Seat No.	

Set **P**

M.Sc. (Botany) (Semester - I) (New) (NEP CBCS)
Examination: March/April – 2026
Biology and diversity of Algae, Bryophytes, Pteridophytes and Fungi (2314101)

Day & Date: Friday, 17-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) All questions carry equal marks.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative (MCQ). **08**

1) Cell wall of fungi is made up of _____.
   a) Cellulose b) Pectin
   c) Chitin d) Polygalactose

2) The algae which grow on rocks known as _____.
   a) Halophytic b) Thermophytic
   c) Lithophytic d) Symbiotic

3) Star shape arrangement of stele is known as _____.
   a) Plectostele b) Holostele
   c) Actinostele d) Protostele

4) Which of the following belongs to division chlorophyta?
   a) *Spirogyra* b) *Ulva*
   c) *Laminaria* d) *Sargassum*

5) _____ among the following is one of the bryophyte member.
   a) *Marchantia* b) *Isoetes*
   c) *Equisetum* d) *Pteris*

6) Agaricus belongs to division _____.
   a) Zygomycotina b) Basidiomycotina
   c) Ascomycotina d) Both a & b

7) Asexual spores of zygomycotina known as _____.
   a) Teliospores b) Basidiospores
   c) Aplanospores d) Zygospores

8) _____ among the following is one of the marine algae.
   a) *Spirogyra* b) *Chara*
   c) *Nostoc* d) *Sargassum*

B) Write True or False. **04**

1) Mosses belongs to dividend Cyanophyta.
2) Algae bear saprophytic nature.
3) Classification system for fungi proposed by Smith.
4) Stellar evolution observed in pteridophytes.

Q.2 Answer the following. (Any Six) **12**

a) Define algae.
b) Give any 4 characters of fungi.
c) Draw a well labeled diagram of archegonium of sphagnum.
d) Give any 4 unusual habitats of algae.
e) What is telome concept?
f) Give flowchart of classification of Pteridophytes.
g) Give differentiating characters of Bryophytes & Pteridophytes.
h) Draw a well labeled life cycle of Bryophytes.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on Thallus organization in algae.
b) Write a note on stellar evolution in Pteridophytes.
c) Give general characters of Pteridophytes.
d) Write a note on morphology & reproduction in Funariales.

Q.4 Answer the following. (Any Two) **12**

a) Write a note on reproduction in Psilotum.
b) Give the interrelationship of division Chlorophyta & Cyanophyta.
c) Give the salient features of class Lycopsida.

Q.5 Answer the following. (Any Two) **12**

a) Write a note on anatomy of leaf & reproduction in Equisetum.
b) Give the interrelationship in class Marchantiales & Jungermanniales.
c) Describe classification system of algae proposed by G.M. Smith.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - I) (New) (NEP CBCS) Examination: March/April - 2026
Taxonomy of Angiosperms (2314102)

Day & Date: Monday, 20-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative (MCQ). **08**

1) _____ among the following is an example of family Myrtaceae.
   a) Mangifera b) Clitoria
   c) Leucas d) Psidum

2) Conservation of plants outside their habitat is included under _____.
   a) Conservation b) In-Situ conservation
   c) Ex-Situ conservation d) Tissue culture

3) The species are found very less is called as _____.
   a) Endangered b) Varnuable
   c) Rare d) Endemic

4) Angiosperm phylogeny group (APG) IV was published in _____.
   a) 2004 b) 2010
   c) 2016 d) 2020

5) Bessey's system of classification is _____ system of classification.
   a) Evolutionary b) Natural
   c) Phylogenetic d) Artificial

6) The herbarium specimen is basic tool for plant _____.
   a) Identification b) Nomenclature
   c) Phylogeny d) Classification

7) Isotype is a duplicate of the ____ collected by same author from same locality.
   a) Lectotype b) Holotype
   c) Neotype d) Syntype

8) *Tectona grandis* belongs to family _____.
   a) Annonaceae b) Orchidaceae
   c) Sapotaceae d) Verbenaceae

B) Write True or False. **04**

1) The term ‘Taxonomy’ was coined by A.P. de Candolle.
2) Plant taxonomy is the science of naming and classifying plants.
3) Conservation genetics is important for maintaining genetic diversity.
4) Manilkara zapota belongs to Meliaceae.

Q.2 Answer the following. (Any Six). **12**

a) Define Botanical Garden.
b) Define alpha Taxonomy.
c) What is neotype?
d) Write any two biodiversity hotspots in India.
e) Define In-situ conservation.
f) Write any one rule of ICN.
g) Write any two salient features of family Lamiaceae.
h) Write any two economic importance of family Amaranthaceae.

Q.3 Answer the following. (Any Three) **12**

a) Describe the principles of the Taxonomy.
b) Explain general evolutionary trends in gynoecium.
c) Explain the rule of citation of authority.
d) Describe different conservation strategies.

Q.4 Answer the following. (Any Two) **12**

a) Explain the role of Botanical gardens.
b) Describe maintenance and loss of Biodiversity.
c) Describe salient features of family Bignoniaceae.

Q.5 Attempt the following. (Any Two) **12**

a) Describe the merits of Cronquist system of classification.
b) Describe typological species concept.
c) Give an economic importance of family Poaceae.

Seat No.	

