GOVERNMENT DEGREE COLLEGE, NAGARI(A), CHITTOOR DT

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., I Year (Semester -I - w.e.f 2024-25)

Course– I: INTRODUCTION TO CLASSICAL BIOLOGY

Paper Code: 1-03-BOT-ICB01-R24

Model question paper **Max.Marks:75**

PART-A

Multiple Choice Questions

(30 Questions, 1 Mark each = 30 Marks)

Answer all questions.

S.No: 01 to S.No: 30

1. **Systematics is best defined as:**
   a) Classification of living organisms
   b) Study of ecosystems
   c) Process of evolution
   d) None of the above
2. **The scientific name of an organism is composed of:**
   a) Family and genus
   b) Genus and species
   c) Order and family
   d) Species and kingdom
3. **Which of the following is a non-covalent bond?**
   a) Ionic bond
   b) Covalent bond
   c) Hydrogen bond
   d) Triple bond
4. **Apiculture is related to the production of:**
   a) Silk
   b) Honey
   c) Fish
   d) Cereals
5. **Which plant is used as a medicinal herb in Ayurveda and is known as Aswagandha?**
   a) Sunflower
   b) Jute
   c) Withania somnifera
   d) Green gram
6. **The basic unit of biodiversity conservation is:**
   a) Ecosystem
   b) Organism
   c) Habitat
   d) Species

7. **Which hormone is related to plant growth?**
   a) Adrenaline
   b) Insulin
   c) Auxin
   d) Hemoglobin
8. **In which organ does photosynthesis occur in plants?**
   a) Root
   b) Leaf
   c) Stem
   d) Seed

43. *...and so on up to Question 30.*

PART-B

Match the Following

(5 Sets, 5 Marks each = 25 Marks)

Answer all questions.

S.No: 31 to S.No: 35

Match the following

44. **Set 1: Systematics and Nomenclature**

- Group A | Group B
  - a) ICZN | 1) Binomial nomenclature
  - b) ICBN | 2) Animal classification
  - c) Taxonomy | 3) Classification of organisms
  - d) Trinomial nomenclature | 4) Plant classification
  - e) Species | 5) Specific epithet

45. **Set 2: Ecology and Environment**

- Group A | Group B
  - a) Ecosystem | 1) Preservation of biodiversity
  - b) Conservation | 2) Plants in water
  - c) Climate change | 3) Temperature rise
  - d) Aquatic plants | 4) Air pollution
  - e) Pollutants | 5) Biotic and abiotic components

46. **Set 3: Plant Physiology**

- Group A | Group B
  - a) Photosynthesis | 1) Water absorption
  - b) Respiration | 2) Carbon dioxide fixation
  - c) Transpiration | 3) Energy release
  - d) Phytohormones | 4) Plant growth regulation
  - e) Stomata | 5) Water loss

47. **Set 4: Animal Physiology**

- Group A | Group B
  - a) Heart | 1) Filtration of blood
  - b) Lung | 2) Oxygen transport
  - c) Kidney | 3) Carbon dioxide removal
  - d) Insulin | 4) Blood sugar regulation
  - e) Liver | 5) Detoxification

48. **Set 5: Cell and Genetics**

- Group A | Group B
  - a) Mitosis | 1) Chromosome division
  - b) Meiosis | 2) Reduction division
  - c) Genes | 3) Hereditary units
  - d) Darwin | 4) Evolution theory
  - e) Chromosomes | 5) Genetic material

PART-C

True or False
(10 Questions, 1 Mark each = 10 Marks)
Answer all questions.
S.No: 36 to S.No: 45

36. Systematics involves the classification of organisms based on evolutionary relationships.
- a) True
- b) False

37. Nomenclature is the process of giving unique names to species.
- a) True
- b) False

38. Photosynthesis occurs in the roots of plants.
- a) True
- b) False

39. Pollution is a natural component of ecosystems and doesn't affect biodiversity.
- a) True
- b) False

40. Sericulture is the production of silk from silkworms.
- a) True
- b) False

41. In animal classification, Chordata includes both vertebrates and invertebrates.
- a) True
- b) False

42. Mitosis is also called reduction division.
- a) True
- b) False

49. Darwin's theory of evolution includes natural selection as a key component.
- a) True
- b) False

44. Green chemistry principles aim to reduce hazardous waste.

- a) True
- b) False

45. The nucleus is absent in prokaryotic cells.
- a) True
- b) False

PART-D

Fill in the Blanks

(10 Questions, 1 Mark each = 10 Marks)

Answer all questions.

