

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2022

Botany

BOT4C04—PLANT PHYSIOLOGY, ECOLOGY AND GENETICS

(2014—2018 Admissions)

Time : Three Hours

Maximum : 64 Marks

Section A

*Answer all questions in a word or phrase.
1 mark each.*

1. The ratio of monohybrid test cross.
2. The character that is not expressed in the first filial generation.
3. Negatively geotropic breathing roots in halophytes.
4. Name of a plant with succulent, flat and fleshy leaves for storing water.
5. The site of Calvin cycle.
6. The cell organelle associated with protein synthesis.
7. The pressure developed in solution due to the presence of dissolved salts in it.
8. The enzyme for carboxylation in C_3 plants.
9. Name the plant hormone responsible for apical dominance in plants.
10. Name the flowering hormone.

(10 × 1 = 10 marks)

Section B (Short Answer Questions)

*Answer any seven questions.
2 marks each .*

11. State the law of segregation.
12. Distinguish back cross and test cross.
13. Write short notes on diffusion.
14. What are antitranspirants ? Give an example.
15. Distinguish action spectrum and absorption spectrum.
16. State the law of limiting factors.
17. What are the anatomical peculiarities of C_4 plants ?

18. Which are the major events during the light phase of photosynthesis ?
19. Write a brief note on senescence.
20. Write any four important physiological role of cytokinins in plants.

(7 × 2 = 14 marks)

Section C (Short Essay Questions)

*Answer any six questions.
4 marks each.*

21. What is incomplete dominance ? Illustrate your answer with an example.
22. Write notes on Mendel's monohybrid experiments.
23. Comment on the morphological adaptations exhibited by xerophytes.
24. 'Transpiration is a necessary evil'. Comment on the statement.
25. Explain cyclic photophosphorylation. Add a note on its significance.
26. Describe the mechanism of anaerobic respiration.
27. Define seed dormancy. Explain the methods to overcome seed dormancy.
28. Discuss the importance of vernalization in flowering plants.

(6 × 4 = 24 marks)

Section D (Essay Questions)

*Answer any two questions.
8 marks each.*

29. Explain Calvin cycle in detail.
30. Describe the mechanism of opening and closing of stomata and the role of potassium ions in stomatal movement.
31. Explain the concept of ecosystem and its biotic components.

(2 × 8 = 16 marks)

**FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2022**

Botany

BOT 4B 04—PHYCOLOGY, BRYOLOGY AND PTERIDOLOGY

(2014—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Section A

Answer all questions

Each question carries 1 mark.

1. A bryophyte in which the cell structure resembles that of an alga.
2. A bryophyte with multicellular rhizoids with oblique septa.
3. Fusion of two similar gametes.
4. The life cycle in algae, in which haploid and diploid plants are morphologically similar.
5. In which alga is plaque stage found ?
6. Types of phycobilins found in algae.
7. An example for a microphyllous pteridophyte.
8. A pteridophyte which have sporocarp.
9. A pteridophyte where embryo development is exoscopic.
10. Name of a leptosporangiate fern.

(10 × 1 = 10 marks)

Section B (Short Answer Questions)

Answer all questions.

Each question carries 2 marks.

11. Write a brief account of any fossil bryophyte.
12. Describe the structure of mature sporophyte in *Riccia*.
13. Write notes on the importance of algae as fuels and pollution indicators.

Turn over

14. Describe the formation of daughter colony in *Volvox*.
15. Describe cap cell formation in *Oedogonium*.
16. Write short notes on siphonaceous thallus structure.
17. Differentiate between homosporous and heterosporous ferns by giving suitable examples.
18. What is Rhizophore ? Give an example.
19. Write down any *two* hydrophytic and xerophytic characters of *Equisetum*.
20. Describe the sorus in *Pteris*.

(10 × 2 = 20 marks)

Section C (Short Essay Questions)

Answer any **six** questions.

Each question carries 5 marks.

