SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Botany

BOT 6B 14 (E3)—GENETICS AND CROP IMPROVEMENT

(2019 Admissions)

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 is back crossing ? How is it done ?

2. List two achievements in arecanut breeding.

3. Write a note on abiotic stresses.

4. What is Evaluation ? Mention its significance.

5. Differentiate between inbreeding and inbreeding depression.

6. Expand ICRISAT and add a note on its activities.

7. What is Mutation ? Give its application on crop improvement.

8. What is Quarantine ? Why is it important ?

9. Explain Biofertilizer.

10. What is Emasculation ? How is it done ?

11. Write notes on the significance of haploids in crop improvement ?

12. Explain Plant introduction.

(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. Explain the activities of IPGRI.

14. What is nitrogen fixation ? Write a note on genetics of nitrogen fixation..

15. Describe the breeding techniques and achievements in Coconut.

16. Write a note on any two International research institutes contributing their research activities for crop improvement.

17. What is Hybridization ? Explain heterosis. Give its impact on crop improvement

18. Explain Selection.

19. What is polyploidy breeding ? Explain various methods you have studied..

(5 × 5 = 25 marks)

Section C

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

20. Write a note on disease resistance, types and its applications.

21. Explain the various breeding strategies adopted in crop improvement. Mention their advantages and limitations.

(1 × 11 = 11 marks)

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS–UG)

Botany

BOT 6B 14 (E2)—ADVANCED ANGIOSPERM SYSTEMATICS

(2019 Admissions)

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. Define utricle. In which family it is found.

2. Explain binomial nomenclature with suitable example.

3. Write notes on MBGIPS.

4. What are dichotomous keys ?

5. Write short notes on ancient systems of classification.

6. Differentiate effective and valid publication.

7. Enumerate the identifying features of Cyperaceae.

8. Write about virtual herbarium.

9. What is meant by character weighting ?

10. Write botanical names of any *four* economically important plants of Amaranthaceae.

11. Expand ICN. Name the latest code.

12. Write about the importance of botanical gardens.

(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. Write about use of digital resources in taxonomy.

14. Describe flora, revision and monographs.

15. Write about phylogenetic and molecular systems of classification.

16. What is a type specimen ? Explain the various types used in plant nomenclature.

17. Describe the steps involved in the preparation and maintenance of herbarium.

18. Differentiate Capparidaceae and Sterculiaceae.

19. Enumerate the characteristic features of the family Verbenaceae giving special emphasis on its economic value.

(5 × 5 = 25 marks)

Section C

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

20. Explain the role of morphology, anatomy, palynology, embryology and cytology in taxonomic studies.

21. Describe the diagnostic features of the family Arecaceae with suitable diagrams. Add notes on the economic importance of the family.

(1 × 11 = 11 marks)

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Botany

BOT 6B 14 (E1)—GENETIC ENGINEERING

(2019 Admissions)

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 is DNase used for ?

2. What is CTAB method of DNA extraction ?

3. How does RNase A remove RNA ?

4. How do you dissolve guanidine thiocyanate ?

5. What is the principle of electrophoresis separation of protein molecules ?

6. How is elution of DNA done in gel electrophoresis ?

7. What is the purpose of the transfer in Southern blot protocol ?

8. Why are plasmids used as vectors ?

9. How chromosome walking can be used to find a gene ?

10. What is GFP and how is it used as a reporter gene ?

11. What is RNAi used for ?

12. What is a Transgenic Crop ?

(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. How can you create a knockout gene ?

14. What are antibiotic markers and why are antibiotic markers used during the genetic modification process ?

15. What are the ethical issues of recombinant DNA technology ?

16. Why detergents SDS are used in DNA extraction ?

17. How do you isolate concentrated DNA ?

18. Why TE buffer is preferred for long term storage of DNA ?

19. Explain the procedure of genomic DNA extraction from plants ?

(5 × 5 = 25 marks)

Section C

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

20. Write an account on the restriction enzymes used for recombinant DNA technology ?

21. Give a detailed account on the different methods of transferring DNA into host cells ?

(1 × 11 = 11 marks)

Name.......................................

Reg. No...............................

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Botany

BOT 6B 13—ENVIRONMENTAL SCIENCE

(2019 Admissions)

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 is endemism ?

2. Give an account of the abiotic factors in an ecosystem.

3. What is umbrella species ? Give an example.

4. What are pioneer communities ? Give an example.

5. Mention the chief sources of noise pollution.

6. What do you understand by density of a population ?

7. Distinguish between primary succession and secondary succession.

8. Discuss the role of IUCN in conservation strategies.

9. Write a brief account on importance value index.

10. Write a short note on global warming.

11. What are lentic ecosystems ? Give an example.

12. Comment on BOD.

(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. Explain the common threats to biodiversity. Discuss the various biodiversity conservation strategies.