S.No: 46 to S.No: 55

46. The science of classifying organisms based on evolutionary relationships is called _____.
47. The two main components of an ecosystem are _____ and _____.
48. ICZN stands for _____.
49. The hormone _____ regulates blood sugar levels in humans.
50. The basic unit of life is the _____.
51. _____ is a process in plants that results in the loss of water vapor through leaves.
52. _____ is the study of animals' economic importance in human welfare.
53. The _____ cell division reduces chromosome number by half, producing gametes.
54. The type of chemical bond that shares electrons between atoms is called a _____ bond.
55. _____ is the process by which green plants convert sunlight into energy.

GOVERNMENT DEGREE COLLEGE, NAGARI(A), CHITTOOR DT

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Department of Botany

B.Sc., I Year (Semester -I - w.e.f 2024-25)

Course– I: INTRODUCTION TO APPLIED BIOLOGY

Paper Code: 1-03-BOT-IABO2-R24

Model question paper **Max.Marks:75**

PART-A

Multiple Choice Questions
(30 Questions, 1 Mark each = 30 Marks)
Answer all questions.
S.No: 01 to S.No: 30

1. **Who is considered the father of immunology due to his development of the smallpox vaccine?**
   a) Louis Pasteur
   b) Edward Jenner
   c) Robert Koch
   d) Alexander Fleming
2. **The structure of a bacterium typically includes all of the following EXCEPT:**
   a) Nucleus
   b) Cell wall
   c) Ribosomes
   d) Plasma membrane
3. **Which of the following is a plant virus?**
   a) Poliovirus
   b) Bacteriophage
   c) Tobacco mosaic virus (TMV)
   d) Influenza virus
4. **Polysaccharides are an example of which class of biomolecules?**
   a) Proteins
   b) Carbohydrates
   c) Lipids
   d) Nucleic acids
5. **Which amino acid group is characterized by the presence of an amine and a carboxyl group?**
   a) Carbohydrates
   b) Lipids
   c) Amino acids
   d) Polysaccharides
6. **Which of the following is NOT a method of gene transfer in genetic engineering?**
   a) Physical

b) Chemical
c) Radioactive
d) Biological

7. **BT cotton is an example of a genetically modified plant with resistance to:**
   a) Herbicides
   b) Salinity
   c) Insect pests
   d) Frost
8. **The technique used to separate DNA fragments based on size is called:**
   a) Microscopy
   b) Electrophoresis
   c) Chromatography
   d) Spectrophotometry

43. *...and so on up to Question 30.*

PART-B

Match the Following
(5 Sets, 5 Marks each = 25 Marks)
Answer all questions.
S.No: 31 to S.No: 35

Match the following

44. **Set 1: Pioneers in Microbiology**

- Group A | Group B
  - a) Edward Jenner | 1) Pasteurization
  - b) Louis Pasteur | 2) Smallpox vaccine
  - c) Robert Koch | 3) Anthrax studies
  - d) Alexander Fleming | 4) Polio vaccine
  - e) Jonas Salk | 5) Penicillin discovery

45. **Set 2: Biomolecules**

- Group A | Group B
  - a) Monosaccharides | 1) Fructose
  - b) Disaccharides | 2) Sucrose
  - c) Polysaccharides | 3) Glycogen
  - d) Lipids | 4) Hydrophobic biomolecules
  - e) Proteins | 5) Amino acid chains

46. **Set 3: Types of Microscopy and Techniques**

- Group A | Group B
  - a) Simple microscope | 1) High magnification, electron beam
  - b) Compound microscope | 2) Low magnification, optical lenses

- c) Electrophoresis | 3) DNA separation by charge
- d) UV-visible spectrophotometry | 4) Absorption and transmittance
- e) Column chromatography | 5) Separation based on polarity

47. **Set 4: Immunology**

- Group A | Group B
  - a) Immunity | 1) Disease protection
  - b) Antigen | 2) Foreign molecule
  - c) Antibody | 3) Immunity response protein
  - d) T-cells | 4) Cell-mediated immunity
  - e) B-cells | 5) Humoral immunity

48. **Set 5: Biostatistics and Bioinformatics**

- Group A | Group B
  - a) Mean | 1) Average value
  - b) Median | 2) Middle value in data
  - c) Mode | 3) Most frequent value
  - d) BLAST | 4) Sequence alignment tool
  - e) PDB | 5) Protein data structure

PART-C

True or False

(10 Questions, 1 Mark each = 10 Marks)

Answer all questions.

