
   v. The levels of energy transfer in a food chain are called .....

2. Write short notes on **any three** of the following: (5x3=15)
   (a) Food web
   (b) Temperature as an ecological factor
   (c) Raunkiaer's Life forms
   (d) Endemism

3. (a) Illustrate the following with the help of diagrams ONLY: (4x2=8)
   i. Soil Profile
   ii. Single channel energy flow model

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3. What are the different bio-geographical zones of India? Describe their salient features. (7)

4. Define ecological succession. Explain the process of ecological succession occurring in a water body with the help of suitable diagrams. (7)

5. What are biogeochemical cycles? Discuss phosphorous cycle with the help of a (8)

SECTION – B

1. (a) Define any five of the following: (5x1=5)
   i. Taxon
   ii. Herbarium
   iii. Flora
   iv. Basionym
   v. OTU
   vi. *nom.cons.*

   (b) Identify the taxonomic rank of the following: (5x0.5=2.5)
   i. Brassicaceae
   ii. *Sorghum*
   iii. Asterales
   iv. Magnoliopsida
   v. Dissiflorae

2. Write short notes on any **three** of the following: (3x5=15)
   (a) Principle of priority and its limitations
   (b) Type method
   (c) Englerian concept of a primitive flower
   (d) Rejection of scientific names
   (e) Importance of botanical garden in taxonomy

3. Differentiate between **any three** of the following: (3x5=15)
   (a) Phenogram and Cladogram
   (b) Indented key and Parallel key
   (c) Phenetic and Phylogenetic classification
   (d) Continuous and discontinuous variations
   (e) Taxonomic category and taxonomic group

4. (a) Give an outline of the system of classification proposed by Engler and Prantl for seed plants (upto the level of series). Enumerate its merits and demerits. (5 + 3 = 8)

   (b) Discuss the role of palynology in solving taxonomic problems with suitable examples. (7)