(1)

[This question paper contains 4 printed pages.]

Your Roll No.....

K

Sr. No. of Question Paper : 5743

Unique Paper Code : 2162011101

Name of the Paper : Plant Diversity and Evolution

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

Semester : I

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 number **1** is compulsory. **All** questions carry equal marks.
4. All parts of a question must be answered together.
5. Draw diagrams wherever required.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

P.T.O.

1. (a) Name the genus having the following characteristic (Attempt **any five**) : (1×5=5)

(i) Fairy Ring

(ii) Tuberculate Rhizoids

(iii) Peltate columella

(iv) Scalariform conjugation

(v) Gymnosperm with jointed stem

(vi) Bryophyte with leafy gametophyte

(vii) Pteridophyte with ligule

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

(i) The theory of natural selection was proposed by _____.

(ii) The viral genome incorporated in bacterial genome is known as _____.

(iii) The reserve food material in brown algae is _____.

(iv) In fungi, asexual spores produced inside sporangia are called _____.

(v) _____ is known as cord moss.

(vi) The two types of scales present in *Marchantia* are _____ and _____.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(vii) Heterotrichous thallus is present in _____ algae.

(c) Match the following : (1×5=5)

(i) R. H. Whittaker	(a) Apical Notch
(ii) Myxomycetes	(b) Five Kingdom Classification
(iii) Marchantia	(c) Slime molds
(iv) Sporophyll	(d) Vessel elements in xylem
(v) *Gnetum*	(e) Spore-bearing leaf

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

(a) Eubacteria and Archaebacteria

(b) Chlorophyceae and Phaeophyceae

(c) Antheridiophore and Archaegoniophore

(d) Lytic and Lysogenic cycle

(e) Gymnosperm and Angiosperm

3. Draw a well labelled diagram of followings (Attempt **any three**) : (5×3=15)

(a) V.S. thallus of *Marchantia* passing through gemma cup

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(b) Thallus of *Rhizopus* showing sporangiophore

(c) Morphological diagram of *Spirogyra*

(d) Female strobilus of *Gnetum.*

(e) Model of TMV

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

(a) Types of Lichens and their ecological roles

(b) Evolutionary trends in Pteridophytes

(c) Affinities between Gymnosperms and Angiosperms

(d) Morphology of *Marchantia* thallus

(e) Brief account of *Ephedra*

5. Attempt **(any two)** from the following : (7.5×2=15)

(a) Artificial, natural, and phylogenetic systems of classification.

(b) "Bryophytes are amphibians of the plant kingdom" Comment. Draw the life cycle of *Funaria.*

(c) Describe Genetic Recombination in Bacteria.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(2)

Your Roll No_____

Sr. No. of Question Paper : 5978

Unique paper code : 2162011103

Name of the Paper : Basic Laboratory and Field Skills in Plant Biology

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

Semester : I

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. All questions carry equal marks.
4. Question No. **1** is compulsory.
5. Attempt all parts of a question together.
6. Use of simple calculator is allowed.

Q1. Answer the following questions **15**

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

(i) In a confocal microscope, the out-of-focus light is eliminated by passing emitted light through a _____aperture.

(ii) The molality of 100mL of a solution taken from a 2M solution will be _____.

(iii) For a random sample of 16 students, the average CGPA 8, and the sample standard deviation is S = 4. The standard error of the sample is _____.

(iv) _____ is an example of secondary database.

(v) According to Beer-Lambert law, the absorbance of a solution is directly proportional to the _____ of the absorbing species and the path length.

(vi) $Log_{10}1000$ is equal to _____.

b). Match the column (5 ×1=5)

i.	Cell size	A	
ii.	Biohazard	B	Hemocytometer
iii.	Cell number	C	
iv	Environmental Hazard	D	Micrometer
v.	Radioactive	E	

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

c) Define (any five) (5×1=5)

(i) Lux meter
(ii) Fluorochrome
(iii) Preservative
(iv) Stock Solution
(v) Scientific Notations
(vi) Biocontainment

Q2. Differentiate between the following (any five) **(5X3 =15)**

(i) Precision and Accuracy
(ii) Bar Graph and Histogram
(iii) Median and Mode
(iv) Conductivity meter and pH meter
(v) LB Media and YEB Media
(vi) Fluorescence microscope and Confocal microscope