14. Explain the salient features of forest ecosystem.

15. What are biodiversity hotspots ? Add a note on biosphere reserves.

16. Explain the major sources of soil pollution.

17. Discuss various environmental legislations in India.

18. Write a brief account on the productivity of an ecosystem.

19. Briefly explain the morphological and anatomical adaptations in hydrophytes.

(5 × 5 = 25 marks)

Section C

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

20. Explain Carbon cycle with the help of schematic diagram.

21. Describe the sources and effects of water pollution ? Discuss various techniques used in the management of environmental pollution.

(1 × 11 = 11 marks)

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS–UG)

Botany

BOT 6B 12—PLANT PHYSIOLOGY AND METABOLISM

(2019 Admissions)

Time : Two Hours   Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 marks.
All questions can be attended.
Overall ceiling 30.

1. Define SPAC.

2. Define Imbibition.

3. Define Transpiration pull.

4. Differentiate passive and active transport.

5. Explain RUBISCO.

6. Define photorespiration.

7. Explain pressure flow hypothesis.

8. Define phototropism.

9. Differentiate anabolism and catabolism.

10. What is redox potential ?

11. Describe Chemiosmotic hypothesis.

12. What is β oxidation ?

(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 K$^+$ ion exchange theory.

14. Explain water absorption mechanism in plants with the sport of Cohesion-tension theory.

15. Write an account on ecological significance of C4 and CAM metabolism.

16. Write an account on any *three* plant growth hormones.

17. Describe phloem transport in plants.

18. Write an account on *two* glycolysis.

19. Write an account on electron transport mechanism in mitochondrion.

$(5 \times 5 = 25$ marks$)$

Section C

Answer any **one** *questions.*
Each question carries 11 marks.

20. Write an account on cyclic and non-cyclic photophosphorylation in plants. Add a note on assimilatory powers.

21. Explain biological nitrogen fixation in plants. Add a note on ammonia assimilation.

$(1 \times 11 = 11$ marks$)$

C 20533

Name...

Reg. No...................................

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Botany

BOT 6B 11—BIOTECHNOLOGY, MOLECULAR BIOLOGY AND BIOINFORMATICS

(2019 Admissions)

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 is Proteomics ? What are the applications ?

2. Write a note on the technique Biolistics.

3. Define mutations. What are its consequences ?

4. Briefly explain about nucleotide databases. Give example.

5. Operon.

6. What are the genetic features modified in FlavrSavr tomato ?

7. What are Pyrimidines ? Give examples.

8. What is the importance of SwissProt ?

9. Write a brief note on antibiotic resistance markers.

10. Primers.

11. What is the scope of Artificial intelligence in biology ?

12. What are the salient features of Type II restriction endonucleases ?

(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. Briefly explain the science behind 'Golden Rice' ? Why it is so called ?

14. Briefly explain the production of mature mRNA from DNA.

Turn over

15. Explain how BLAST is used.

16. Describe how Transformed bacteria are selected ?

17. Describe the regulation of genes in a Trp operon.

18. Molecular Phylogeny.

19. Describe mechanism of gene regulation in FlavrSavr Tomato.

(5 × 5 = 25 marks)

Section C

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

20. Write an essay on the various application of Biotechnology, with special reference to environmental pollution.

21. Write an essay on Biological databases and its significance.

(1 × 11 = 11 marks)

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS–UG)

Botany

BOT 6B 10—GENETICS AND PLANT BREEDING

(2019 Admissions)

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. Define genotype and phenotype.

2. What is recessive epistasis ?

3. Define laws of inheritance.

4. Define plant breeding. Briefly describe various objectives of plant breeding.

5. Write a short note on clonal selection.

6. What is mutagen and differentiate physical and chemical mutagen ?

7. What is pure line selection ?

8. Explain Hardy-Weinberg Law and factors affecting it.

9. Explain genetic basis of heterosis.

10. Define lethal genes.

11. What is incomplete dominance ?

12. Explain Polygenic Inheritance with suitable examples.

(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 multiple allelic inheritance and its significance.

14. Give an account of three-point test cross method of gene mapping.

15. Illustrate sex linked inheritance with a suitable example.

16. Elaborate Linkage and Crossing Over.

17. Explain the genetics of inheritance of coat colour in mice.

18. Briefly describe the procedures of mutation breeding.

19. Explain polyploidy breeding with suitable examples.

(5 × 5 = 25 marks)

Section C

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

20. Illustrate multiple alleles with ABO blood group as an example. A woman homozygous for blood type B marries a man who is heterozygous for blood type A. State the possible phenotypic ratio of the offspring.

21. With suitable examples elaborate various types of plant hybridisation procedures.

(1 × 11 = 11 marks)

(Pages : 2)

Name..

Reg. No...................................