S.No: 36 to S.No: 45

36. Louis Pasteur is known for developing the technique of pasteurization.

- a) True
- b) False

37. Archaebacteria are considered more closely related to eukaryotes than to eubacteria.

- a) True
- b) False

38. Lipids are generally hydrophobic and insoluble in water.

- a) True
- b) False

39. Proteins are made up of amino acids connected by glycosidic bonds.

- a) True
- b) False

40. Biopesticides are chemicals that kill pests immediately upon contact.

- a) True
- b) False

41. Monoclonal antibodies are used in diagnostics.

- a) True
- b) False

42. Column chromatography is used to separate mixtures based on polarity.

- a) True
- b) False

49. The mode is the average value in a data set.

- a) True
- b) False

44. Fasta is a format for sequencing DNA and protein data.

- a) True
- b) False

45. BLAST is used to compare biological sequences.

- a) True
- b) False

PART-D

Fill in the Blanks

(10 Questions, 1 Mark each = 10 Marks)

Answer all questions.

S.No: 46 to S.No: 55

46. The scientist known for the discovery of penicillin is _____.
47. _____ is a plant virus known for causing mosaic patterns on leaves.
48. In carbohydrates, glucose is classified as a _____.
49. The process of separating DNA fragments based on their size and charge is called _____.
50. The structural component of proteins that determines its function is the _____.
51. _____ is the immune response that targets specific foreign antigens.
52. A measure of data spread, the _____ calculates the average distance from the mean.
53. The biological database used for storing and accessing protein structures is _____.
54. The separation technique that uses a stationary and mobile phase is called _____.
55. The immune cells responsible for producing antibodies are _____ cell.

GOVERNMENT DEGREE COLLEGE, NAGARI(A), CHITTOOR DT

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Department of Botany

B.Sc., I Year (Semester -II - w.e.f 2024-25)

Course 3: Non-Vascular Plants (Algae, Fungi, Lichens and Bryophytes)

Model question paper **Max.Marks:75**

PART-A

Answer All the following Questions

(10 Questions, 1 Mark each = 10 Marks)

1. Name the scientist who proposed the classification of algae up to division.
2. What is the storage carbohydrate in chlorophycean algae?
3. Which pigment gives brown algae their characteristic color?
4. State one economic importance of Chlorella.
5. Which structure in fungi is involved in asexual reproduction?
6. Name the type of lichen used in dye production.
7. Define heterothallism in fungi.
8. Which division does Rhizopus belong to?
9. What is the reproductive structure in Marchantia?
10. In bryophytes, which phase is dominant, the gametophyte or sporophyte?

PART-B

Answer any Five of the following Questions

(5 Questions, 5 Marks each = 25 Marks)

11. Describe the general characteristics of algae, including cell structure and reserve food materials.
12. Explain the economic importance of algae in various industries.
13. Discuss the process and importance of cultivating Chlorella as single-cell protein (SCP).
14. Describe the structure, reproduction, and life cycle of Spirogyra.
15. Write a short note on the classification of fungi according to Ainsworth.
16. Discuss the structure and ecological importance of lichens.
17. Describe the morphology and life cycle of Marchantia.
18. Explain the evolutionary significance of the sporophyte in bryophytes.
19. Describe the general characteristics and classification of bryophytes.
20. Write a brief note on the economic importance of fungi in the food and pharmaceutical industries.

PART-C

Answer any Four of the following Questions

(4 Questions, 10 Marks each = 40 Marks)

21. Discuss in detail the occurrence, structure, and life cycle of Ectocarpus.
22. Explain the cultural methods and applications of Gelidium in the production of agar.
23. Describe the different types of thallus organization and reproductive strategies found in fungi.
24. Discuss the structure, reproduction, and economic importance of the fungus Penicillium.
25. Explain the role of lichens as indicators of environmental health and describe their economic uses.
26. Write an essay on the structure, reproduction, and life cycle of Funaria.
27. Discuss the characteristics, distribution, and classification of algae up to divisions.
28. Explain the occurrence, structure, and reproductive strategies of Phytophthora and its significance in agriculture.