Q3. Write short notes on following (any three) **(3X5=15)**

(i) Grades of laboratory chemicals based on purity
(ii) Sampling Methods
(iii) Agarose Gel Electrophoresis
(iv) Steps for Herbarium preparation

Q4. Answer the following questions: **15**

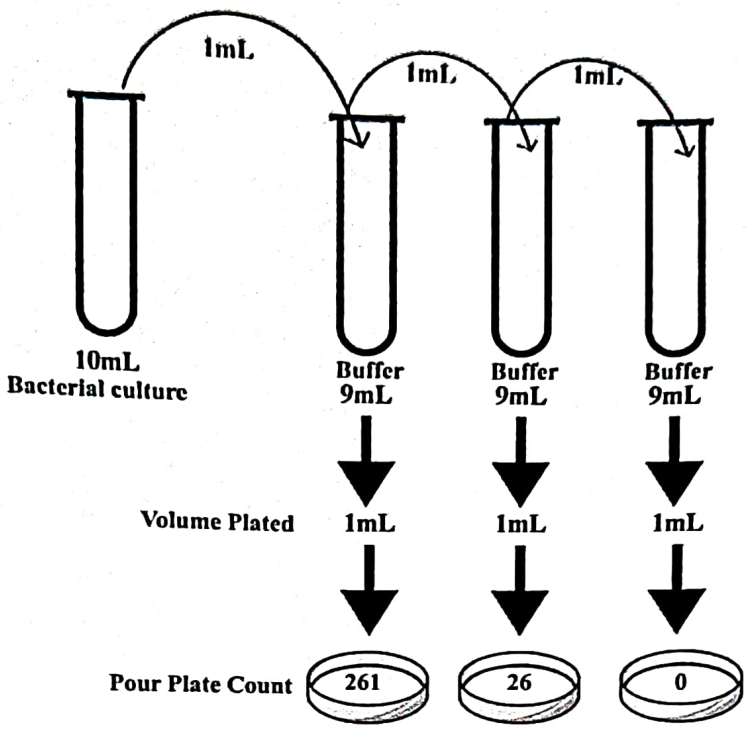
a) Explain the concept of the limit of resolution, and how it relates to the resolving power of an optical instrument? Illustrate and label a ray diagram showing the image formation in a compound microscope. (7)
b) From the following data recorded on the height of the plants of varieties G-65 and PS-16 of Mungbean; find out which variety is more consistent using coefficient of variation? (8)

Varieties	Plant height (in cm)									
G-65	25	50	45	30	70	42	40	48	34	60
PS-16	10	70	50	20	95	55	42	60	48	80

Q5. Answer the following questions: **15**

a) Discuss the various bacterial culture techniques with its applications. (7)
b) Determine the number of bacteria present in original bacterial culture (10ml) using the provided serial dilution image. (4)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY



(c) Calculate the molarity of a sulfuric acid solution (molecular weight = 98 g/mol) prepared by dissolving 196 g of the acid in water to make a final volume of 500 ml. Additionally, if a young researcher mistakenly diluted 2 L of a 6 M sulfuric acid solution by adding 4 L of water, what will be the new molarity of the resulting solution? (4)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5724 **K**

Unique Paper Code : 2162012301

Name of the Paper : Phycology – The World of Algae (DSC)

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

Semester : III

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. Draw well-labelled diagrams wherever necessary.
5. Attempt all parts of a question together.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

P.T.O.

1. (a) Name the alga associated with the following terms: **(any five)** (5x1=5)

(i) Red Tides

(ii) Amylum Stars

(iii) Salt Tolerance

(iv) Gas Vacuoles

(v) Red Snow

(vi) Single Cell Protein

Match the following terms of **Column A** with **Column B** : (5×1=5)

Column A	**Column B**
(i) Cap Cells	*Sargassum*
(ii) Spermocarp	*Vaucheria*
(iii) Clump Formation	*Coleochaete*
(iv) Synzoospore	*Oedogonium*
(v) Conceptacle	*Ectocarpus*

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(c) Briefly discuss the contributions of the following: (any two) (2×2.5=5)

(i) H. D. Kumar

(ii) F. E. Fritsch

(iii) T. V. Desikachary

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

(a) Macrandrous and Nannandrous

(b) Isogamy & Oogamy

(c) Centric Diatom & Pennate Diatom

(d) Phaeophyceae & Rhodophyceae

(e) Unilocular Sporangium & Plurilocular Sporangium

(f) Haplontic Life-Cycle & Diplontic Life-Cycle

3. Draw well-labelled diagram of the following : (any Three) (3×5=15)

(a) *Vaucheria* - Thallus bearing sex organs

(b) *Sargassum* - V.S. Male Conceptacle

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(c) *Chara* - T.S. Globule

(d) *Chlamydomonas/ Chlorella* - E.M.