Set P

M.Sc. (Botany) (Semester - I) (New) (NEP CBCS) Examination: March/April – 2026
Plant Growth and Development (2314107)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct from the following: **08**

1) The effect of far-red light on phytochrome is _____.
   a) It activates phytochrome
   b) It inactivates phytochrome
   c) It has no effect
   d) It enhances chlorophyll production

2) Phytochromes exist in _____ form.
   a) Pr and Pfr b) P700 and P680
   c) PhyA and PhyB d) Red and far-red

3) Cryptochromes primarily respond to _____.
   a) UV light b) Red light
   c) Blue light d) Green light

4) Apoptosis is commonly referred to as _____.
   a) Programmed cell death b) Necrosis
   c) Autophagy d) Senescence

5) ___ of the following does NOT typically contribute to the senescence of leaves in plants.
   a) Decrease in chlorophyll production
   b) Increased production of ethylene
   c) Accumulation of toxic metals
   d) Shortening of daylight hours

6) Triacontanol is often used in which type of agriculture?
   a) Organic farming b) Conventional farming
   c) Hydroponics d) All of the above

7) CCC also called as _____.
   a) Chloroform Concentration Control
   b) Cyclocel
   c) Calcium Carbonate Compound
   d) Controlled Crop Chemical

8) Which hormone is primarily responsible for the ripening of many fruits?
   a) Auxin b) Cytokinin
   c) Ethylene d) Gibberellin

B) Write True/False. **04**

1) Apoptosis is called programmed cell death.
2) Phytochromes are interconvertible in nature.
3) The endosperm provides nutritional support to the developing embryo.
4) Auxins are responsible for the ripening of many fruits.

Q.2 Answer the following. (Any Six) **12**

a) Define Senescence.
b) Define Cytochrome.
c) Define seed dormancy.
d) Enlist the names of growth retardants.
e) What is the role of phytochromes?
f) Which part of the seed develops into the Shoot during germination?
g) Write the role of paclobutrazol.
h) Define seed germination.

Q.3 Answer the following. (Any Three) **12**

a) Describe properties of phytochromes.
b) Explain post-harvest technology for leafy vegetables.
c) Describe Programmed cell death.
d) Explain in brief signaling in plants.

Q.4 Answer the following. (Any Two) **12**

a) Describe in brief signaling mechanism of cytokinin.
b) Explain in detail senescence of leaves.
c) Describe role of Maleichydrazide.

Q.5 Answer the following. (Any Two) **12**

a) Give discovery & mechanism of action of Auxin.
b) Describe the role of Arabidopsis thaliana mutants in physiological studies.
c) Describe in brief outline of physiology of seed germination.

Seat No.	

Set | P

M.Sc. (Botany) (Semester - I) (New) (NEP CBCS) Examination: March/April – 2026
Herbal and Drug Technology (2314108)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) Father of Ayurveda is _____.
   a) Raymond b) Charaka
   c) Yogi d) Unani

2) The common name of withania somnifera is _____.
   a) Tulasi b) Ashwandha
   c) Ginger d) Spirulina

3) Biodynamic agriculture is a type of farming where chemical fertilizers are totally replaced with _____ nutrients.
   a) Micronutrients b) Biological
   c) Chemical d) Micronutrients

4) Zingiber officinale is the botanical name of _____.
   a) Onion b) Garlic
   c) Turmeric d) Ginger

5) Traditional system of medicine is also known as _____ medicine.
   a) Indigenous b) Folk
   c) Alternative d) All of these

6) The class of secondary metabolites which is characterized by the presence of the hydroxyl group with an aromatic ring is _____.
   a) Glycosides b) Phenolics
   c) Alkaloids d) Terpenes

7) The disadvantage of ultrasonic extraction is _____.
   a) Formation of free radical b) Low cost
   c) Less time d) All of the above

8) Microwave assisted extraction method are _____.
   a) Energy vector b) Electromagnetic energy
   c) Both a & b d) Preparation of antibodies

B) Fill in the blanks. **04**

1) Ayur means _____ Veda means _____.
2) Drugs & Cosmetic Act come in _____.
3) IPR stands for _____.
4) Dextrorotatory (+) means _____.

Q.2 Answer the following. (Any Six) **12**

a) What is pest? Types of paste.
b) Write the advantage of biopesticides.
c) Write the basic principle of GMP.
d) What is traditional knowledge?
e) Write the advantages of phycosomes.
f) Give the application of *Spirulina.*
g) Write the disadvantage of herbal excipients.
h) What is the trade of medicinal plants in India?

Q.3 Answer the following. (Any Three) **12**

a) What is churna? and explain the method of preparation.
b) Write the sources and uses of Indian gooseberry.
c) What is Ayurveda? Write the basic principles of Ayurveda.
d) Add a note on Bioprospecting.

Q.4 Answer the following. (Any Two) **12**

a) Write down in detailed about Dandruff treatment by herbal drugs.
b) Describe in detailed about raw material in herbal drug industry.
c) What is IPR? Give its types and explain in detail about it.

Q.5 Answer the following. (Any Two) **12**

a) Describe the various stages of processing of good agriculture practices.
b) Define pest. Give the various methods of pest control.
c) Write down in the detailed about herbal formulations.

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M.Sc. (Botany) (Semester - I) (New) (NEP CBCS) Examination: March/April - 2026
Research Methodology (2314103)

Day & Date: Friday, 24-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) What does IPR stand for?
   a) International Property Rights
   b) Intellectual Public Rights
   c) International Patent Rights
   d) Intellectual Property Rights

2) Which of the following is NOT a type of Intellectual Property?
   a) Copyright b) Patent
   c) Trademark d) Ownership rights over land

3) Which form of IPR protects literary and artistic works?
   a) Patent b) Copyright
   c) Trademark d) Trade Secret

4) Which of the following protects inventions and innovations?
   a) Copyright b) Patent
   c) Trademark d) Geographical Indication

5) Applied research is conducted to _____.
   a) Develop theories and principles
   b) Test scientific hypotheses
   c) Solve specific, practical problems
   d) Explore general phenomena

6) Which of the following is a characteristic of descriptive research?
   a) It explains the cause-and-effect relationship
   b) It focuses on describing characteristics or phenomena
   c) It tests new theories
   d) It applies statistical tools to manipulate data

7) What is primary data?
   a) Data that is collected from previously published sources
   b) Data that is collected directly by the researcher for a specific purpose
   c) Data that is generated through computer simulations
   d) Data that has been summarized and interpreted by others.