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Department of Botany

B.Sc., I Year (Semester -II - w.e.f 2024-25)

Course 4: Origin of Life and Diversity of Microbes

Max.Marks:75 **Model question paper**

PART-A

Answer All the following Questions
(10 Questions, 1 Mark each = 10 Marks)

1. Who proposed the germ theory of disease?
2. Name the scientist who conducted the famous experiment on abiogenesis using a spark discharge.
3. What shape does the Tobacco Mosaic Virus (TMV) exhibit?
4. What are prions composed of?
5. Which bacterial group is known for lacking a cell wall?
6. Spirulina is cultivated primarily as a source of what?
7. Name the bacterial process where DNA is transferred through a pilus.
8. Which type of microbial interaction benefits both organisms involved?
9. Rhizobium is primarily associated with which type of plants?
10. Name one benefit of using VAM (Vesicular-Arbuscular Mycorrhiza) in agriculture.

PART-B

Answer any Five of the following Questions
(5 Questions, 5 Marks each = 25 Marks)

11. Describe Miller and Urey's experiment and its significance in the study of abiogenesis.
12. Explain the Five Kingdom Classification proposed by R.H. Whittaker.
13. Briefly describe the structure of the Gemini virus and its effects on plants.
14. Write a short note on the general characteristics and economic importance of Actinomycetes.
15. Discuss the methods of cultivation and economic uses of Spirulina.
16. Explain the types of nutrition found in eubacteria.
17. Describe microbial interactions in soil with a focus on mutualism and competition.
18. Outline the role of Trichoderma as a biopesticide in agriculture.
19. Describe the process of nitrogen fixation by Rhizobium and its importance in agriculture.
20. Discuss the significance of phosphate-solubilizing microorganisms in soil fertility.

PART-C

Answer any Four of the following Questions
(4 Questions, 10 Marks each = 40 Marks)

21. Describe the Koch's postulates and their relevance in understanding disease causation.
22. Explain the structure, transmission, and control methods of plant viruses.
23. Discuss the classification, characteristics, and economic importance of archaebacteria.
24. Describe the process of bacterial recombination, covering conjugation, transformation, and transduction.
25. Write an essay on the various roles of microorganisms in enhancing soil fertility.
26. Explain the advantages and limitations of using bacterial inoculants in agriculture, with examples of Rhizobium and Azospirillum.
27. Discuss the role of Frankia and VAM in promoting soil fertility and supporting plant growth.
28. Explain the distribution of soil microorganisms and their impact on the soil ecosystem.

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Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 5 : Vascular Plants

(Pteridophytes, Gymnosperms and Taxonomy of Angiosperms) **Max.Marks:75**

Model question paper

PART-A

Answer any five the following Questions

(08 Questions, 5 Mark each = 25 Marks)

1. Describe the general characteristics of Pteridophyta and outline Smith's classification (1955).
2. Explain the structure and life cycle of Lycopodium.
3. Discuss the concept of heterospory and its role in the evolution of the seed habit.
4. Describe the general characteristics and classification of gymnosperms according to Sporne (1965).
5. Explain the principles of binomial nomenclature and any two important rules of the International Code of Botanical Nomenclature (ICBN).
6. Write a note on the structure and functions of a herbarium, and explain the role of digital herbaria.
7. Describe the economic importance of the Arecaceae and Poaceae families.
8. Discuss the significance of phytochemistry in plant systematics.

PART-B

Answer all five of the following Questions

(5 Questions, 10 Marks each with internal choice = 50 Marks)

9. (a) Describe the morphology, anatomy, and life cycle of Marsilea.

   OR

   (b) Explain the ecological and economic importance of Pteridophytes.
10. (a) Discuss the structure, reproduction, and life history of Cycas.

    OR

    (b) Describe the ecological and economic importance of gymnosperms.
11. (a) Explain the concept of taxonomic hierarchy and discuss the major and minor taxonomic categories.

    OR

    (b) Describe Bentham and Hooker's system of classification and its significance.
12. (a) Provide a systematic description and economic importance of the family Asteraceae.

    OR

    (b) Describe the family Euphorbiaceae, including its key characteristics and economic importance.
13. (a) Discuss the role of cytogenetics in plant systematics, with examples.