21. Write an account on the evolution of gametophytes in bryophytes.
22. Explain the structure of sporophyte of *Anthoceros*.
23. Give a concise account of classification of algae by Fritsch.
24. Describe the vegetative characters of *Chara*.
25. Discuss the important features of asexual reproduction in *Vaucheria*.
26. Outline the general characters of Bacillariophyceae.
27. Describe the structure of gametophyte in *Psilotum*.
28. Explain the morphological features of *Marsilea* sporophyte.

(6 × 5 = 30 marks)

Section D (Essay Questions)

Answer any **two** questions.

Each question carries 10 marks.

29. Write an essay on the different types of steles found in the pteridophytes mentioned in your syllabus, with suitable diagrams.
30. Describe the life cycle of Selaginella.
31. Describe the process of asexual reproduction in nannandrous species of *Oedogonium*.

(2 × 10 = 20 marks)

FOURTH SEMESTER (CBCSS—UG) EXAMINATION, APRIL 2022**Botany****BOT4C04—PLANT PHYSIOLOGY, ECOLOGY AND GENETICS**

(2019 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

Section A*Answer atleast eight questions.**Each question carries 3 marks.**All questions can be attended.**Overall ceiling 24.*

1. Write notes on water potential and its significance.
2. Discuss the role of magnesium in plants.
3. Define osmosis. Comment on its significance.
4. Write about action spectrum and absorption spectrum.
5. What are the major processes taking place during light phase ?
6. Distinguish scarification and stratification.
7. Write a brief note on synthetic auxins.
8. Write notes on senescence and abscission.
9. Define hydrosere. Which are the different stages ?
10. What are pneumatophores ? Give an example.
11. What is test cross ? How does it differ from back cross ?
12. Distinguish genotype and phenotype.

(8 × 3 = 24 marks)

Turn over

Section B

Answer atleast five questions.

Each question carries 5 marks.

All questions can be attended.

Overall ceiling 25.

13. Explain transpiration pull theory in detail.
14. Discuss the significance of transpiration.
15. What is vernalization ? Discuss its importance in plants.
16. Discuss the role of cytokinins in plant development.
17. Write an account on the ecological adaptations found in xerophytes.
18. What is epistasis ? Explain with fruit colour in Cucurbita as an example.
19. Write about Mendel's experiments on monohybrid cross.

(5 × 5 = 25 marks)

Section C

Answer any one question.

The question carries 11 marks.

20. Write a detailed account on Calvin cycle.
21. Explain the concept of ecosystem and its biotic and abiotic components.

(1 × 11 = 11 marks)

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2022**Botany****BOT 4B 04—METHODOLOGY AND PERSPECTIVES IN PLANT SCIENCE**

(2019 Admission onwards)

Time : Two Hours

Maximum : 60 Marks

Section A*Answer at least **eight** questions.**Each question carries 3 marks.**All questions can be attended.**Overall Ceiling 24.*

1. Define hypothesis.
2. Expand NCBI. What is its significance ?
3. What is random error ?
4. Distinguish between molarity and normality.
5. What is CRAF ? What is its use ?
6. What is a fixative ? Give two examples.
7. Define maceration.
8. What is Chi square test ? What is its application ?
9. Differentiate between direct observation and indirect observation with examples.
10. What is pH? How do you distinguish acids and bases based on pH ?
11. What is SEM ? Mention two applications.
12. What is micrometry ?

(8 × 3 = 24 marks)

Turn over

Section B

*Answer at least **five** questions.*

Each question carries 5 marks.

All questions can be attended.

Overall Ceiling 25.

13. Describe the various styles of citation.
14. What is centrifugation ? Mention the types of centrifuges and their applications.
15. What are the different ways of representation of data ?
16. What is dehydration? Explain the process with examples of dehydrating agents.
17. Explain the principle and uses of spectrophotometry.
18. Give an account on the different types of observations.
19. Discuss staining of specimens with reference to double staining and vital staining.

(5 × 5 = 25 marks)

Section C

*Answer any **one** question.*

The question carries 11 marks.

20. Elaborate the steps involved in the scientific method.
21. What is chromatography ? Explain the principle, types and applications of chromatographic techniques.