8) What is a Citation Index?
   a) A tool used to measure the number of words in a document
   b) A database that lists articles and tracks the references or citations made in scholarly work
   c) A collection of articles from popular magazines
   d) An index used for identifying library catalog numbers

B) Write True /False. **04**

1) What does a trademark protect software?
2) Coca-Cola formula is an example of a "trade secret"
3) Primary data can be both qualitative and quantitative
4) Explanatory research primarily concerned with understanding 'why' and 'how'?

Q.2 Answer the following (Any Six) **12**

a) What is meaning of research?
b) What is research problem?
c) Types of sampling.
d) What is ANOVA?
e) What is citation index?
f) What is h index?
g) What are main types of IPR?
h) What is trade secretes?

Q.3 Answer the following. (Any Three) **12**

a) Write objectives of research.
b) Types of sampling, Explain steps in sampling.
c) Explain Mode of paper communication.
d) Describe copyright and trademarks with suitable example.

Q.4 Answer the following. (Any Two) **12**

a) Describe in brief formulation of hypothesis.
b) What is primary data? Describe method of collection of primary data.
c) Explain ISSN and ISBN.

Q.5 Answer the following (Any Two). **12**

a) Describe steps in research.
b) What is standard deviation? Describe variance and correlation.
c) Describe criteria and procedure of patenting.

Seat No.	

Set P

M.Sc. (Botany) (Semester - II) (New) (NEP CBCS) Examination: March/April – 2026
Biology and Diversity of Gymnosperm and Paleobotany (2314201)

Day & Date: Thursday, 16-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) 08

1) _____ is serves as a connecting link between the angiosperms and gymnosperms.
   a) Gnetales b) Coniferales
   c) Ginkgoales d) Cycadales

2) In gymnosperms, the ovules typically arc _____.
   a) bitegmic and anatropous
   b) bitegmic and orthotropous
   c) unitegmic and orthotropous
   d) unitegmic and anatropous

3) Fossiliferous area in India to which Prof. Sahni gave special attention was _____.
   a) Rajmahal hills of Bihar and Salt range
   b) Shivalik Hills of Northern Himalaya
   c) Karakoram Hills
   d) None of the above

4) The Birbal Sahni Institute of Paleobotany was established in the year _____.
   a) 1942 b) 1943
   c) 1946 d) 1948

5) Fossils are most common in _____ rock types.
   a) sedimentary b) igneous
   c) metamorphic d) All of these

6) Flowers and cones are similar because of _____.
   a) both assist seed dispersal
   b) both attracting insects to pollinate
   c) both are shiny and bright
   d) both are reproductive structures

7) _____ is the process in which bacteria turn the plant life into carbon.
   a) Mineralization b) Encrustation
   c) Distillation d) Carbonization

8) The plant body of _____ resembles that of living cycads.
   a) Bennettitales b) Pentoxylales
   c) Conferiales d) Cordaitales

B) Write True /False. **04**

1) Tallest known gymnosperm is Sequoia.
2) Phanerogams without the ovaries are Pteridophytes.
3) Rodeites belongs to order - Filicales.
4) Stigmaria belongs to order - Lepidodendrales.

Q.2 Answer the following. (Any Six) **12**

a) Define phylogeny.
b) What is Paleobotany?
c) Enlist types of fossils.
d) What is fossilization?
e) Enlist the fossil genera of Psilophytales.
f) Define Gymnosperms.
g) Enlist the fossil genera of Calamitales.
h) Enlist any two fossil plant species.

Q.3 Answer the following. (Any Three) **12**

a) Comment upon general morphology of Filicales.
b) Comment upon evolutionary trends in Bennettitales.
c) Comment upon phylogeny of Cycadales.
d) Enlist the salient features of Ginkgoales.

Q.4 Answer the following. (Any Two) **12**

a) Explain in brief Indian fossil flora.
b) Explain in brief process of fossilization.
c) Comment upon general morphology of Welwitschiales.

Q.5 Answer the following. (Any Two) **12**

a) Explain in brief modern trends in classification of Gymnosperms.
b) Comment upon economic importance of Gymnosperms.
c) Explain in brief evolutionary trends in Coniferales.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2026
Advances in Pathology (2314202)

Day & Date: Saturday, 18-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Draw neat and labelled sketches wherever necessary.
3) Figures to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ). **08**

1) Which of the following disease caused by *Plasmopara viticola?*
   a) Powdery mildew of teak b) Rust of jowar
   c) Downy mildew of grapes d) Leaf spot of brinjal

2) Defense mechanism is involved in ____.
   a) Minimizing the infection b) Increasing the infection
   c) Plant disease resistance d) Host susceptibility

3) Disease triangle is caused by ____.
   a) Host, pathogen and symptoms
   b) Host, pathogen and viruses
   c) Host, pathogen and fungicides
   d) Host, pathogen and environment

4) The phytoalexins are involved in ____.
   a) Physiological defense mechanisms
   b) Structural defense mechanisms
   c) Ecological defense mechanisms
   d) None of the above

