

**FOURTH SEMESTER M.Sc. DEGREE [REGULAR/SUPPLEMENTARY]
EXAMINATION, APRIL 2022**

(CBCSS)

Botany.

BOT 4E 02 3—GENETIC ENGINEERING

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Part A

Answer any four questions.

Each question carries 2 weightage.

1. The _____ is a start codon and _____ is a stop codon.
2. Why glycerol or sucrose is used in the loading dye of agarose gel electrophoresis ?
3. What is the function of 'ori' in a plasmid vector ?
4. Name two different enzymes used in rDNA technology ?
5. Name two methods used for non-vector mediated gene transfer ?
6. Explain RAMPO ?
7. Explain hair-pin formation of primers used in PCR ?

(4 × 2 = 8 weightage)

Turn over

Part B

Answer any four questions.

Each question carries 3 weightage.

8. Explain reverse-transcriptase PCR ?
9. Differentiate microsatellite and minisatellite markers ?
10. What is Genetic fingerprinting ?
11. What is the role of Ti Plasmid in genetic engineering ?
12. Give a brief note on north-western blotting technique ?
13. What are GM crops ?
14. What is a genomic Library ?

(4 × 3 = 12 weightage)

Part C

Answer any two questions.

Each question carries 5 weightage.

15. Explain single gene cloning and expression of a recombinant protein ?
16. Discuss gene therapy, viral and non-viral approaches in transgenics ?
17. Give an account of Northern Blotting analysis ?
18. Give an account of molecular markers and its applications ?

(2 × 5 = 10 weightage)

**FOURTH SEMESTER M.Sc. DEGREE [REGULAR/SUPPLEMENTARY]
EXAMINATION, APRIL 2022**

(CBCSS)

Botany

BOT 4E 02 2—PATHOLOGY OF PLANTATION CROPS AND SPICES

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

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Part A

I. Write short answer on any *four* of the following :

- 1 What is contact fungicide ? Write an example.
- 2 Write the symptoms and control measures of stem bleeding in coconut.
- 3 Write the principle of integrated pest and disease management.
- 4 Explain the principle of biological control.
- 5 How systemic protection different from that of surface protectants.
- 6 Write the general symptoms of fungal diseases in plants.
- 7 How avoidance techniques useful for disease and pest management.

(4 × 2 = 8 weightage)

Turn over

Part B

II. Write a short essay on any *four* of the following :

- 8 Briefly explain different types of fungicides.
- 9 Write the mode of action of pesticides.
- 10 Write a brief account on the bud rot of coconut.
- 11 Write the chemistry of bactericides.
- 12 Write the advantages of integrated pest and disease management.
- 13 Give a brief account on the diseases caused by pests on spice crops.
- 14 Write the causes and management of nut fall of Areca.

(4 × 3 = 12 weightage)

Part C

III. Write an essay on any *two* of the following :

- 15 Write an essay on the major pathogens of crop plants.
- 16 Write an account on the major sources of Botanicals as plant protectants, their active principles and mode of their applications.
- 17 Give a short account on the biocontrol agents used for plant protection and their mode of action.
- 18 Write the symptoms, causative organism and control measures of two diseases found in cardomom.

(2 × 5 = 10 weightage)

**FOURTH SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, APRIL 2022**

(CBCSS)

Botany

BOT4E016—GENETIC AND CROP IMPROVEMENT

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend **all** questions in each section.*
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I. Write short answer on any *four* of the following. Each question carries 4 weightage.

- 1 Explain the term dichogamy.
- 2 What is plant domestication ?
- 3 Write the floral biology of Cardamom
- 4 Write the significance of sexual reproduction in plants.
- 5 Write the mechanism of action of Colchicine in chromosome duplication.
- 6 Name one ICAR institute in Kerala and write about the area of research in the Institute.
- 7 Differentiate vertical and horizontal disease resistance.

(4 × 2 = 8 weightage)

Turn over

II. Write short essay on any *four* of the following. Each question carries 3 weightage :

- 8 Write the floral biology and propagation of rubber.
- 9 Briefly explain the mechanism of disease resistance.
- 10 Write the origin and evolution of wheat.
- 11 Briefly explain the farmer's right and Plant breeders' right.
- 12 Explain the process of seed certification.
- 13 Give an account on the applications of distant hybridization in Plant Breeding.
- 14 Briefly explain the genetics of nitrogen fixation.