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Botany

BOT 6B 15—GENETICS AND CROP IMPROVEMENT

(2014 to 2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Section A

Answer all questions.
Each question carries 1 mark.

1. Expand ICRISAT.

2. Name two varieties of Rice produced by breeding techniques.

3. Centre of origin of Rubber.

4. An agency involved in plant genetic resource conservation.

5. Define quarantine measures.

6. What is Heterosis ?

7. The gene responsible for nitrogen fixation activity.

8. An organism from which cry gene is taken for transgenesis.

9. Name the stress hormone.

10. A physical mutagen.

(10 × 1 = 10 marks)

Section B

Answer all questions.
Each question carries 2 marks.

11. Explain disease escape.

12. Distinguish between oligogenic and polygenic inheritance.

13. Enlist two problems associated with breeding for freezing tolerance.

14. What are the advantages of using biofertilizers ?

15. How are plants physiologically affected by heat stress ?

Turn over

16. What is the significance of using haploids in breeding experiments ?

17. State the differences between primary and secondary plant introduction.

18. Name a variety of Pepper developed by breeding and list its salient features.

19. Where is CCMB situated ? What are its major research activities ?

20. Explain inbreeding and its disadvantages.

(10 × 2 = 20 marks)

Section C

Answer any **six** *questions.*
Each question carries 5 marks.

21. Distinguish between basal defense and R gene mediated defense in disease resistance.

22. Write a note on the breeding methods adopted for drought resistance.

23. Describe the steps involved in hybridization technique.

24. How are mutations induced ? How does it aid crop improvement ?

25. What are the physiological effects of mineral stress in plants ?

26. Elaborate on the sources of heat stress resistance and tolerance.

27. Give an account on the steps involved in conservation of plant genetic resources.

28. Write notes on the location and activities of the following:

    (a) IRRI ; and (b) CPCRI.

(6 × 5 = 30 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 *marks.*

29. Explain, in detail, the origin, floral biology and breeding techniques in Coconut. List achievements.

30. Describe the techniques involved in breeding for insect resistance in plants. What are the major achievements ?

31. What is abiotic stress ? Discuss any *one* abiotic stress in plants emphasizing its genetics, breeding approaches and problems associated with the process.

(2 × 10 = 20 marks)

SIXTH SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION, MARCH 2022

Botany

BOT 6B 14—ADVANCED ANGIOSPERM SYSTEMATICS

(2014 to 2018 Admissions)

Time : Three Hours   Maximum : 80 Marks

Section A

Answer *all* the questions :

1. ——————— is the father of plant taxonomy.

2. ICBN is expanded as ————

3. The fruits in Arecaceae is ————.

4. The system of naming plants by using *two* epithets is called ————.

5. *Lawsonia alba* belongs to the family ————.

6. Digital flora is ————.

7. Give the botanical name of a plant belonging to Scorphlariaceae.

8. IPINI is expanded as ————.

9. Stamens in Meliaceae are ————.

10. The placentation in Capparidaceae is ————.

(10 × 1 = 10 marks)

Section B

Answer *all* questions :

11. What is virtual herbarium ?

12. Explain phylogenetic classification with an example.

13. How do you differentiate a Flora and flora ?

14. Explain rule of priority.

15. What is the role of herbalists in plant classification ?

16. Differentiate isolation and speciation.

Turn over

17. What are the evolutionary characters of Nymphaeceae ?

18. What is typification ?

19. What is the significance of author citation ?

20. Explain TROPICOS.

(10 × 2 = 20 marks)

Section C

Answer any *six* of the following :

21. Explain the Linnaean natural system of classification.

22. Give an account on molecular taxonomy.

23. Differentiate polynomial and binomial systems.

24. What are botanical gardens ? Enlist the major botanical gardens of India.

25. Explain the principle and significance of taxonomic keys.

26. How does embryology contribute to taxonomic studies ?

27. What is ICBN ? Give a brief outline of its principles.

28. Comment on APG system of classification.

(6 × 5 = 30 marks)

Section D

Answer any *two* of the following :

29. Write an essay on the scope and importance of taxonomy.

30. Explain with suitable examples how palynology contributes to systematic botany.

31. Give an account on the concept of characters and correlation of characters.

(2 × 10 = 20 marks)

(Pages : 2)

Name...

Reg. No....................................

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Botany

BOT 6B 13—GENETIC ENGINEERING

(2014 to 2018 Admissions)

Time : Three Hours
Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 mark.

1. Mention the pH of Tris buffer using for DNA extraction.

2. What buffer is commonly used to store DNA samples ?

3. What are terminal transferases ?

4. Which anionic detergent can be used for cell disruption ?

5. Expand GFP.

6. Write the name of a plasmid derived vector.

7. What are Polylinkers ?

8. Name a non-radioactive DNA labeling technique.

9. Give an example of a transgenic animal.

10. What is meant by antisense RNA ?

(10 × 1 = 10 marks)

Section B

Answer **all** *questions.*
Each question carries 2 marks.