5) Characteristic appearance of plant disease is called as ____.
   a) Severity b) Resistance
   c) Symptoms d) Epidemics

6) Plant pathologists should know the knowledge of ____.
   a) Plant physiology b) Plant anatomy
   c) Plant genetics d) All of the above

7) Shoot disease of sugarcane is called due to ____.
   a) Leaves like appearance of roots
   b) Root like appearance of stem
   c) Stem like appearance of leaves
   d) Grass like appearance of the stem

8) The plants easily influenced by pathogen called as ____.
   a) Resistant b) Susceptible
   c) Eradicate d) None of the above

B) Write True/False. **04**

1) Using of chemicals for disease controlling is one of the eco-friendly method.
2) Plant disease causing fungi are always pathogenic.
3) A diseases spread through soil are called as soil borne diseases.
4) *Puccinia* fungus is causes the rust diseases of plants.

Q.2 Answer the following. (Any Six) **12**

a) What is plant defense mechanism?
b) What is epidemiology?
c) Write on any two characters of plant pathogenic viruses.
d) What is root parasite?
e) Write on phanerogamic plant parasites.
f) Give the symptoms of downy mildew diseases.
g) Write the name of any two smut diseases of plants.
h) What is difference between MLO's and Bacteria?

Q.3 Answer the following. (Any Three) **12**

a) Write short note on protection.
b) Write short note on BMV disease.
c) Write short note on any one bacterial disease studied by you.
d) Write short note on club root of crucifer disease.

Q.4 Answer the following. (Any Two) **12**

a) Comment on the methods of diagnosis of plant diseases.
b) Write on slow and rapid epiphytotics.
c) Comment on chemical controlling of plant diseases.

Q.5 Attempt the following. (Any Two) **12**

a) Give the classification of plant diseases.
b) Comment on classification, morphology and characteristics of MLO's.
c) Write the characters of plant pathogenic algae. Add a note on any one algal disease of plant.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2026
Crop Physiology (2314207)

Day & Date: Tuesday, 21-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ). **08**

1) In ripening fruits _____ hormone is present.
   a) Auxin b) ABA
   c) Ethylene d) Polyglycol

2) CIMAP has the headquarter at _____.
   a) Nasik b) Bangalore
   c) Lucknow d) Pune

3) _____ among the following is an example of straight fertilizer.
   a) Urea b) Diammonium phosphate
   c) Nitrophosphate d) Ammonium phosphate

4) What are frits?
   a) Nutrients
   b) Minerals
   c) Micronutrients mixed with special glass
   d) Macronutrients mixed with special type of glass

5) Basically, growth hormones are present at _____.
   a) Root b) Shoot apex
   c) Lateral branches d) Stem

6) Critical period of day plant is _____.
   a) 16 -18 hrs light period b) 16-18 hrs dark period
   c) 8 hrs dark period d) 8 hrs light period

7) First phage in growth curve is _____.
   a) Lag phase b) Log phase
   c) Exponential phase d) Death phase

8) _____ type of fertilizers are toxic.
   a) Insoluble
   b) Soluble
   c) Which shows white precipitate on soil
   d) Evaporating

B) Write true/false. **04**

1) The herbicides which can be applied for many herbs are called as Broad spectrum.
2) CIMAP works for medicinal plants.
3) Diphenyl impregnated paper used to increase shelf life of fruits.
4) Basically Auxin & GA composition of growth hormone used to promote growth.

Q.2 Answer the following. (Any Six) **12**

a) Define weedicide.
b) Define growth.
c) Define types of plants under photoperiodism.
d) Define vernalization.
e) Key nutrients in groundnut.
f) Define source sink relationship.
g) Write condition required for growth of sugarcane.
h) Causes of devernalization.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on source sink relationship.
b) Write a note on Physiological yield of cotton.
c) Write mandates of IARIT.
d) Write a note on nitrogen fixation in chick pea.

Q.4 Answer the following. (Any Two) **12**

a) Write a note on cryopreservation.
b) Write mandates of CIMAP.
c) Write a note on types of fertilizers.

Q.5 Attempt the following. (Any Two) **12**

a) Write a note on Post harvest technology for vegetables.
b) Write a note on applications of cytokinine.
c) Write role & mandates of BARC.

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Seat No.	

Set P

M.Sc. (Botany) (Semester - II) (New) (NEP CBCS) Examination: March/April - 2026
Angiosperm Systematics (2314208)

Day & Date: Tuesday, 21-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ). 08

1) Linnaeus published his book of *Systema nature* in _____.
   a) 1735 b) 1835
   c) 1839 d) 1738

2) American biologist _____ proposed the removal of fungi into a separate kingdom.
   a) Linnaeus b) R.H. Whittaker
   c) Chattan d) Huxley

3) Grouping organism based on a set of rules _____.
   a) Taxonomy b) Phenology
   c) Systematics d) ICBN

4) One or more than one similar families constitute _____.
   a) Phylum b) Genera
   c) Species d) Order

5) GPS strands for _____.
   a) Global positioning system
   b) Global protocol system
   c) Government positioning system
   d) Goa protocol system

6) The genus _____ has been separated from *Melia* among other feature by the presence of unipennate leaves as against bipinnate in the latter.
   a) *Polyanthus* b) *Azadirachta*
   c) *Cosmos* d) *Tamarindus*

7) Out of following _____ is a common method used to preserve plant specimens in a herbarium.
   a) Freezing b) Immersing in water
   c) Drying d) Painting with preservatives

8) In Bentham and Hooker system of classification, _____family belongs to order Rosales.
   a) Celastraceae b) Rosaceae
   c) Sapotaceae d) Lamiaceae

B) Fill in the blanks. **04**

1) The Halotaxonomic phase consider under _____ type of taxonomy.
2) Lal Bagh botanical garden is located in _____.
3) in _____ series embryo curved around the endosperm and ovule usually one.
4) Family Onagraceae is characterized by _____ type of embryo sac.