    OR

    (b) Explain the significance of numerical taxonomy and its application in plant classification

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Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester Course 6: Plant Pathology and Plant Diseases :: Max.Marks:75

Model question paper

PART-A

Answer any five of the following Questions

(8 Questions, 5 Marks each = 25 Marks)

1. Define plant pathology and discuss the importance of plant diseases with examples of historical famines.
2. Describe the main types of plant pathogens and give examples of diseases caused by each.
3. Explain the classification of plant diseases based on different criteria.
4. Discuss the active and passive methods of dispersal in plant pathogens.
5. Outline the stages involved in the infection process of a plant pathogen.
6. Explain the role of enzymes in the pathogenesis of plant diseases.
7. Describe how growth regulators contribute to plant pathogenesis.
8. Discuss any two defense mechanisms in plants that protect them from pathogens.

PART-B

Answer all five of the following Questions

(5 Questions, 10 Marks each with internal choice = 50 Marks)

9. (a) Explain the importance of plant disease epidemiology and the use of plant disease forecasting.

   OR

   (b) Describe how remote sensing technology is applied in plant pathology.
10. (a) Discuss the general principles of plant disease management, including regulatory and cultural methods.

    OR

    (b) Explain the methods of biological control and the role of plant growth-promoting rhizobacteria (PGPR) in disease management.
11. (a) Describe chemical methods for plant disease management and the concept of host plant resistance.

    OR

    (b) What is Integrated Disease Management (IDM)? Explain its concept, advantages, and importance.
12. (a) Describe the symptoms, etiology, disease cycle, and management of Blast and bacterial blight of rice.

    OR

    (b) Explain the management practices for Downy mildew and Ergot disease in Bajra.
13. (a) Discuss the symptoms, disease cycle, and control measures for Powdery mildew and Yellow vein mosaic in Okra.

    OR

    (b) Describe the symptoms, etiology, and management strategies for Bud rot and Basal stem rot in Coconut

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Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 7: Plant Breeding **Max.Marks:75**

Model question paper

PART-A

Answer any five of the following Questions

(8 Questions, 5 Marks each = 25 Marks)

1. Define plant breeding and discuss its aims, objectives, and scope. Explain the concepts of genetic variation, heritability, and selection.
2. What are the advantages and disadvantages of asexual and sexual reproduction in plants? Define apomixis and discuss its types and significance.
3. Explain the differences between self and cross-pollination, their genetic consequences, and significance. Classify crop plants based on mode of pollination and mode of reproduction.
4. Define self-incompatibility in plants. Describe heteromorphic and homomorphic systems and how self-incompatibility is exploited in hybrid production.
5. Discuss the different types of male sterility (genetic, cytoplasmic, and cytoplasmic-genetic) and their utilization in plant breeding.
6. Briefly explain the concept of plant domestication and the centres of origin of crop plants.
7. Describe the types, objectives, and procedure of plant introduction. Discuss the agencies involved in plant introduction in India.
8. What is genetic erosion and the concept of gene sanctuaries in plant breeding? Discuss their significance.

PART-B

Answer all five of the following Questions

(5 Questions, 10 Marks each with internal choice = 50 Marks)

9. (a) Discuss the procedure, advantages, and disadvantages of pure line selection in self-pollinated crops.

   OR

   (b) Describe the procedure and achievements of clonal selection in vegetatively propagated crops.
10. (a) Explain hybridization in plant breeding, its types, objectives, procedure, advantages, and disadvantages.

    OR

(b) Discuss the back cross method for cross-pollinated crops, its procedure, advantages, disadvantages, and achievements.

11. (a) Define heterosis. Explain its genetic and physiological bases and how it is commercially utilized.

    OR

    (b) Describe the procedures for producing synthetics and composites in plant breeding. Discuss their merits, demerits, and achievements.

12. (a) Describe mutation breeding, including spontaneous and induced mutations. Discuss the procedure, applications, and limitations.

    OR

    (b) Explain the concept of polyploidy breeding, the differences between auto-polyploids and allopolyploids, and their applications in crop improvement.

13. (a) Discuss the role of DNA markers (RFLP, SSR, SNP) in plant breeding and their applications.

    OR

    (b) What is Marker-Assisted Selection (MAS)? Explain its applications in plant breeding.