11. How could you determine the purity of isolated DNA ?

12. What are the principles of electrophoresis ?

13. Define electroelution.

14. What is dot blot transfer ?

15. Define nick translation.

Turn over

16.   Explain site directed mutagenesis.

17.   What is chromosome walking ?

18.   Explain the role of *in silico* tools in gene discovery.

19.   Differentiate between antisense RNA and RNAi technology.

20.   Explain the methods of removal of proteins from cell homogenate.

(10 × 2 = 20 marks)

Section C

Answer any **six** *questions.*
Each question carries 5 marks.

21.   What is gene knockouts ? What are the uses of knockout models ?

22.   Discuss the applications of five enzymes used in recombinant DNA technology.

23.   Explain the methods of elution of DNA from gel.

24.   Differentiate plaque and colony hybridization.

25.   What are the essential features of a cloning vector ?

26.   How are plasmids isolated for small scale experiments ?

27.   Discuss any *two* methods to select the recombinants.

28.   What are the applications of recombinant DNA technology ?

(6 × 5 = 30 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 marks.

29.   Explain the procedure of isolation and purification of RNA.

30.   Give an account on different types of cloning vectors.

31.   Explain the various mechanism of gene transfer into eukaryotic cells.

(2 × 10 = 20 marks)

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Botany

BOT 6B 12—ENVIRONMENTAL SCIENCE

(2014 to 2018 Admissions)

Time : Three Hours   Maximum : 80 Marks

Section A

*Answer **all** questions.*
1 mark each.

1. What are the important gaseous pollutants contributing to acid rains ?

2. What is the combination of smoke and fog ?

3. When was Environmental Protection Act (EPA) introduced ?

4. Name the first protected area in India.

5. What are Xerophytes ?

6. Expand IUCN.

7. Name the succession initiating on dry habitat.

8. What is the cause of 'Minamata' disease ?

9. What do you mean by EPA ?

10. What are Savannahs ?

(10 × 1 = 10 marks)

Section B (Short Answer Questions)

*Answer **all** questions.*
2 marks each.

11. What is climate change ? What are the effects of climate change ?

12. Explain species-area curve.

13. What is trophic structure ?

14. Write short note on primary succession.

Turn over

15. What do you mean by keystone and flagship species ?

16. Briefly explain pond ecosystem.

17. Write short note on carbon cycle.

18. Define the term 'Biodiversity'. What do you mean by hot-spot of biodiversity ?

19. How air pollutions are classified ?

20. Briefly describe the Prevention and Control of Pollution act, 1981.

(10 × 2 = 20 marks)

Section C (Short Essays)

Answer any **six** *questions.*
5 marks each.

21. What are the threats to biodiversity ?

22. Describe the energy flow in ecosystems with example.

23. Explain Biosphere Reserves. Write short note on Biodiversity centres in India.

24. Define water pollution. What are the causes, effects and control measures of water pollution ?

25. Describe different types of plant adaptations.

26. Differentiate between lentic and lotic ecosystems with examples.

27. Discuss the efforts of different world organisations in the regulation of green house gases emission.

28. What is climate change ? What are the effects of climate change ?

(6 × 5 = 30 marks)

Section D (Essays)

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

29. What is ecological succession ? Write different stages of ecological succession.

30. With examples discuss the ecological pyramids in detail.

31. Write an essay on food chain.

(2 × 10 = 20 marks)

SIXTH SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION, MARCH 2022

Botany

BOT 6B 11—CELL BIOLOGY AND BIOCHEMISTRY

(2014 to 2018 Admissions)

Time : Three Hours　　　　　　　　　　　　　　　　　Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. The type of ribosome and its subunits in eukaryotes.

2. The site of synthesis of rRNA.

3. What are centrioles made up of ?

4. Chromatin that remain condensed during interphase.

5. Who proposed nucleosome model of chromatin ?

6. Name of a basic amino acid.

7. Name of an oligosaccharide.

8. Protein part of an enzyme molecule.

9. Isomers having same structure and molecular formula, but different configuration.

10. Enzymes having similar biological function, but different molecular structure.

(10 × 1 = 10 marks)

Section B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. Differentiate between primary and secondary constriction.

12. Write any *four* functions of endoplasmic reticulum.

13. What is meant by reciprocal translocation ?

Turn over

14. What is synaptonemal complex ? What is its function ?

15. List out the different stages and the important events of prophase I.

16. Write an account on the structure and properties of starch.

17. What are phospholipids ? Give an example.

18. Write notes on zwitterions.

19. Write an account on glycoproteins.

20. Differentiate between nucleosides and nucleotides.

(10 × 2 = 20 marks)

Section C

Answer any **six** *questions.*
Each question carries 5 marks.