Q.2 Answer the following. (Any Six) **12**

a) What is three kingdom system of classification?
b) Write the application of GPS.
c) Define palynology.
d) Give the names any two herbaria of the world.
e) What do you mean by revisions?
f) What are Arboreta?
g) What are the three components of GPS?
h) Write down any four characters of order ebenales.

Q.3 Answer the following. (Any Three) **12**

a) Write a short note on five kingdom system of classification.
b) What is GIS? Write down the component of GIS.
c) Give the functions of herbarium.
d) Write a short note on taxonomic evidence with respect to cytology.

Q.4 Answer the following. (Any Two) **12**

a) Give the brief account of Steps in biosystematics.
b) Explain in details websites used in plant identification.
c) Define Palynology. Add a short note on taxonomic evidences with respect to palynology.

Q.5 Attempt the following. (Any Two) **12**

a) Give the brief account on Advancement levels in systematics.
b) Add a note on following websites:
   1) The plant list.
   2) Efloras
c) Describe in detail the order Rubiales as per Bentham and Hooker system of classification.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - III) (New) (NEP CBCS)
Examination: March/April – 2026
Plant Embryology and Palynology (2314301)

Day & Date: Friday, 17-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw a neat, well labeled, complete diagram wherever necessary.

Q.1 A) Choose correct answer from given alternative: **08**

1) Anther wall shows presence of _____ layers.
   a) 3 b) 4
   c) 5 d) 6

2) In hibiscus pollens are _____.
   a) Porate b) Colpate
   c) Colporate d) Shiny

3) In palynology different diseases caused due to _____.
   a) Pathogen b) Viruses
   c) Bacteria d) Allergic pollen

4) In angiosperms anthers were _____.
   a) Sporangiate b) Tetrasporangiate
   c) Pentamerous d) All

5) _____ among the following is a type of monosporic embryosac.
   a) Edymeon b) Allium
   c) Drusa d) Penea

6) In angiosperms embryosac is _____ nucleated.
   a) 3 b) 4
   c) 5 d) 8

7) Process of formation of megaspores is called as _____.
   a) Sporogenesis b) Genesis
   c) Microsporogenesis d) Megasporogenesis

8) _____ among following used as a tool of identification of plants in palynology.
   a) Axis b) Colour
   c) Pollen d) Soil

B) Write True or False. **04**

1) Angiosperm ovule shows two integuments.
2) Aeropalynology is the branch of palynology.
3) In megasporogenesis only nuclear divisions occur.
4) Entry of pollen through integument is called Porogamy.

Q.2 Answer the following. (Any Six) **12**

a) Write a note on polyembryony.
b) Write a note on apomixis.
c) Write a note on anther wall.
d) Write note on typical structure of ovule.
e) Define parthenocarpy.
f) Define plant embryology.
g) Draw well labelled diagram of Bisporic embryo sac.
h) Define palynology.

Q.3 Answer the following. (Any Three) **12**

a) Describe in detail process of megasporogenesis.
b) Describe in detail causes of Polyembryony.
c) Describe role of Palynology in agriculture.
d) Write a note on allergic pollens.

Q.4 Answer the following. (Any Two) **12**

a) Describe in detail process of microsporogenesis.
b) Describe in detail Bisporic embryo sac.
c) Describe in detail role of Palynology in taxonomy.

Q.5 Answer the following. (Any Two) **12**

a) Describe somatic embryogenesis.
b) Describe Palynotaxonomy.
c) Describe pollen calendars & its importance.

Seat No.	

Set P

M.Sc. (Botany) (Semester - III) (New) (NEP CBCS) Examination: March/April - 2026
Cytogenetics and Crop Improvement (2314302)

Day & Date: Monday, 20-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) BLAST stands for _____.
   a) Basic Local Alignment Tool
   b) Base Local Alignment Technique
   c) Basic Logic Alignment tool
   d) Base Logic Alignment Tool

2) The sign that signifies the goods by different name, design, logo, symbol is called _____.
   a) Copyright b) Trade mark
   c) Patent d) Trade secrete

3) The group of genes within an organism that shares a common evolutionary origin and have similar functions is called _____.
   a) Gene amplification b) Gene conversion
   c) Gene family d) Gene modification

4) The duration of the Patent is _____ years.
   a) 10 b) 20
   c) 30 d) 50

5) _____ is the process of determining the location of genes and DNA sequences on chromosomes.
   a) Chromosome mapping b) Recomination
   c) Crossing over d) Gene conversion

6) IPR stands for _____.
   a) Intellectual Property Rights b) International Property Rights
   c) Indian Property Rights d) Intellectual Prosperous Rights

7) In hybridoma technology monoclonal antibodies are produced by fusing B-cells with _____.
   a) Myeloma cells b) WBC
   c) RBC d) T- cells

8) _____ sites are the DNA sequences that act as a recombination hotspot.
   a) Chi
   b) Telomere
   c) Centriole
   d) Spindle fibres

B) Write True/False. **04**

1) The patent can be granted for discovery of any living organism.
2) DNA sequences that move from one location on the genome to another is called Jumping genes.
3) Bt cotton, Golden rice are Transgenic plant.
4) Proteomics deals with structure, functions, expressions and interactions of genes.