(4 × 3 = 12 weightage)

III. Write an essay on any *two* of the following. Each question carries 5 weightage :

- 15 Write an essay on the application of mutation in crop improvement.
- 16 Give an account on the breeding techniques and crop management in Pepper.
- 17 Write an essay on the farming systems and sustainable agriculture.
- 18 How genetically modified organisms are produced ? Write its merits and demerits.

(2 × 5 = 10 marks)

FOURTH SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)
EXAMINATION, APRIL 2022

(CBCSS)

Botany

BOT4E01 3—PLANT TISSUE CULTURE

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each section.*
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Part A

- I. Answer any four questions : (Short Answer type) Each question carries 2 weightage :
- 1 Explain the importance of somaclonal variation.
 - 2 Write about a media for special purpose.
 - 3 Write a note on certification of TC plants.
 - 4 Explain the importance of low cost alternatives.
 - 5 Write about additives and adsorbants.
 - 6 Explain lab to land awareness.
 - 7 Mention the importance of VAM in TC plants.

(4 × 2 = 8 weightage)

Turn over

Part B

II. Answer any *four* questions : (Short Essay type) Each question carries 3 weightage :

- 8 Write an account on embryo and endosperm culture.
- 9 Write about the contamination problems and measures to avoid it in tissue culture lab.
- 10 Explain somatic embryogenesis and synthetic seed production.
- 11 Explain the action of PGRs in tissue culture.
- 12 Explain methodology for virus indexing.
- 13 Write an account in tissue culture ventures and success stories in India.
- 14 Describe the hardening technique of TC plants.

(4 × 3 = 12 weightage)

Part C

III. Answer any *two* questions : (Essay type) Each question carries 5 weightage :

- 15 Write an account on different plant tissue culture media.
- 16 Describe bio-reactor technology and secondary metabolite production.
- 17 Explain commercial tissue culture production of teak, bamboo and banana. Explain cost benefit analysis
- 18 Explain protoplast culture and haploid plant culture.

(2 × 5 = 10 weightage)

**FOURTH SEMESTER M.Sc. DEGREE [REGULAR/SUPPLEMENTARY]
EXAMINATION, APRIL 2022**

(CBCSS)

Botany

BOT 4E01 2—ENVIRONMENTAL BIOLOGY AND BIODIVERSITY CONSERVATION

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

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Part A

I. Write short answer on any *four* of the following :

- 1 What is ecological foot print ?
- 2 Explain Allee principle.
- 3 Write a short note on the concept of habitat and ecological niche.
- 4 Explain the term ozone depletion.
- 5 What is metadatabase ?
- 6 Explain Biodiversity Act (2002).
- 7 Define carrying capacity. Write the factors which affect the carrying capacity of the population.

(4 × 2 = 8 weightage)

Turn over

Part B

II. Write short essay on *any four* of the following :

- 8 Briefly explain trade related IPP.
- 9 Write a short account on the taxonomic working groups in Plant Science.
- 10 Give a short account on the forest biome.
- 11 Briefly explain the mechanisms of population regulation.
- 12 Give an account on the types of interaction between two species.
- 13 Write a short essay on the Cairo conference.
- 14 Briefly explain interspecific competition and coexistence.

(4 × 3 = 12 weightage)

Part C

III. Write an essay on *any two* of the following :

- 15 Give an account on the modern methods of conservation practices.
- 16 Write an essay on the disaster management.
- 17 Briefly explain the forest types of Kerala.
- 18 Write a brief account on the causes and consequences of loss of biological diversity.

(2 × 5 = 10 weightage)

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(Pages : 2)

Name.....

Reg. No.....

**FOURTH SEMESTER P.G. DEGREE (SUPPLEMENTARY) EXAMINATION
SEPTEMBER 2021**

(CUCSS)

Botany

BO0 4ET 13—GENETIC ENGINEERING

(2010 Syllabus)

Time : Three Hours

Maximum : 36 Weightage

Part A

I. Answer *all* the questions very briefly. Each question carries 1 weightage :

- 1 Describe the principle used in Maxam-Gilbert DNA sequencing method.
- 2 What is SSCP ? What is its significance ?
- 3 Discuss Ti plasmid as a cloning vector.
- 4 Give an account on the probes used in Southern blotting.
- 5 How are plasmids extracted for rDNA technology ?
- 6 With examples, discuss unambiguity and degeneracy of the genetic code.
- 7 State the differences between the genes of prokaryotes and eukaryotes.
- 8 What is Annealing ? How can you standardise the annealing temperature for a PCR reaction ?
- 9 Discuss DNA profiling.
- 10 Explain with an example, the production of vaccine by genetic engineering.
- 11 Discuss the importance of *Agrobacterium tumefaciens* in gene transfer.
- 12 Designate types of gene therapy based on type of treated cells.
- 13 What is a super bug ? What is its significance ?
- 14 Explain the role of viral vectors in gene therapy.