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

(a) Sexual Reproduction in *Coleochaete*

(b) Daughter Colony Formation

(c) Heterocyst-Structure and Functions

(d) Phycocolloids

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

(a) Life-Cycle of *Polysiphonia /Gracilaria* (with Illustrations). (4+3.5)

(b) Fine Structure and Evolutionary Significance of *Prochloron*. (5+2.5)

(c) Salient Features & Economic Importance of Dinoflagellates. (5+2.5)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(4)

Paper no. - 5957

Sr. No. of Question Paper	:	**Your Roll No.....**
Unique Paper Code	:	2162012303
Name of the Paper	:	Genetics and Plant Breeding
Name of the Course	:	B.Sc. Hons Botany (NEP-2022)
Semester	:	III

Duration: 2 Hours **Maximum Marks: 60**

Instructions for Candidates

1. Write your Roll No. on the top immediately on the 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.

Q. 1. (a) Define (*any five*): **(5x1 = 5)**

(i) Silent mutation
(ii) Barr body
(iii) Back cross
(iv) Extranuclear inheritance
(v) Co-dominance
(vi) Pleiotropy

(b) Expand (*any five*): **(5x1 = 5)**

i) ClB
ii) TE
iii) Ac
iv) 5BU
v) mtDNA
vi) F_2

(c) Give the contribution of the following (***any five***): **(5x1 = 5)**

i) H. J. Muller
ii) Barbara McClintock
iii) A. Sturtevant
iv) G. H. Shull
v) W. Johannsen
vi) Mary Lyon

Q2. Differentiate between (***any five***): **(5x3 = 15)**

(i) Physical and Chemical mutagen
(ii) Mass and Pureline selection
(iii) Complete and Incomplete linkage

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(iv) Reciprocal and Non-reciprocal translocation
(v) Nuclear inheritance and extranuclear inheritance
(vi) Monosomy and Trisomy

Q3. Write short note on ***any three*** of the following: **(3x5 = 15)**

i) Speciation
ii) Epistasis
iii) Variegation pattern in 4'Oclock plant
iv) Transposons
v) Heterosis

Q4. (a) What is polygenic inheritance? Explain with the help of cross using suitable example. Write any three characteristic features of this mode of inheritance. (8)

(b) Discuss Hardy- Weinberg law. What assumption must be met for a population to be in Hardy- Weinberg equilibrium? (7)

Q5. A *Drosophila* geneticist crossed females homozygous for three X-linked mutations (*y, yellow body; B, bar eye shape; v, vermilion* eye color) to wild-type males. The F1 females, which had gray bodies and bar eyes with dark red pigment, were then crossed to $y\ B^{+}\ v$ males, yielding the following results:

Class	Phenotype	Number
1.	*yellow, bar, vermilion*	546
2.	*wild type*	
3.	*yellow*	244
4.	*bar, vermilion*	
5.	*yellow, vermilion*	160
6.	*bar*	
7.	*yellow, bar*	50
8.	*vermilion*	

a) Which classes represent the parental types, single cross overs and double cross overs. (3)

b) Determine the recombination frequencies between each pair of genes, their order and map the distance between the genes on the chromosome. (6)

c) Define coefficient of coincidence and interference. Calculate the value of coefficient of coincidence for the given data. (6)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

[This question paper contains 4 printed pages.]

Your Roll No.....

K

Sr. No. of Question Paper : 5840

Unique Paper Code : 2162013503

Name of the Paper : Plant Physiology

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

Semester : V

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.