21. Explain fluid mosaic model of plasma membrane with the help of a diagram.

22. Explain the structure and functions of golgi complex.

23. Describe the organization of chromatin in eukaryotes.

24. Write an account on the significance of secondary metabolites.

25. How are lipids classified ?

26. Write an account on polysaccharides found in plants.

27. Comment on the biological functions of proteins.

28. Give an account of the importance of coenzymes, citing examples.

(6 × 5 = 30 marks)

Section D

Answer any **two** *questions.*
Each question carries 10 marks.

29. Write an essay on numerical changes in chromosome number and its significance.

30. Describe various stages of mitotic cell divisions. Add a note on its significance.

31. Describe the properties of enzymes and the mechanism of enzyme action.

(2 × 10 = 20 marks)

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2022

Botany

BOT 6B 10—PLANT PHYSIOLOGY AND METABOLISM

(2014 to 2018 Admissions)

Time : Three Hours   Maximum : 80 Marks

Section A

Answer **all** *questions.*
1 *mark each.*

1. A Nobel laureate for working out C_3 Pathway in photosynthesis.

2. Munch mass flow hypothesis explains —————————.

3. In ————————— plants CO_2 fixation occurs during night.

4. Mineral ion required for nitrogen fixation is —————————.

5. The plant hormone that promote fruit ripening is —————————.

6. Number of carboxylation in CAM pathway.

7. Site of Kreb's cycle is —————————.

8. Absorption of water by cell wall is by a process called —————————.

9. The assimilatory power of photosynthesis is ————————— and —————————.

10. Kranz anatomy is found in ————————— Plants.

(10 × 1 = 10 marks)

Section B (Short Answer Questions)

Answer **all** *questions.*
2 *marks each.*

11. What is Abscission ?

12. Write a brief note on Photoperiodism.

13. What is substrate level phosphorylation ?

14. Explain Blackman's law of limiting factors.

15. What is Guttation ?

Turn over

16. Explain phloem loading.

17. With suitable diagram explain the growth curve.

18. Write any *four* the practical application of auxins.

19. What is water potential ?

20. Explain Emerson's enhancement effect.

Section C (Short Essay)

Answer any **six** *questions.*
5 marks each.

21. Describe the mechanism of non cyclic photophosphorylation in plants.

22. Explain the process involved in biological nitrogen fixation.

23. What is CAM pathway ? Explain its significance.

24. Describe glyoxylate cycle.

25. Give a critical account of various factors influencing photosynthesis.

26. Write a note on nastic movements.

27. Explain the fate of pyruvic acid in anaerobic conditions.

28. What is seed dormancy ? Describe the method to break seed dormancy.

Section D (Essays)

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

29. Explain in detail CO_2 fixation by Calvin cycle.

30. Discuss the K^+ mechanism of opening and closing of stomata.

31. Explain the electron transport reaction in mitochondrion.

(Pages : 2)

Name...................................

Reg. No...............................

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION MARCH 2022

Botany

BOT 6B 09—GENETICS AND PLANT BREEDING

(2014 to 2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. What is clonal selection ?

2. Who is known as the father of green revolution in India.

3. What is linkage group ?

4. Give an example for polygenic inheritance.

5. What is meant by back cross ?

6. Give an example for lethal gene in humans.

7. Name a disease caused due to trisomy of chromosome 21.

8. Give an example for improved variety produced by hybridization.

9. What is meant by acclimatization ?

10. Give the ratio of dominant epistasis.

(10 × 1 = 10 marks)

Section B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. What are the advantages of pure line selection ?

12. Enumerate the objectives of hybridization.

13. What is co-dominance ?

14. State law of independent assortment.

Turn over

15. Write a short note on Turner's syndrome.

16. Differentiate between complete and incomplete linkage.

17. What is extra nuclear inheritance ?

18. Define mutation breeding.

19. What is coincidence ?

20. Differentiate between gene frequency and genotypic frequency.

(10 × 2 = 20 marks)

Section C

Answer any **six** *questions.*

Each question carries 5 *marks.*

21. Explain recessive epistasis with an example.

22. What is clonal selection ? What are its advantages ?

23. Explain self sterility in *Nicotiana*.

24. What is meant by X-liked inheritance ? Explain.

25. Write a note on polyploidy breeding.

26. Explain incomplete dominance with an example.

27. How is genetic engineering helpful in plant breeding ?

28. Define hybrid vigour. How is it useful to farmers ?

(6 × 5 = 30 marks)

Section D

Answer any **two** *questions.*

Each question carries 10 *marks.*

29. With the help of an example, explain polygenic inheritance.

30. Explain the different mechanisms of sex determination with examples.

31. What is the significance of mutation in plant breeding ? Explain with suitable example.

(2 × 10 = 20 marks)

(Pages : 2)

SIXTH SEMESTER (CUCBCSS—UG) DEGREE [SPECIAL] EXAMINATION MARCH 2021

Botany

BOT 6B 15—GENETICS AND CROP IMPROVEMENT

Time : Three Hours

Maximum : 80 Marks

Section A

Answer all questions.
Each question carries 1 mark.