(1 × 11 = 11 marks)

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION, APRIL 2021

Botany

BOT 4C 04—PLANT PHYSIOLOGY, ECOLOGY AND GENETICS

Time : Two Hours

Maximum : 60 Marks

Section A*Answer at least **eight** questions.**Each question carries 3 marks.**All questions can be attended.**Overall Ceiling 24.*

1. What are the deficiency symptoms of nitrogen in plants ?
2. Write a brief account on root pressure theory.
3. What is imbibition ? Explain the role of imbibition in plants.
4. What are the anatomical peculiarities of C₄ plants ?
5. What is photorespiration ? Name the cell organelles associated with this.
6. Which are the different phases of growth ?
7. Write a brief account on natural plant hormones.
8. What is vernalization ? Comment on the significance.
9. List out any four adaptations found in halophytes.
10. Describe the nature of stem and leaves in *Opuntia*.
11. What is test cross ? Write the test cross ratio of monohybrid and dihybrid crosses.
12. Explain homozygous and heterozygous condition, citing examples.

(8 × 3 = 24 marks)

Section B*Answer at least **five** questions.**Each question carries 5 marks.**All questions can be attended.**Overall Ceiling 25.*

13. Discuss the role of K⁺ and H⁺ in opening and closing of stomata.
14. Describe the mechanism of active absorption of water.

Turn over

15. What is meant by seed dormancy? Write about the techniques to break seed dormancy.
16. Write notes on senescence and abscission in plants.
17. Give a detailed account on the biotic components of an ecosystem.
18. Explain the principles of inheritance discovered by Mendel.
19. Write an account of interaction of genes with epistasis as an example.

(5 × 5 = 25 marks)

Section C

Answer any one question.

The question carries 11 marks.

20. What is dark reaction in photosynthesis? Explain the process in C₃ plants.
21. What is succession? Illustrate your answer with succession in fresh water environment.

(1 × 11 = 11 marks)

**FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2021**

Botany

BOT 4B 04—METHODOLOGY AND PERSPECTIVES IN PLANT SCIENCE

Time : Two Hours

Maximum : 60 Marks

Section A

Answer at least eight questions.

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

1. How is a molar solution prepared ? How does it differ from a normal solution ?
2. Mention the importance of Shodhganga in research.
3. What is a histogram ? Distinguish it from a bar diagram.
4. Differentiate between percentage and ppm.
5. What is Carnoy's fluid ? What is its use ?
6. Define smear preparation.
7. How are specimens stained for viewing in a TEM ?
8. List two applications of centrifugation.
9. What are Ogives ? What is its significance ?
10. What is the principle of colorimetry ? What are its applications ?
11. Write down the formula of Standard deviation and Mean deviation.
12. How can data of research findings be presented ?

(8 × 3 = 24 marks)

Turn over

Section B

*Answer at least five questions.
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.*

13. Discuss the methods by which statistical data can be represented using a computer.
14. What do you mean by impact factor of a journal? List out a few biological journals with high impact factor.
15. What is the principle of chromatography? Give an account on adsorption chromatography.
16. Give an account on killing and fixing process and its significance with examples.
17. Differentiate the following : Whole mounts, maceration and smear.
18. Explain the measures of central tendency.
19. What is pH ? How do you measure pH ?

(5 × 5 = 25 marks)

Section C

*Answer any one question.
The question carries 11 marks.*

20. What is the principle of microscopy ? Discuss the different types of microscopes used for viewing biological samples.
21. Explain the various parts of a research project. Add a note on the sources of reference.

(1 × 11 = 11 marks)

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2021**Botany****BOT 4C 04—PLANT PHYSIOLOGY, ECOLOGY AND GENETICS**

Time : Three Hours

Maximum : 64 Marks

Section A*Answer all questions in a word or phrase.**1 mark each.*

1. The F_2 phenotypic ratio in incomplete dominance.
2. The suppressed character that does not appear in the first filial generation.
3. Name a plant with sunken stomata.
4. Give an example for a total parasite.
5. The movement of particles from the region of higher concentration to the region of lower concentration.
6. The sub units of 80s ribosome.
7. The site of light reaction in chloroplast.
8. Mode of transfer of energy between accessory pigments.
9. Name of a natural cytokinin.
10. The process of rupturing seed coat by mechanical means to break dormancy.