1. (a) Expand the following (Any Five): (5 x 1 = 5)

   (i) IPT

   (ii) DCMU

   (iii) TIBA

   (iv) NCED

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(v) CCC

(vi) ACC

(b) Name the following (Any Five): (5 x 1 = 5)

(i) 2,4-D foliar spray stimulates flowering in which plant

(ii) Structure of ABA hormone

(iii) A PUFA derivative hormone

(iv) Chemical that works as an anti-gibberellin

(v) A hormone extending the vase life of roses

(vi) Asexual stage of Fungus after which a hormone was named

(c) Give one contribution of the following scientists (Any five): (5 x 1 = 5)

(i) H. A. Borthwick and S. B. Hendricks

(ii) M. Chailakhyan

(iii) P. Agre

(iv) J. Levitt

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(v) H. H. Dixon and Jolly

(vi) W. F. Gericke

2. Distinguish between (Any Three): (3 x 5 = 15)

(i) Carriers and Channels

(ii) Source and Sink with reference to phloem translocation

(iii) Simple and Facilitated Diffusion

(iv) Apoplastic and Symplastic uptake of water and minerals

(v) Hydroponics and Soil Culture

3. Write short notes on (Any Five): (5 x 3 =15)

(i) Factors affecting seed dormancy

(ii) Types of Dormancy

(iii) Significance of Transpiration

(iv) Ion theory of stomatal opening and closing

(v) Phloem sap composition

(vi) Bioassays of each Acidic nature Hormones

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

4. (a) Enumerate the physiological role of Ethylene as a plant hormone. (5)

(b) Write a detailed account of the florigen concept. (5)

(c) What is the role of Hydroponics in understanding plant's nutrient requirements? (5)

5. (a) Critically comment on the role, source, and deficiency symptoms of any two of the following: (2 x 4 = 8)

(i) Phosphorus and Calcium

(ii) Nitrogen and Cobalt

(iii) Sodium and Manganese

(b) Discuss briefly the microanatomy of guard cells and their role in functioning. (5)

(c) Enumerate various factors affecting nutrient uptake. (2)

6. Name and describe the role of hormones involved in the mobilization of food reserves in cereal grains during germination. List the commercial applications of this hormone. (15)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

Paper no. – 503 **SET B**

Sr. No. of question paper- **Your Roll number——**

Unique Paper Code: 2163013005
Name of the Course: B.Sc. (H) Botany/B.Sc. Life Science
Name of the Paper: Plant Pathology (DSE)
Semester: V

Duration- 2 hours **Maximum marks- 60 Marks**

(Write your roll number on the top immediately on receipt of this question paper)

Instructions for candidates:

1. Attempt **four** questions in all, including Question No 1, which is compulsory.
2. All questions carry equal marks.
3. Draw diagrams wherever required.

Q 1. (a) Define the following: **(1x5=5)**

(i) Inoculum
(ii) Incubation period
(iii) Hypoplasia
(iv) Epiphytotic disease
(v) Sclerotia

(b) Fill in the blanks; **(1x5=5)**

i. Aecial stage develops in rust disease on ---------- host.
ii. A spherical and granular cytoplasmic body in the centre of the oosphere of *Albugo* is known as ----------.
iii. Brand spores are formed in -------- disease.
iv. .....is the causative agent of the Root knot disease of Brinjal.
v. ---------- is a simple or branched projection of hyphae into host cells that act as an absorbing organ.

(c) State whether the following statements are true or false: **(1x5=5)**

(i) Anton de Bary is known as the father of modern mycology and plant pathology.
(ii) Bordeaux mixture is an example of an organic fungicide.
(iii) The disease pyramid includes the components: host, pathogen, environment, and time.
(iv) Plant quarantine helps prevent the introduction and spread of exotic plant diseases.
(v) Vein clearing of bhindi is a fungal disease transmitted through soil.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

Q 2. Differentiate between the following (any three): **(5x3= 15)**

(a) Primary host and secondary host
(b) Systemic and localised infection
(c) Powdery and downy mildew of disease
(d) Rust and Smut disease

Q 3. Give an account of the causal organism, symptoms, disease cycle and control measures of any one bacterial / viral disease studied by you. **(15)**

Q 4. Write short notes on the following (any three): **(5x3= 15)**

(a) Koch's Postulates
(b) Epidemiology
(c) Cultural practices of plant disease control
(d) Plant quarantine regulations

Q 5. (a). Explain sexual mode of reproduction in *Phytophthora infestans* with suitable diagram. **(7.5)**

(b). Discuss the role of systemic fungicides in modern plant disease management. **(7.5)**

Q 6. (a) Give a brief account about the Plant defence mechanisms (Constitutive and induced, structural and biochemical) with one suitable example each. **(7.5)**

(b) Discuss the Apple scab disease, symptoms, disease cycle and control measures with suitable labelled diagrams. **(7.5)**

(1000)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

[This question paper contains 4 printed pages.]