1. Name an improved variety of Arecanut.

2. The sum total of all genes in a crop and its related species is called ————.

3. KFRI is located at ————.

4. An example of a plant domesticated by introduction.

5. A gene which is a potential source of abscisic acid.

6. A fungal biofertilizer.

7. A GM crop with insect resistance.

8. Centre of origin of Rubber.

9. A national botanic garden in Kerala.

10. Expand BARC.

(10 × 1 = 10 marks)

Section B

Answer at least five questions.
Each question carries 4 marks.
All questions can be attended.
Overall Ceiling 20.

11. Distinguish between mass selection and pureline selection.

12. What is reclamation of soil ?

13. State the differences between glycophytes and halophytes.

14. Enlist the sources of chilling tolerance.

15. What is the significance of polyploids in crop improvement.

Turn over

16. What is drought ? How do plants escape drought ?

17. Define pathogenicity.

18. How are biofertilizers applied to plants ?

19. What do you mean by vertical and horizontal resistance ?

20. List out the problems encountered in breeding for salinity resistance.

(5 × 4 = 20 marks)

Section C

Answer at least **five** *questions.*
Each question carries 7 marks.
All questions can be attended.
Overall Ceiling 35.

21. What are the research activities and achievements of CCMB ?

22. Write an account on breeding for resistance to parasitic weeds.

23. Define and explain the terms : (a) Inbreeding Depression ; (b) Heterosis ; and (c) Heterobeltiosis.

24. Describe mutation breeding, listing a few achievements.

25. Explain the breeding approaches that can be adopted for salinity resistance.

26. Distinguish oligogenic, polygenic and cytoplasmic inheritance with examples.

27. Write briefly on the floral biology and breeding methods adopted in Rice.

28. What are the steps involved in hybridization ? List the advantages of this technique.

(5 × 7 = 35 marks)

Section D

Answer at least **one** *question.*
The question carries 15 marks.

29. Explain the genetics of insect resistance in plants. Add a note on the methods and problems encountered in breeding for disease resistance.

30. Describe the classification and methods of conservation of plant genetic resources.

31. What are the sources of disease resistance ? Give an account on the methods of breeding for disease resistance.

(1 × 15 = 15 marks)

Name.....................................

Reg. No...............................

SIXTH SEMESTER (CUCBCSS—UG) DEGREE (SPECIAL) EXAMINATION MARCH 2021

Botany

BOT 6B 13—GENETIC ENGINEERING

Time : Three Hours

Maximum : 80 Marks

Section A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. Expand CTAB.

2. Define Electroporation.

3. What is annealing ?

4. An example for a transgenic animal.

5. Function of S1 nuclease.

6. What is GFP ?

7. Name a detergent used in DNA isolation.

8. A DNA stain.

9. What is antisense RNA ?

10. A commercial kit for plasmid DNA isolation.

(10 × 1 = 10 marks)

Section B

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

Each question carries 4 *marks.*

All questions can be attended.

Overall Ceiling 20.

11. State two differences between cDNA and genomic DNA library.

12. What is the function of reverse transcriptase ?

Turn over

13. Describe one method to store DNA samples.

14. What is the principle of electrophoresis ?

15. Distinguish between YAC and BAC.

16. Define Mutagenesis. Name one method of mutagenesis.

17. What is the significance of luciferase enzyme ?

18. What are adapters ? What is its function ?

19. Define Lipofection.

20. Mention methods to lyse cells for nucleic acid isolation.

(5 × 4 = 20 marks)

Section C

Answer at least **five** *questions.*
Each question carries 7 marks.
All questions can be attended.
Overall Ceiling 35.

21. Discuss the applications of rDNA technology.

22. Describe the protocol for small scale isolation of plasmid DNA.

23. Write notes on chromosome walking and its significance.

24. What are knock out models? What are their uses ?

25. What is the principle underlying blue-white screening ? Why is it important ?

26. Explain the different methods by which the desired gene is linked with plasmid DNA.

27. Discuss, in detail, any *two* methods of gene transfer into eukaryotic cells.

28. Give an account on restriction endonucleases and their functions.

(5 × 7 = 35 marks)

Section D

Answer at least **one** *question.*
The question carries 15 marks.

29. Discuss the steps involved in the isolation of DNA from bacterial cells. How can you check the purity of the isolated sample ?

30. Write notes on :

    (a) Southern Blot Hybridization.

    (b) Probes and their labelling.

31. Define vectors and list their salient features. Write notes on the different types of vectors used in rDNA technology with examples.