(10 × 1 = 10 marks)

Section B (Short Answer Questions)*Answer any seven questions.**2 marks each.*

11. Describe the law of segregation by Mendel.
12. What is test cross ? What is the ratio of a dihybrid test cross ?
13. What is imbibition ? What is its significance in plants ?
14. Write about different types of transpiration.
15. What is red drop ?

Turn over

16. What is photorespiration? Name the cell organelles associated with this process.
17. State how carboxylation take place in C_4 plants.
18. Comment on terminal oxidation.
19. Write a brief account on abscission.
20. What are the different phases of growth?

(7 × 2 = 14 marks)

Section C (Short Essay Questions)

Answer any **six** questions.

4 marks each.

21. Explain interaction of genes with epistasis as an example.
22. Write an account of dihybrid experiments by Mendel.
23. List out the morphological adaptations seen in hydrophytes.
24. Comment on the significance of transpiration.
25. Write notes on red drop and Emerson enhancement effect.
26. C_4 plants are energetically more efficient than C_3 plants. Comment on the statement.
27. Define seed dormancy. Explain the causes for seed dormancy.
28. Write an account on the physiology of fruit ripening.

(6 × 4 = 24 marks)

Section D (Essay Questions)

Answer any **two** questions.

8 marks each.

29. Explain EMP pathway. Comment on the significance.
30. Write an essay on stomata and their role in transpiration.
31. Give an account on succession in fresh water environment.

(2 × 8 = 16 marks)

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(Pages : 2)

Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION, APRIL 2021

Botany

BOT 4B 04—PHYCOLOGY, BRYOLOGY AND PTERIDOLOGY

Time : Three Hours

Maximum : 80 Marks

Section A

Answer all questions.

1 mark each.

1. A bryophyte with pseudoelaters in the capsule.
2. Write the name of a fossil bryophyte.
3. Thick walled vegetative cells rich in food materials.
4. Name of a microscopic, unicellular alga studied by you.
5. Name the red pigmented species of *Chlamydomonas* responsible for red snow.
6. An alga in which conjugation is found.
7. Name of an aquatic fern.
8. Name of an eusporangiate fern.
9. Name the type of sorus where all sporangia mature at the same time.
10. Name a living pteridophyte which possesses rhizoids like bryophytes.

(10 × 1 = 10 marks)

Section B

Short answer questions.

Answer all questions.

2 marks each.

11. Write notes on fossil bryophytes.
12. Write notes on peristome.
13. Comment on the medicinal uses of algae.
14. Describe the thallus structure in *Volvox*.
15. Distinguish lateral and scalariform conjugation in *Spirogyra*.
16. Differentiate between zoospore and synzoospore.
17. Point out two important differences in the life cycle of homosporous and heterosporous plants.

Turn over

18. Describe the structure of Sporangioophore in *Equisetum*.
19. Why Selaginella is called resurrection plants ?
20. Write notes on the gametophytes of *Pteris*.

(10 × 2 = 20 marks)

Section C

Short essay questions.
Answer any six questions.
5 marks each.

21. Write an account on the economic importance of bryophytes.
22. Describe the structure of sporogonium in *Funaria*.
23. Write about the distribution of sex organs in *Oedogonium*.
24. Comment on the position and sex organs of *Chara*.
25. Describe the process of cystocarp formation in the genera of red algae studied by you.
26. Give an outline of algal classification by Fritsch.
27. Write an account of apogamy and apospory in pteridophytes
28. Write notes on the importance of heterospory in the life cycle of *selaginella*.

(6 × 5 = 30 marks)

Section D

Essay questions.
Answer any two questions.
10 marks each.

29. With the help of suitable diagrams, describe the life cycle of *Psilotum*.
30. Write an essay on stelar evolution in pteridophytes.
31. Give a detailed illustrated account of sexual reproduction in *Sargassum*.

(2 × 10 = 20 marks)