Your Roll No.....

K

Sr. No. of Question Paper : 5705

Unique Paper Code : 2162013501

Name of the Paper : Molecular Biology of the Cell

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

Semester : V

Duration : 2 Hours Maximum Marks : 90

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 **four** questions in all.
4. All parts of questions must be answered together.

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

   (i) Transcription unit

   (ii) Consensus sequence

   (iii) Enhancer

   (iv) Snurps

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(v) Repressor

(vi) Promoter clearance

(b) Fill in the blanks. (1×5=5)

(i) The process of reformation of double helices from the denatured complementary single strands of DNA is called _____.

(ii) Positive charge in histone molecules are imparted due to the presence of high percentage of _____ and _____ residues.

(iii) The Clover leaf model of tRNA structure was proposed by _____.

(iv) The _____ is responsible for recognition of promoter during prokaryotic transcription.

(v) Genes specifying proteins or enzymes that are not the part of the regulatory elements in an operon are called _____.

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

(i) PTGS

(ii) hnRNA

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(iii) TAF

(iv) UTR

(v) RISC

(vi) ORF

2. Write a short note on any three of the following. Draw proper diagrams wherever necessary. (5×3=15)

(i) Wobble Hypothesis.

(ii) Prokaryotic & Eukaryotic RNA Polymerases.

(iii) Fraenkel-Conrat reconstitution experiment.

(iv) John Cairn's experiment describing the Theta mode of replication.

(v) Transcription termination in eukaryotes

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

(i) A DNA, B DNA and Z DNA.

(ii) Splicing in group I and group II introns.

(iii) Inducible and repressible system.

(iv) RNA Pol-I, RNA Pol-II and RNA Pol-III

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

4. (a) Elaborate the three possible modes of DNA replication and discuss as how Meselson and Stahl deduced the most accurate and accepted model. (7)

(b) Elaborate the process of transcription initiation in prokaryotic and eukaryotic systems. (8)

5. (a) "Nearly all three major forms of RNA molecules are involved in some aspect during translation". Elaborate the statement and discuss in details the components of translational machinery. (7)

(b) Define the term "spliceosome". Elaborate various molecular complexes associated in the assembly of spliceosome and the mechanism of splicing via spliceosome complex. (8)

6. (a) Define RNA interference. Give the steps involved in post transcriptional gene silencing by siRNA. (7)

(b) Elaborate the various types of promoter elements in prokaryotic and eukaryotic genes. Describe at least two key features that distinguish a eukaryotic enhancer element form a promoter. (8)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7022 **K**

Unique Paper Code : 2162524701

Name of the Paper : Environmental Biotechnology and Management

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

Semester : VII

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. **First** question is compulsory and attempt any other **three** questions from remaining.
3. Part of the questions to be attempted together.
4. **All** questions carry equal marks.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

P.T.O.

1. (a) Match the following : (1×5=5)

(i) Global warming	(a) Damages DNA and causes skin cancer in living organisms
(ii) Bioconcentration	(b) Trapping of infrared radiation by greenhouse gases
(iii) UV-B radiation	(c) Anaerobic treatment to reduce high BOD load
(iv) Distillery effluent	(d) Increase in pollutant concentration in an organism from its environment
(v) Montreal Protocol (1987)	(e) Agreement to phase out ozone-depleting substances

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

(i) BOD

(ii) WCED

(iii) UNEP

(iv) UNFCCC

(v) CPCB

(vi) GHG

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(vii) CFCs

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

(i) Bioleaching

(ii) Biomagnification

(iii) Eutrophication

(iv) Anthropogenic Activities

(v) Bioindicator

(vi) Phytoremediation

(vii) Biotransformation

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

(a) Bioreactor

(b) Biosensor

(c) Environmental ethics

(d) Trickling filter

3. (a) What is superbug? How it is useful in bioremediation of oil spill? Discuss in detail.