(1 × 15 = 15 marks)

Name...

Reg. No...................................

SIXTH SEMESTER (CUCBCSS—UG) DEGREE [SPECIAL] EXAMINATION MARCH 2021

Botany

BOT 6B 12—ENVIRONMENTAL SCIENCE

Time : Three Hours   Maximum : 80 Marks

Section A

Answer all questions.
Each question carries 1 mark.

1. Expand WWF.

2. What is 'temporary threshold shift' ?

3. Name India's first biosphere reserve.

4. What are Epiphytes ?

5. What is BOD ?

6. Name the air pollutant which causes severe damage to plants and animals even in smaller quantity.

7. Name the protocol that reduces green house gases.

8. What do you mean by EPA ?

9. What is the name of American grasslands ?

10. Which is the major green house gas responsible for causing 60% of green house effect ?

(10 × 1 = 10 marks)

Section B

Answer at least **five** *questions.*
Each question carries 4 marks.
All questions can be attended.
Overall Ceiling 20.

11. Write the concept of Megadiversity Nation.

12. What is gross primary production ?

13. What is El-Nino phenomenon ?

Turn over

14. Write a short note on secondary succession.

15. What do you mean by endangered and endemic species ?

16. What are the components of forest ecosystem ?

17. Explain the importance of value index.

18. Briefly describe the values of biodiversity.

19. Differentiate between biodegradable and non-biodegradable pollutants.

20. What is food web ?

(5 × 4 = 20 marks)

Section C (Short Essays)

Answer at least **five** *questions.*
Each question carries 7 marks.
All questions can be attended.
Overall Ceiling 35.

21. Describe different types of food chains.

22. Explain Nitrogen cycle in an ecosystem.

23. With examples describe different conservation strategies to conserve biodiversity.

24. Discuss biodiversity at global level.

25. Define air pollution. What are the causes, effects and control measures of air pollution ?

26. What do you mean by solid waste management ? Explain the control measures of urban and industrial waste.

27. Discuss the salient features of Prevention and control of Pollution Act 1981.

28. Discuss different "Hot-spots of biodiverisity" in India.

(5 × 7 = 35 marks)

Section D (Essay)

Answer at least **one** *question.*
The question carries 15 marks.

29. What is conservation biodiversity ? Explain India's efforts for biodiversity conservation.

30. Describe various types of biogeochemical cycles in nature.

31. Explain Pollution. Given an account of various kinds of pollution.

(1 × 15 = 15 marks)

SIXTH SEMESTER (CUCBCSS—UG) DEGREE [SPECIAL] EXAMINATION MARCH 2021

Botany

BOT 6B 11—CELL BIOLOGY AND BIOCHEMISTRY

Time : Three Hours

Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Who proposed fluid mosaic model of plasma membrane ?

2. The term for pairing of homologous chromosomes in meiosis.

3. What are spindles made up of ?

4. State any one function of plant vacuoles.

5. A chromosome with centromere at the centre.

6. Write the name of an acidic amino acid.

7. Name the bond that connect two sugars in a disaccharide.

8. Of what monosaccharide units is cellulose made up of ?

9. Expand IUB.

10. Name a pentose sugar.

(10 × 1 = 10 marks)

Section B

Answer at least **five** *questions.*
Each question carries 4 *marks.*
All questions can be attended.
Overall Ceiling 20.

11. Differentiate between euchromatin and heterochromatin.

12. What are the functions of glyoxisomes ?

13. What are the components of a nucleosome ?

14. Distinguish paracentric and pericentric inversions.

Turn over

15. Describe the structure of a eukaryotic ribosome.

16. Describe the structure of cellulose.

17. Write notes on cholesterol.

18. Describe the structure of a dipeptide.

19. Write notes on denaturation of proteins.

20. Draw the structure of a ribonucleotide.

(5 × 4 = 20 marks)

Section C

Answer at least **five** *questions.*
Each question carries 7 marks.
All questions can be attended.
Overall Ceiling 35.

21. Explain the major physiological functions carried out by endoplasmic reticulum.

22. Describe the structure of polytene chromosomes.

23. Write notes on polyploidy.

24. Name any four important plant metabolites and discuss their role.

25. Write an account on polysaccharides.

26. Explain the structure of proteins.

27. Explain the role of lipids in plant metabolism.

28. What are coenzymes ? Illustrate your answer with examples.

(5 × 7 = 35 marks)

Section D

Answer at least **one** *question.*
The question carries 15 marks.

29. Describe mitotic cell division with suitable diagrams. Comment on its significance.

30. With the help of a neat labelled diagram, explain fluid mosaic model of plasma membrane and point out the functions performed by it.

31. What are enzymes ? Discuss their properties and mode of action.

(1 × 15 = 15 marks)

(Pages : 2)

Name.....................................

Reg. No..............................