Q.2 Answer the following. (Any Six) **12**

a) Define Crossing over.
b) What is gene conversion?
c) Explain Trade secrete.
d) What is GenBank?
e) Enlist the proteins involved in eukaryotic recombination.
f) Define somatic cell.
g) What is gene amplification?
h) Define transgenic plants.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on Gene Families.
b) Explain the role of Genetic markers.
c) Give the uses of bioinformatics in biological researches.
d) Explain the Hybridoma technology.

Q.4 Answer the following. (Any Two) **12**

a) Explain the process of Somatic hybridization.
b) Describe BLAST and give its types.
c) Write a note on molecular mechanism of Recombination.

Q.5 Answer the following (Any Two). **12**

a) Explain Protein Data Bank (PDB).
b) Describe the domains of IPR.
c) Explain the organization of genome in prokaryotes.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - III) (New) (NEP CBCS) Examination: March/April – 2026
Advances in Plant metabolism and Biochemistry (2314306)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 PM

Instructions: 1) All questions are compulsory.
2) All questions carry equal marks.
3) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) In mitochondria ATP formation is carried out by _____.
   a) ATPase b) Catalase
   c) Peroxidase d) None of these

2) First ejected electron in photosystem I accepted by _____.
   a) FRS b) pQ
   c) PGAL d) O_2

3) In C_4 plants _____ acts as CO_2 acceptor.
   a) PEPA b) Malic acid
   c) OAA d) RUBP

4) Glycolysis is also known as _____.
   a) EMP pathway b) Pentose Phosphate pathway
   c) Chloroplast d) Peroxisomes

5) Reaction centre in PS I is _____.
   a) M200 b) P670
   c) P600 d) P700

6) Phosphorus uptake in alkali soil in the form of _____.
   a) $H_2PO_4^-$ b) HPO_4^{2-}
   c) PO_4^{3-} d) $\mathrm{H_3PO_4}$

7) _____ of the following is NOT the class of secondary metabolite.
   a) Terpenes b) Amino acids
   c) Phenolics d) Alkaloids

8) CAM pathway present in _____ plant members.
   a) Braceacaceae b) Casurinaceae
   c) Crassulaceae d) Apiaceae

B) Write True or False. **04**

1) Glycolysis is a type of respiration.
2) Rubisco is one of the products of respiration.
3) Photolysis takes place in Photo system I.
4) Pentose phosphate pathway shows IV complex.

Q.2 Answer the following. (Any Six) **12**

a) Write a note on glycolysis.
b) Write a note on any two types of secondary metabolites.
c) Write a note on Photosystem I.
d) Write note on ultra structure of chloroplast.
e) What is phosphate uptake?
f) Give any 4 names of aromatic amino acids.
g) What are secondary metabolites?
h) Give the forms of Sulphur in soil.

Q.3 Answer the following. (Any Three) **12**

a) Describe in detail light reaction in photosynthesis.
b) Describe in detail shikimic acid pathway.
c) Write a note on regulation in Rubisco.
d) Write a note on sulphate metabolism.

Q.4 Answer the following. (Any Two) **12**

a) Describe phosphate metabolism in plants.
b) Describe in detail Pentose phosphate pathway.
c) Describe in detail Electron Transport Chain.

Q.5 Answer the following. (Any Two) **12**

a) Comparative account of photosynthesis & respiration.
b) Describe in brief integration of major metabolic pathways in plants.
c) Compare between C_3 and C_4 pathway.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - III) (New) (NEP CBCS) Examination: March/April – 2026
Recent Trends in Angiosperm Taxonomy (2314307)

Day & Date: Wednesday, 22-04-2026 Max. Marks: 60
Time: 11:00 AM To 01:30 AM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Select the correct alternative and rewrite the sentence. 08

1) The term karyotype refers to _____.
   a) Protein structure
   b) Number and appearance of chromosome
   c) DNA base sequence
   d) Cell membrane composition

2) In numerical taxonomy, the process of grouping species based on similarity coefficient is known as _____.
   a) Clustering b) Dendrogram
   c) Phylogeny d) Morphometry

3) _____ is a digitized collection of images of preserved plants or plant parts.
   a) E-herbarium b) Literature
   c) Manual d) Monograph

4) The branch of taxonomy closely related to the biochemistry is called _____.
   a) Chemotaxonomy b) Omega taxonomy
   c) Cytotaxonomy d) Beta taxonomy

5) In chemotaxonomy, organisms are classified with the help of _____.
   a) DNA sequences b) Proteins and lipids
   c) Chlorophyll content d) Morphological features

6) In APG III system, highest taxonomic rank is _____.
   a) Kingdom b) Phylum
   c) Class d) Order

7) In an e-Herbarium, image is typically stored in _____format.
   a) Only text
   b) Physical photographs
   c) Digital images, often in JPG or TIFF formats
   d) audio recordings

8) Which of the following techniques are used in Transmission Electron Microscopy (TEM) for examining cellular structure?
   a) Negative-Staining
   b) Shadow Casting
   c) Ultrathin Sectioning
   d) Negative-Staining, Shadow Casting, Ultrathin Sectioning, Freeze-Etching

B) Fill in the blanks. **04**

1) APG-III system of recognizes _____ major clades within the Angiosperm.
2) The Indian Virtual Herbarium (IVH) was developed by the _____ under the Government of India's Programme Digital India Initiatives.
3) In numerical taxonomy, a group of OTU with defined levels of similarity is called _____
4) _____ is used as chemical markers commonly used in chemotaxonomy to identify species in the genus Citrus.