(b) Describe the mechanism and role of bioaccumulation and biosorption in removal of heavy metal pollutants.

P.T.O.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(c) Discuss the significance of the Stockholm Conference (1972) and its Declaration in shaping global environmental policy. (5×3=15)

4. (a) Describe the main features of the Kyoto Protocol (1997) and its role in combating climate change.

(b) What is acid rain? Discuss its causes, chemical reactions involved, and effects on soil, water, vegetation, and monuments.

(c) Describe in brief about the various biotechnological approaches for management of global environmental problems. (5×3=15)

5. (a) Write the working principle and applications of Up-flow Anaerobic Sludge Blanket Reactor.

(b) Discuss the role and importance of biopesticides in sustainable agriculture.

(c) Discuss the concept and significance of bioprospecting. (5×3=15)

6. (a) Discuss in detail about bioremediation of organic and inorganic pollutants.

(b) Describe the aerobic treatment process used for wastewater management. (7.5×2=15)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

Paper no. – 12847

Unique Paper Code: 2164001004
Name of the Paper: **Basic Laboratory and Field Skills in Plant Biology and Allied Sciences**
Name of the Course: **Botany**
Semester : **I**
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 questions carry equal marks.
5. Draw well-labelled diagrams wherever necessary

Q1. (a) Expand the following (**any five**): (5 × 1= 5)

(i) PAGE
(ii) LAF
(iii) YEB media
(iv) TEM
(v) AGE
(vi) EDTA

(b) Match the following: (5 × 1= 5)

(i) Centrifugation	a) Systematics and Phylogeny
(ii) Taxonomy	b) Herbarium
(iii) MS-PowerPoint	c) Fixative
(iv) Osmium Tetroxide	d) Separation
(v) Mounting	e) Presentation

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

(i) Specialized filters named as .....are used in Confocal microscopy to remove out of focus light
(ii) .....is a spreadsheet program developed by Microsoft that organizes, calculates, and analyze data in a grid of rows and columns.
(iii) 58.6 L equals to .....mL
(iv) .....is the middle value in a dataset when the data is arranged in ascending or descending order
(v) .....involves a stepwise reduction of microbial concentration using a constant dilution factor

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(vi) .....is defined as the number of moles of solute per Kg of solvent

Q2. Differentiate between **(any five)**: (5 × 3 = 15)

(i) Light and Electron Microscope
(ii) Ocular and Stage Micrometer
(iii) Herbarium and Museum
(iv) MS-Word and MS-PowerPoint
(v) Primary and Secondary data
(vi) Stock and Standard solution

Q3. Discuss the following **(any three)**: (3 × 5 = 15)

(i) Biosafety measures and their importance
(ii) Fixatives used in plant biology
(iii) Different culturing techniques used in microbiology
(iv) Cataloguing and preservation of plant specimens

Q4 Draw well-labelled diagrams of the following **(any three)**: (3 × 5 = 15)

(i) Laminar air flow
(ii) Streak plate method
(iii) Fire extinguishers
(iv) Histogram and Pie chart

Q5. Attempt the following questions **(any two)**: (7.5 × 2 = 15)

a) Discuss the process of data collection and analysis in biological research. (7.5)

b) Define Beer-Lambert's law. Discuss the working principle and applications of Spectrophotometer. (7.5)

c) Define Molarity, Molality, and Normality. Discuss various classes and handling of laboratory chemicals. (7.5)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

Paper no. – 502 Your Roll No.....

Unique Paper Code: 2163012002
Name of the Paper: Biostatistics and Bioinformatics for Plant Sciences
Name of Course Botany (DSE)
Semester III
Duration: 2 hours Maximum Marks: 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on the receipt of this question paper.
2. Attempt **Part A** and Part **B** on separate answer sheets.
3. Question no. **1** is compulsory of **both** the sections.
4. Attempt **three** questions from Part **A** and **three** questions from Part **B** including compulsory Q. No. **1** of **both** the sections.
5. Attempt All parts of a question together.
6. Use of simple calculator allowed.