SIXTH SEMESTER (CUCBCSS—UG) DEGREE (SPECIAL) EXAMINATION MARCH 2021

Botany

BOT 6B 10—PLANT PHYSIOLOGY AND METABOLISM

Time : Three Hours

Maximum : 80 Marks

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Give an example for an antitranspirant.

2. The pressure developed in a turgid cell is ———— .

3. In plants Molybdenum is required for ———— .

4. Photorespiration occurs in ———— plants.

5. Metal ion required for opening and closing of stomata is ———— .

6. The main force for ascent of sap in higher plants is ———— .

7. Guttation takes place through ———— .

8. The swelling of soaked seed is due to ———— .

9. What are regarded as the assimilatory power of photosynthesis ?

10. Who proposed transpiration pull theory ?

(10 × 1 = 10 marks)

Section B

Answer at least **five** *questions.*
Each question carries 4 *marks.*
All questions can be attended.
Overall Ceiling 20.

11. Explain briefly oxidative decarboxylation of pyruvic acid.

12. What is facilitated diffusion ?

13. What is substrate level phosphorylation ?

14. Distinguish between anabolism and catabolism.

Turn over

15. What is Blackman's law of limiting factors ?

16. Differentiate between reductive amination and trans amination.

17. Explain with suitable diagram the growth curve.

18. Explain the practical application of gibberellins.

19. Comment on the property of water as solvent.

20. Differentiate between passive and active transport in plants.

(5 × 4 = 20 marks)

Section C (Short Essay)

Answer at least **five** *questions.*
Each question carries 7 marks.
All questions can be attended.
Overall Ceiling 35.

21. Describe the mechanism of photophosphorylation in plants.

22. Explain the process involved in biological nitrogen fixation.

23. Explain the significance of transpiration.

24. Give an account on photoperiodism and its significance.

25. Give a critical account biosynthesis of fatty acids in plants.

26. Compare and contrast symbiotic a symbiotic nitrogen fixation.

27. Explain the chemiosmotic hypothesis with reference to light reaction.

28. Explain the mechanism involved in control of stomatal opening and closing ?

(5 × 7 = 35 marks)

Section D (Essay)

Answer at least **one** *question.*
Each question carries 15 marks.

29. Describe EMP pathway with a schematic diagram.

30. Explain in detail CO_2 fixation by Calvin cycle.

31. Explain in detail the β oxidation of fatty acid in plants.

(1 × 15 = 15 marks)

SIXTH SEMESTER (CUCBCSS—UG) DEGREE [SPECIAL] EXAMINATION MARCH 2021

Botany

BOT 6B 09—GENETICS AND PLANT BREEDING

Time : Three Hours

Maximum : 80 Marks

Section A

Answer all questions.
Each question carries 1 mark.

1. Give an example for sex limited traits.

2. The genetic makeup of an organism is referred to as —————————.

3. What are lethal genes ?

4. Give the phenotypic ratio of dominant epistasis.

5. In test cross a dominant phenotype is crossed with —————————.

6. Give an example for polygenic inheritance in man.

7. The selection method applied for the improvement of self pollinated crops is —————————.

8. Give an example for improved variety produced by hybridization.

9. The reduced biological fitness of a population due to inbreeding is —————————.

10. Which law predicts that allelic frequencies remain constant from one generation to the next ?

(10 × 1 = 10 marks)

Section B

Answer at least five questions.
Each question carries 4 marks.
All questions can be attended.
Overall Ceiling 20.

11. What is Acclimatisation ?

12. Define law of purity of gametes.

13. What is Emasculation ?

Turn over

14. Differentiate between complete and incomplete linkage.

15. What is meant by codominance ?

16. Write a short note on reciprocal cross.

17. Give two examples for X-linked inheritance ?

18. Define Heterosis.

19. What is genetic drift ?

20. Why did Mendel use pea plant as experimental material ?

(5 × 4 = 20 marks)

Section C (Short Essay)

Answer at least **five** *questions.*
Each question carries 7 marks.
All questions can be attended.
Overall Ceiling 35.

21. Explain plastid inheritance in *Mirabilis*.

22. What is clonal selection ? What are its advantages ?

23. Explain multiple alleles with a suitable example.

24. What incomplete dominance ? Explain with suitable example.

25. Write a note on plant introduction.

26. Explain the pattern of inheritance in sickle cell anaemia.

27. Write a note on complementary genes.

28. Explain sex determination in Melandrium *album* ?

(5 × 7 = 35 marks)

Section D (Essay)

Answer at least **one** *question.*
The question carries 15 marks.

29. Explain polygenic inheritance with suitable example.

30. Compare and contrast chromosome theory and genic balance theory of sex determination.

31. What is mutation breeding ? Discuss the importance of mutation breeding with suitable examples.

(1 × 15 = 15 marks)