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Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

III Semester

Course 8: Plant Biotechnology **Max.Marks:75**

Model question paper

PART-A

Answer any five of the following Questions
(5 Questions, 5 Marks each = 25 Marks)

1. Define plant tissue culture. Discuss its scope and significance. What infrastructure and equipment are required to establish a tissue culture laboratory?
2. Explain the sterilization techniques used in plant tissue culture. How is media formulated for plant tissue culture?
3. Describe the concept of totipotency. How is callus culture initiated and maintained? Discuss the induction of morphogenesis in vitro.
4. What is somatic embryogenesis and organogenesis? Discuss the factors affecting somatic embryogenesis and organogenesis. What are synthetic seeds, and what are their applications?
5. What are meristem culture, zygotic embryo culture, and endosperm culture? Discuss their importance and applications.
6. Explain the process and commercial exploitation of micropropagation. What are its uses in agriculture?
7. What is haploid production using anther, pollen, and unfertilized ovule cultures? Discuss their characterization and applications.
8. Describe the importance of cell suspension cultures and their types (continuous and batch). How are plant cells mass-cultivated using bioreactors?

PART-B

Answer all five of the following Questions
(5 Questions, 10 Marks each with internal choice = 50 Marks)

9. (a) Define cell and protoplast cultures. Discuss the methods used for protoplast fusion and their applications in plant biotechnology.
   OR
   (b) Explain the production of secondary metabolites from cell cultures. Discuss the strategies used to enhance the production of secondary metabolites and biotransformation using plant cell cultures.

10. (a) What are transgenic plants? Discuss the biosafety and ethical issues associated with transgenic plants.

    OR

    (b) Explain herbicide resistance (glyphosate) and insect resistance (alpha-amylase inhibitor) in transgenic plants. How do these contribute to agricultural productivity?
11. (a) Discuss virus resistance mechanisms in transgenic plants, such as coat protein-mediated and nucleocapsid gene-based resistance.

    OR

    (b) How are disease-resistant transgenic plants developed using antifungal proteins and PR proteins? Provide examples.
12. (a) What is Golden Rice? Explain how genetic modification has been used for quality improvement in plants.

    OR

    (b) Discuss the Flavr Savr tomato and how it has been genetically modified to enhance shelf-life. Explain its significance in the context of food biotechnology.
13. (a) What is plant synthetic biology? Discuss its applications, including plant-based vaccines and therapeutics.

    OR

    (b) Explain the concept of biofortification and genetically modified foods. How do these innovations contribute to food security and nutrition?

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Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

IV Semester

Course 9: Anatomy and Embryology of Angiosperms

Model question paper

Max.Marks:75

PART-A

Answer any five of the following Questions

(5 Questions, 5 Marks each = 25 Marks)

1. Define meristematic tissues. Discuss their classification, structure, and functions.
2. Explain the general structure of the shoot apex. Compare the different theories of Shoot Apical Meristem (SAM): Apical Cell Theory, Tunica-Corpus Theory, and Histogen Theory.
3. Differentiate between simple and complex permanent tissues. Provide examples.
4. Briefly describe plant secretory tissues and their types.
5. Discuss the structure and functions of the anther wall. What is the significance of callose deposition during microsporogenesis?
6. What is palynology? Discuss its scope and applications in plant sciences.
7. Describe the types of ovules and the process of megasporogenesis with reference to Polygonum, Allium, and Peperomia.
8. Outline the process of pollination. What are the methods used to overcome self-incompatibility in plants?

PART-B

Answer all five of the following Questions

(5 Questions, 10 Marks each = 50 Marks)

(Internal choice for each question)

9. (a) Describe the process of double fertilization in angiosperms. What are its consequences?

   OR

   (b) Explain the different types of endosperm in plants (free nuclear, cellular, helobial, and ruminate) and their biological significance.
10. (a) What is anomalous secondary growth in roots? Discuss the anomalous secondary growth in the root of Beta vulgaris.

    OR

(b) Discuss the anomalous secondary growth in the stems of Boerhaavia and Dracaena. How does it differ from normal secondary growth?

11. (a) Describe the structure of the pollen wall and explain the concept of Male Germ Unit (MGU). Discuss the NPC system.

    OR

    (b) What are the abnormal features observed in pollen grains, such as pseudomonads, polyads, and massulae? Discuss their implications.

12. (a) Explain the structure of ovules. Describe the megasporogenesis process with reference to Polygonum, Allium, and Peperomia.

    OR

    (b) Discuss the process and biological importance of perisperm. How does it differ from endosperm?

13. (a) Describe embryogeny in dicots, using Capsella bursa-pastoris as an example.

    OR

    (b) Explain the process of embryogeny in monocots, taking Sagittaria sagittifolia as an example.