Part A

1. (a) Expand the following **(any five)** 5X1=5

i. SNP
ii. EST
iii. OTU
iv. MSA
v. FASTA
vi. NIH

(b.) Define **(any five)** 5X1=5

i. Similarity
ii. Query
iii. Outgroup
iv. Identity
v. Homology
vi. Cheminformatics

2. Differentiate between the following **(any two)** 2X5=10

i. Gap and penalty
ii. BLASTx and BLASTn
iii. PDP and PlantPepDB

3. Write short notes on following **(any two)** 2×5=10

i. Aims and scope of Bioinformatics
ii. Composite databases
iii. Applications of bioinformatics in crop improvement

4. (a) What is Molecular Phylogeny? Write the features of a phylogenetic tree. 5

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(b) Discuss the salient features of UniProt. 5

PART B

1. (a) Define the following (**any five**): 1x5 = 5

i. Tabulation
ii. Degrees of freedom
iii. Variable
iv. Histogram
v. Mean deviation
vi. Central value

(b) Match the following: 1x5 = 5

	Column A	Column B
i.	r	Population Mean
ii.	μ	Summation
iii.	$\sum$	Standard Deviation
iv	χ^2	Coefficient of correlation
v	σ	Chi-square

2. Differentiate between the following (**any 2**) 2x5 = 10

i. Paired and unpaired t test
ii. Positive and negative correlation
iii. Type I and type II error

3. a) Define sampling. What are the various sampling methods used in biostatistics. 5

b) Define chi-square test. Explain goodness of fit with the help of a suitable example. 5

4. a) Name the measure of dispersion that is most widely used and is considered a standard measure of dispersion? Justify your answer. Write the formula for the above measure of dispersion. 5

b) Calculate the coefficient of variance from the following data obtained on the culm length (in cm) of 2 rice varieties. 5

Variety 1	2	4	6	6	8	5	5	4	3	2
Variety 2	3	5	2	9	7	5	4	6	8	4

(1000)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5763 **K**

Unique Paper Code : 2162014701

Name of the Paper : Genomics, Proteomics and Bioinformatics

Name of the Course : **Botany**

Semester : VII

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. All parts of a question should be answered together.
5. Draw diagrams wherever required.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

P.T.O.

1. (a) State whether the following statements are true or false **(any five)** : (1×5=5)

(i) The term "epigenome" refers to the total set of genes in an organism.

(ii) Cas9 endonuclease introduces double-stranded breaks in target DNA.

(iii) X-ray crystallography is used to study the tertiary structure of DNA.

(iv) PubMed database provides information on metabolic pathways.

(v) DNA methylation is a reversible epigenetic modification.

(vi) Entrez is a search system for accessing multiple biological databases.

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

(i) sgRNA

(ii) NCBI

(iii) MALDI-ToF

(iv) nLC-MS/MS

(v) KEGG

(vi) PDB

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

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

(i) A ..... is any maximal consecutive run of spaces in a single sequence in a given alignment.

(ii) ..... is the study of the individuality of cells using omics approaches.

(iii) CRISPR-Cas9 is derived from the natural immune system of .....

(iv) The nucleotide sequence database maintained by NCBI is known as .....

(v) In Edman sequencing, amino acids are removed sequentially from the ..... terminus.

(vi) ..... is used to determine the 3D structure of proteins using diffraction patterns.

2. (a) Explain the complexity of the eukaryotic genome. Discuss the role of genomics in health. (8)

(b) Define molecular phylogeny. With the help of a labelled diagram, explain the different parts of a phylogenetic tree. (7)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

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

(a) Genomics ethics

(b) Environmental metagenomics

(c) Post-translational modifications

(d) Scope of bioinformatics

4. Differentiate between **(any three)** : (3×5=15)

(a) Metagenomics and Epigenomics

(b) Nucleotide database and Protein database

(c) ChIP seq and Bisulphite sequencing

(d) Genomics and Proteomics

5. (a) Describe the workflow of proteome analysis using 2-D gel electrophoresis. (8)

(b) What is NCBI BLAST? Describe its different types. (7)

6. (a) Discuss the role of epigenetics in stress adaptation in plants. (8)

(b) Discuss the objectives and applications of Human Microbiome Project. (7)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(12)

(This paper has 2 printed pages) Roll No.....