Q.2 Answer the following. (Any Six) **12**

a) What is E- herbarium?
b) Write down any four merits of Numerical Taxonomy.
c) What is cytotaxonomy?
d) What is SEM?
e) What is role of chloroplast DNA in Plant taxonomy?
f) Write down any four demerits of APGs system III.
g) What any one advantage of flavonoids in plant taxonomy?
h) What is karyotype?

Q.3 Answer the following. (Any Three) **12**

a) Write a short note on origin of chemotaxonomy.
b) Write a short note on cladogram.
c) Write down the merits of APG III system of classification.
d) Give the brief account on preparation of E-Herbarium.

Q.4 Answer the following. (Any Two) **12**

a) Define chemotaxonomy and describe in brief group of chemical constituents of plants.
b) Write the applications of numerical taxonomy.
c) Add a short note on cladistics.

Q.5 Answer the following. (Any Two) **12**

a) Discuss the steps in chemotaxonomic investigations.
b) Write a short note on APG III system of classification.
c) Explain the role of chromosome number and structure in cytotaxonomy.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - IV) (New) (NEP CBCS) Examination: March/April – 2026
Phytogeography & Plant Ecology (2314401)

Day & Date: Thursday, 16-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) Hot spots shows presence of _____.
   a) RET plants b) Thorny plants
   c) Deciduous plants d) Tropical plants

2) Prain & Burkill divide India in to _____ region.
   a) 13 b) 14
   c) 15 d) 17

3) In social forestry _____.
   a) Land is created by peoples for cultivation of plants
   b) Peoples come together
   c) Tree cutting by community
   d) Forestry made by peoples

4) Mangrove vegetation is found around _____.
   a) Temparate area b) Tropical area
   c) Coastal area d) Desert area

5) In gene banking _____.
   a) Storage of seeds b) Storage of chromosome
   c) Colling of plants d) Harvesting fruits

6) Continuous distribution is _____.
   a) Plants divided by barrier
   b) Plants with continuous distribution without any barrier
   c) Rare
   d) Endemic

7) Riedely endemism concept was dependent on _____.
   a) Geography b) Endemism
   c) Rare plants d) Huge plants

8) Phytogeography is _____.
   a) Branch of science deals with origin
   b) Branch of science deals with distribution
   c) Branch of science deals with origin & distribution of environment
   d) Branch of science which deals with origin & distribution of plants & animals

B) Write True or False. **04**

1) The plants which are on the verge of becoming extinct called as endangered.
2) Botanical gardens is in-situ way of conservation.
3) Green credit programme include tree plantation.
4) Biodiversity act established in the year 2025.

Q.2 Answer the following. (Any Six) **12**

a) Define RET.
b) Define hotspots.
c) Define biodiversity.
d) Define green belt.
e) Define green credit.
f) Define continental drift.
g) Define alpha biodiversity.
h) Define Endemism.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on western ghat vegetation.
b) Write a note on biological diversity act 2002.
c) Write a note on Maharashtra tree act 1975.
d) Write a note on age & area hypothesis.

Q.4 Answer the following. (Any Two) **12**

a) Write a note on mangrove vegetation in India.
b) Write a note on phytogeographical regions of India.
c) Write a note on different ways of conservation of biodiversity.

Q.5 Answer the following. (Any Two) **12**

a) Write a note on forest conservation act.
b) Write a note on propagation of greenbelt plants.
c) Write a note on role of NGO in conservation of biodiversity.

Seat No.	

Set **P**

M.Sc. (Botany) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2026
Plant Tissue Culture, Greenhouse Technology & Hydroponics (2314402)

Day & Date: Saturday, 18-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.

Q.1 A) Choose correct alternative. **08**

1) The main objective of plant tissue culture is _____.
   a) Soil improvement b) Hybridization
   c) Pest control d) Mass propagation

2) Sterilization is essential to _____.
   a) Increase growth b) Reduce nutrients
   c) Avoid contamination d) Improve light

3) Callus culture involves _____.
   a) Unorganized mass of cells b) Organized tissue
   c) Root formation d) Leaf growth

4) Somatic embryogenesis produces _____.
   a) Seeds b) Pollen
   c) Fruits d) Embryos from somatic cells

5) Anther culture is used for production of _____.
   a) Haploids b) Diploids
   c) Triploids d) Polyploids

6) Greenhouse controls _____.
   a) Soil pH b) Environmental factors
   c) Only water d) Only nutrients

7) Hydroponics means _____.
   a) Soil cultivation b) Sand culture
   c) Air cultivation d) Water-based cultivation

8) Bioreactors are used in _____.
   a) Large-scale cell culture b) Field cultivation
   c) Seed storage d) Fertilization

B) Fill in the blanks. **04**

1) In tissue culture, for sterilization of nutrient media ____is used.
2) IBA is commonly used and very effective for _____ initiation.
3) _____ seeds are artificially encapsulated embryos.
4) Hydroponics is a _____ less cultivation method.

Q.2 Answer the following. (Any Six) **12**

a) Define plant tissue culture.
b) What is sterilization?
c) Define callus.
d) What is somatic embryogenesis?
e) Define greenhouse.
f) What is hydroponics?
g) What is embryo rescue?
h) Define meristem culture.

Q.3 Answer the following. (Any Three) **12**

a) Write a note on factors affecting morphogenesis.
b) Explain the steps of media preparation in tissue culture.
c) Write the applications of synthetic seeds.
d) Give the types of hydroponics.

Q.4 Answer the following. (Any Two) **12**

a) Explain in brief Laboratory design for tissue culture.
b) Describe in brief Greenhouse management.
c) Describe the steps involved in Callus culture with its applications.