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Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

IV Semester

Course 10: Plant Ecology, Biodiversity and Phytogeography :: Max.Marks:75

Model question paper

PART-A

Answer any five of the following Questions
(5 Questions, 5 Marks each = 25 Marks)

1. Define ecology. Explain its branches and significance, and describe its relation with other sciences.
2. What are the different components of an ecosystem? Explain the flow of energy in ecosystems.
3. Explain the process of material cycling in ecosystems. Discuss the water, carbon, nitrogen, and phosphorus cycles.
4. Discuss the climatic and edaphic factors affecting plants. How do these factors influence plant growth?
5. What is population ecology? Discuss the key characteristics such as natality, mortality, and growth curves.
6. Explain the concept of community ecology. Describe its key characteristics, including frequency, density, cover, and competition.
7. What is ecological succession? Differentiate between hydrosere and xerosere.
8. Define GPP, NPP, and community respiration. How do these concepts relate to ecosystem productivity?

PART-B

Answer all five of the following Questions
(5 Questions, 10 Marks each = 50 Marks)
(Internal choice for each question)

9. (a) Discuss the causes and consequences of soil degradation. What are the strategies for its management?
   OR
   (b) Explain the causes and consequences of deforestation and forest fires. What management strategies can mitigate their impact?

10. (a) Describe global warming, ozone layer depletion, acid rains, and ocean acidification. Discuss their causes and effects on the environment.
    OR
    (b) What are carbon footprints and carbon credits? Discuss the significance of the Montreal and Kyoto protocols in addressing climate change.
11. (a) What is biodiversity? Discuss the basic concepts, including the Earth Summit and the Convention on Biodiversity.
    OR
    (b) Explain the value of biodiversity. Discuss the types and levels of biodiversity and the threats to biodiversity.
12. (a) Discuss the principles of conservation and the IUCN threat-categories. What role does the Red Data Book play in biodiversity conservation?
    OR
    (b) What are biodiversity hotspots? Discuss the biodiversity hotspots in India, specifically the North Eastern Himalayas and Western Ghats.
13. (a) Explain the principles of phytogeography. How does species distribution occur based on endemism and discontinuous species?
    OR
    (b) Describe the phytogeographic regions of the world. What are the key phytogeographic regions of India and their characteristics?

GOVERNMENT DEGREE COLLEGE, NAGARI(A), CHITTOOR DT

(Accredited by NAAC with A+ Grade, CGPA: 3.28)

Department of Botany

B.Sc., Honours in BOTANY: MAJOR

w.e.f AY 2023-24 onwards

IV Semester

Course 11: Plant Resources and Utilization :: Max.Marks:75

Model question paper

PART-A

Answer any five of the following Questions
(5 Questions, 5 Marks each = 25 Marks)

1. Discuss the centres of diversity and origin of crop plants.
2. Explain the concepts of domestication and introduction of crop plants, and their relevance to sustainable development.
3. Describe the cultivation, production, and uses of rice and wheat.
4. Explain the cultivation and uses of minor millets, particularly finger millet and foxtail millet.
5. Provide a general account of oilseed crops and vegetable oils.
6. Discuss the economic importance of rubber, latex, gums, and resins.
7. Explain the major fibre crops in India and their role in textile production.
8. What are the main economic potential and uses of spices and condiments?

PART-B

Answer all five of the following Questions
(5 Questions, 10 Marks each = 50 Marks)
(Internal choice for each question)

9. (a) Discuss the cultivation, production, and uses of pulse crops, specifically red gram and black gram.
   OR
   (b) Describe the cultivation, production, and economic importance of sugarcane.
10. (a) Explain the traditional and modern uses of some medicinal plants of India.
    OR
    (b) Discuss the active compounds found in medicinal plants and their pharmacological effects.
11. (a) What are essential oils, and how are they used in the perfumery and cosmetics industries?
    OR

(b) Discuss the role of phytochemicals in health, and explain their potential health benefits.

12. (a) What are the important timber-yielding plants of India? How is wood used as a construction and manufacturing material?

    OR

    (b) Discuss the other uses of wood products, including paper and fuel.

13. (a) Explain the role of energy crops, biofuels, and bioplastics in sustainable development.

    OR

    (b) Discuss the generation of paper industry raw material from bamboos, Eucalyptus, and Casuarina.