Sr. No. of question paper: **10505**
Unique Paper Code: 2163010011
Name of the Paper: Plant Tissue Culture
Name of Course: Botany
Semester: VII

Duration: 2 hours Maximum marks - 60

Instructions for candidates:

- Write your roll number on the top immediately on receipt of this question paper.
- All parts of the question must be answered together.
- All questions carry equal marks.
- Question no. 1 is compulsory
- Attempt four questions in all.
- Draw well-labelled diagrams wherever necessary.

Q.1. a) Expand the following (**any five**) (1x5=5)

i) LS
ii) IAA
iii) 2,4-D
iv) HEPA
v) LAF
vi) BAP

b) Define the following (**any five**) (1x5)

i) callus
ii) *in vitro*
iii) hybrid
iv) explant
v) protoplast
vi) plant growth regulators

c) Write the significant research contribution of any **five** of the following (1x5)

i) Guha & Maheshwari
ii) Haberlandt
iii) E.C. Cocking
iv) F.W. Went
v) Skoog & Miller
vi) P. Maheshwari

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

Q.2. Write short notes on **(any three)** (3x5=15)

i) Micropropagation and its applications
ii) Anther culture
iii) Principle & working of the autoclave in plant tissue culture
iv) Virus elimination techniques in plant tissue culture

Q.3. a) Describe the principle and types of bioreactors for secondary metabolite production in plant tissue culture. (7.5)

b) Define somatic embryogenesis. Explain its types, process and advantages. (7.5)

Q.4. a) What is the principle and procedure of cryopreservation. How it is used for long-term germplasm conservation? (5)

b) Write briefly on protoplast fusion and its applications in crop improvement. (5)

c) Describe the steps involved in the aseptic preparation and inoculation of explants, highlighting the role of sterilizing agents, autoclave and laminar flow chamber (5)

Q.5. a) How does the composition of MS medium support in vitro plant growth? Describe the role of macro- and micronutrients, vitamins, hormones, and gelling agents. (7.5)

b) What are artificial seeds? Enumerate the detailed methodology of its production and write few advantages and applications of these seeds. (7.5)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

This question paper contains 2 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **10508**

Unique Paper Code : **2163010014**

Name of the Paper : **Intellectual Property Rights**

Name of the Course : **Botany**

Semester : **VII**

Duration : **2 Hours** Maximum Marks : **60**

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

Attempt *four* questions in all including Q. No. **1**, which is compulsory.

Part of the questions to be attempted together.

All questions carry equal marks.

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

   i) Bio-prospecting

   ii) Plagiarism

   iii) Gene Bank

   iv) Patent

   v) Intellectual property

   vi) Traditional knowledge

   b) Fill in the blanks: (1×5=5)

   i) Darjeeling tea is an example of.....

   ii) Patents are granted for a period of.....

   iii) *fssai* is an example of.....

   iv) The representation of another author's language, thoughts, ideas, or expressions as one's own original work is known as .....

   v) Example of trademark.....

P.T.O.

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY

(c) State whether statement is True or False : (1×5=5)

i) A patent application can be updated after it has filed to incorporate new features.

ii) Customs authorities have no role in enforcement of Intellectual property rights.

iii) BMW is an example of letter trademark.

iv) Coorg orange is an example of GI.

v) The industrial design head quarter in the patent office at Chennai.

2. a) What is a trademark? Describe the categories of trademark with suitable examples. (7)

b) What are the types of work protected under Copyright Act in India. Discuss the protective measures provided against Copyright infringements under this law. (8)

3. a) Discuss the objectives of patenting biotechnological inventions. Explain the concept of novelty in biotechnology. (8)

b) What is a domain name? What are the safeguards provided to protect it under IPR? (7)

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

a) Paris Convention

b) Protection of goodwill by trademarks

c) National Gene Bank resources

d) Protection of plant varieties

5 a) Describe the features of industrial design and how to obtain the registration for it? Explain with suitable example. (8)

b) What is TKDL? Discuss its objectives and case study related to it. (7)

6. a) Discuss the patent registration procedure in India with the help of flow diagram. Explain any case study related to patent. (8)

b) Discuss the objectives, key provisions, and enforcement mechanisms of the TRIPS Agreement. (7)

कालिन्दी महाविद्यालय पुस्तकालय
KALINDI COLLEGE LIBRARY