Q.5 Answer the following. (Any Two) **12**

a) Explain in brief anther culture with its significance.
b) Write Hydroponics techniques with its applications.
c) Describe in brief cell suspension culture.

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Seat No.	

Set P

M.Sc. (Botany) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2026
Environmental Plant Physiology (2314405)

Day & Date: Tuesday, 21-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Rewrite the following sentences by choosing correct alternative: 08

1) Slat glands are present in halophytes showing _____ Phenomenon.
   a) Salt evasion b) Salt tolerant
   c) Salt insensitive d) All of these

2) Chilling injury occurs when warm region plants are exposed to a temperature of _____.
   a) 0 - 10^0C b) 10 - 15^0C
   c) 25 - 35^0C d) less than 0^0C

3) _____ gas of the atmosphere holds up ultraviolet rays.
   a) Helium b) O_2
   c) N_2 d) CO_2

4) $CaSO_4$ is used for reclamation of _____ Soil.
   a) Acidic b) Alkaline
   c) Saline d) Marshy

5) Tissue water potential is measured in the units of _____.
   a) Amperes b) Volts
   c) Calories d) Megapascals

6) Electrical conductivity of typical saline soil is _____.
   a) Less than 4ds b) More than 4ds
   c) Equal to zero d) Not measurable

7) Accumulation of glycine betaine is observed in some crops in response to _____.
   a) Water stress b) Flooding
   c) Pollution stress d) All of these

8) Depletion of ozone increases the amount of _____ radiations reaching the globe.
   a) Visible b) UV
   c) IR d) Gamma

B) Write True/False. **04**

1) Hypersensitive response in plants occurs within 24 hrs. on pathogen infection to plants.
2) Jasmonic acid biosynthesis takes place in cytoplasm.
3) Antifreeze proteins do not have ability to inhibit the ice crystal growth during chilling stress.
4) Biotic stress in plants is caused by bacterial, nematode and fungal pathogen.

Q.2 Answer the following (Any Six) **12**

a) Which enzyme plays an important role in the development of aerenchyma in wetland species?
b) Define Acclimation.
c) Which gas in the atmosphere hold up the UV rays.
d) What is the Electrical conductivity of typical saline soil?
e) Which phytohormone occurs during waterlogging?
f) What is elastic strain in plants?
g) Define stress.
h) Causes of pollution stress

Q.3 Answer the following (Any Three) **12**

a) Heat shock proteins
b) Reclamation of saline soils
c) Phytoremediation
d) Causes of water logging

Q.4 Answer the following (Any Two). **12**

a) Effect of air pollutant on plant metabolism
b) Give brief account of distribution of salt affected soils in India.
c) Explain the effects of UV rays on plants.

Q.5 Answer the following (Any Two). **12**

a) Explain in brief heavy metal stress tolerance in plants.
b) Explain in brief reactive oxygen species.
c) Describe Effect of High and low temperature stress on plant metabolism.

Seat No.	

Set | P

M.Sc. (Botany) (Semester - IV) (New) (NEP CBCS) Examination: March/April - 2026
Industrial Botany (2314406)

Day & Date: Tuesday, 21-04-2026 Max. Marks: 60
Time: 03:00 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) **08**

1) Which of the following is NOT a qualitative phytochemical test?
   a) Mayer's test b) Salkowski test
   c) Shinoda test d) HPLC

2) _____ is obtained from a bark.
   a) Cinchona b) Ginger
   c) Senna d) Ephedra

3) *Spirulina* is a biomass of _____.
   a) Cynobacteria b) Blue green algae
   c) a) and b) d) None of these

4) Infusions are typically used to extract _____.
   a) Volatile oils
   b) Insoluble minerals
   c) Water-soluble, heat-sensitive plant components
   d) Proteins

5) The main reason for using fungi in industrial enzyme production is ____.
   a) They reproduce sexually
   b) They require complex media
   c) They secrete enzyme extracellularly
   d) They are photosynthetic

6) The scientific name of Tulsi (Holy Basil) is _____.
   a) *Azadirachta indica* b) *Ocimum sanctum*
   c) *Withania somnifera* d) *Emblica officinalis*

7) Ferric chloride test is commonly used to detect: _____.
   a) Alkaloids b) Phenolic compounds
   c) Saponins d) Flavonoids

8) Which medicinal plant is known as "Indian Ginseng"?
   a) Tulsi b) Ashwagandha
   c) Brahmi d) Amla

B) Fill in the blanks. **04**

1) SCP stands for _____.
2) Botanical name of arjuna is ____.
3) MAE stands for _____.
4) Inferiority refers to _____.

Q.2 Answer the following. (Any Six) **12**

a) Give the advantage of single cell protein.
b) Define pharmacognosy.
c) Write the uses of soxhlet extraction.
d) Give the Medicinal properties of curcurmin.
e) Define drug adulteration.
f) Define Biofuel.
g) What is antibiotics?
h) What is morphine?

Q.3 Answer the following. (Any Three) **12**

a) Write down the significance of pharmacopeial standards.
b) Write down the identification and utilization of Garlic.
c) Write down the ultrasound assisted extraction.
d) Add a note on alkaloids.

Q.4 Answer the following. (Any Two) **12**

a) Explain in brief algal technology
b) Describe in detailed about sources of crude drugs.
c) What is aspirin? Give its sources, chemical nature and medicinal properties.

Q.5 Answer the following. (Any Two) **12**

a) Describe in detail about adulteration and drug evaluation.
b) Define sugars. Give the classification and medicinal properties of sugars.
c) Write down in detail about identification and utilization of amla powder.