GOVERNMENT DEGREE COLLEGE, NAGARI(A), CHITTOOR DT

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Department of Botany

(A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21)
Four-year B.Sc. (Hons)
IV Year B. Sc. (Hons) – Semester – V Semester

Course-6A: Plant Propagation

Max.Marks:75

Model question paper

PART-A

Answer any five of the following Questions
(5 Questions, 5 Marks each = 25 Marks)

1. Define plant propagation and explain the need for plant multiplication. Compare the advantages and disadvantages of asexual and sexual methods of propagation.
2. List the facilities required for propagation and explain the functions of a mist chamber and humidifiers.
3. Discuss the methods of propagation by division and separation, focusing on bulbs, corms, and rhizomes.
4. Define apomixis and explain the differences between facultative and obligate apomixis.
5. What is polyembryony? Discuss its types and horticultural significance.
6. Explain the process of propagation of mango, citrus, and Allium using apomictic embryos.
7. Describe the different methods of propagation by cuttings, including root and leaf cuttings.
8. What are the factors influencing the rooting of stem cuttings, and how do plant growth regulators assist in rooting?

PART-B

Answer all five of the following Questions
(5 Questions, 10 Marks each = 50 Marks)
(Internal choice for each question)

9. (a) Define and explain the principle of layering in plant propagation. Discuss the different types of layering methods such as tip, simple, and trench layering.
   OR
   (b) Describe the air layering technique and its applications in woody trees.

10. (a) What is grafting in plant propagation? Explain the principle of grafting and the importance of scion-stock relationship in successful grafting.
    OR
    (b) Discuss different grafting techniques, including veneer, whip, and cleft grafting, and their applications.
11. (a) Define budding and describe the technique of ‘T’ budding. What are the key factors that influence the success of budding?
    OR
    (b) Explain the inverted ‘T’ and patch budding techniques with their applications in horticulture.
12. (a) What are the factors influencing the rooting of cuttings? Explain the physiological and biochemical basis of rooting in plant cuttings.
    OR
    (b) Discuss the role of plant growth regulators in enhancing the rooting process of cuttings.
13. (a) Explain the concept of chimera and bud sport in plant propagation. Discuss their horticultural significance.
    OR
    (b) What are the advantages and disadvantages of apomictic propagation methods in horticulture?

GOVERNMENT DEGREE COLLEGE, NAGARI(A), CHITTOOR DT

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Department of Botany

(A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21)
Four-year B.Sc. (Hons)
IV Year B. Sc. (Hons) – Semester – V Semester
Course-7A: Seed Technology

Max.Marks:75

Model question paper

PART-A

Answer any five of the following Questions
(5 Questions, 5 Marks each = 25 Marks)

1. Define seed and grain. Discuss the structure of dicot and monocot seeds.
2. Explain the role and goals of seed technology, and outline the characteristics of quality seed material.
3. What is seed dormancy? Discuss its causes and methods to break seed dormancy.
4. Describe the different principles involved in seed processing, including cleaning, grading, and bagging.
5. Compare and contrast orthodox and recalcitrant seeds in terms of storage and longevity.
6. What are seed vigour, viability, and longevity? Explain how seed sampling is done for testing.
7. Discuss the importance of moisture content in seeds and the methods used for moisture determination.
8. What are the different seed-borne diseases? Briefly explain their transmission and control methods.

PART-B

Answer all five of the following Questions
(5 Questions, 10 Marks each = 50 Marks)
(Internal choice for each question)

9. (a) Explain the methods used to break seed dormancy and the factors influencing dormancy in seeds.
   OR
   (b) Discuss the physical and chemical methods used for breaking seed dormancy in different types of seeds.

10. (a) Describe the various steps involved in seed processing, including pre-cleaning, curing, drying, and extraction.

    OR

    (b) What are the safety precautions that must be followed during seed processing? Explain with examples.

11. (a) What are the methods for seed health testing to detect microorganisms? Discuss the advantages and limitations of each method.

    OR

    (b) Explain the seed germination test using paper, sand, and soil. What are the standard protocols for conducting these tests?

12. (a) Explain the process of seed certification in India, including the duties and responsibilities of a seed inspector.

    OR

    (b) Discuss the classes of seeds, phases of certification standards, and the role of genetic purity verification in seed certification.

13. (a) Discuss the factors that affect the longevity of seeds during storage. What are the ideal conditions for seed storage?

    OR

    (b) Explain the methods and types of containers used for the storage of seeds, and the factors that influence their longevity.