(14 × 1 = 14 weightage).

Turn over

Part B

II. Answer any *seven* questions in not more than 100 words. Each question carries 2 weightage :

- 15 Citing an example, discuss crop improvement through transgenic plants.
- 16 Enumerate the significance and current applications of nanotechnology in biological sciences.
- 17 Gene therapy is a boon or a curse. Discuss the statement and the ethical aspects involved.
- 18 With examples, explain the role of genetic engineering in the production of vaccines.
- 19 Why are genes sequenced ? Explain the steps in the chemical methods of DNA sequencing.
- 20 What are microsatellites and minisatellites ? How are they utilized for genetic engineering ?
- 21 Discuss the principle of gel electrophoresis. How do you visualize DNA in a gel ?
- 22 Distinguish between RAPD and RFLP. Enlist their applications.
- 23 Enumerate the methodology of Western blotting. How does it differ from Southern blotting ?
- 24 What is restriction mapping ? Discuss its significance in rDNA technology.

(7 × 2 = 14 weightage)

Part C

III. Answer any *two* questions in 300 words each. Each question carries 4 weightage :

- 25 Discuss the principle, process and applications of DNA fingerprinting.
- 26 Explain PCR and its applications. Add a note on the variations of PCR.
- 27 Give a detailed description of the steps involved in rDNA technology.
- 28 Describe central dogma and protein synthesis in prokaryotes.

(2 × 4 = 8 weightage)

FOURTH SEMESTER M.Sc. DEGREE (SUPPLEMENTARY/IMPROVEMENT)
EXAMINATION, MARCH 2021

(CUCSS)

Botany

BO04ET 13 9—PLANT PHYSIOLOGY

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

I Answer the questions very briefly. (Weightage $14 \times 1 = 14$) grades A, B, C, D, E :

- 1 Write an account on cell wall softening during ripening.
- 2 What do you understand by osmosis ?
- 3 Explain water potential.
- 4 What are aquaporins ? Explain its role in transport across the cell.
- 5 Explain membrane potential.
- 6 Compare and contrast passive diffusion and facilitated diffusion.
- 7 Explain Pasteur's effect.
- 8 Explain light compensation point.
- 9 What is meant by substrate level phosphorylation ?
- 10 What is florigen ?
- 11 Explain the structure of thylakoids.
- 12 What is hill reaction ?
- 13 Comment on cryptochromes.
- 14 What is thermoperiodism ?

($14 \times 1 = 14$ weightage)

II. Answer any seven questions in not more than 100 words. (Weightage $7 \times 2 = 14$)

Grades A, B, C, D, E :

- 15 Explain the physiology of seed dormancy.
- 16 Write briefly on physiological effects and practical application of hormone auxin.

Turn over

- 17 List the important physiological processes associated with imbibitions of the seed.
- 18 What is CAM pathway ? Explain its significance.
- 19 Explain the structure and function of RuBisCO.
- 20 What is cyanide resistant respiration ?
- 21 Explain glycolysis. What is its relevance ?
- 22 Explain the structure of electron transfer complexes in mitochondria.
- 23 Enumerate the different transport mechanisms across cell membranes.
- 24 Describe the mechanism involved in control of stomatal opening and closing.

(7 × 2 = 14 weightage)

III. Answer any two questions in 300 words. (Weightage 2 × 4 = 8) grades A, B, C, D, E :

- 25 Give a brief account of CO₂ concentrating mechanisms in green plants.
- 26 Write an essay on the classical theories explaining oxidative phosphorylation.
- 27 Write an essay on any *three* types of abiotic stresses and its survival strategies adopted by plants.
- 28 Explain the structure and function of light harvesting complexes in plants. Explain its mechanism.

(2 × 4 = 8 weightage)