

KAMARAJ COLLEGE (Autonomous)

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(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(4 Pages)

Reg. No:.....

Question Code: 26E00911

Course Code : 24UMBO41

UG Degree - End Semester Examinations, April 2026

Fourth Semester

B.Sc., BOTANY

Plant Diversity - IV

(For those who joined in July 2024 onwards)

Time : 3Hours

Maximum : 75 Marks

PART - A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

- CO:1 1. Gymnosperms are characterized by:
K:1 (a) Presence of enclosed ovules (b) Absence of vascular tissue
(c) Naked ovules (d) Double fertilization
- CO:1 2. Resin obtained from gymnosperms is mainly used in:
K:2 (a) Preparation of varnishes and adhesives
(b) Paper production
(c) Textile dyeing
(d) Food preservation
- CO:2 3. In *Pinus*, the male cone is also known as:
K:1 (a) Megastrobilus (b) Sporophyll
(c) Microstrobilus (d) Ovuliferous scale
- CO:2 4. Coralloid roots of *Cycas* contain symbiotic association with:
K:2 (a) Fungi (b) Bacteria
(c) Algae (d) Cyanobacteria
- CO:3 5. Radiocarbon dating is mainly based on the isotope:
K:1 (a) Carbon-12 (b) Carbon-13
(c) Carbon-14 (d) Carbon-16

- C0:3 6. Compression fossils differ from impression fossils because
K:2 compressions:
- (a) Preserve only external features (b) Contain organic carbon residue
- (c) Are formed only in marine habitats (d) Do not retain plant shape
- C0:4 7. The characteristic leaf scars arranged in a diamond pattern are
K:1 seen in:
- (a) *Rhynia* (b) *Lyginopteris*
- (c) *Lepidodendron* (d) *Psilotum*
- C0:4 8. *Lyginopteris* is called a seed fern because:
K:2
- (a) It produces spores only (b) It has fern-like foliage but produced seeds
- (c) It lacks vascular tissues (d) It reproduces vegetatively
- C0:5 9. The chemiosynthetic theory of origin of life was proposed by:
K:1
- (a) Oparin and Haldane (b) Charles Darwin
- (c) Louis Pasteur (d) Hugo de Vries
- C0:5 10. Modern synthetic theory combines Darwin's natural selection
K:2 with:
- (a) Mutation theory alone (b) Lamarckism
- (c) Mendelian genetics (d) Artificial selection

PART - B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

- C0:1 11. (a) Describe the general characteristics of Gymnosperms.

K:3

(OR)

- (b) Differentiate Gymnosperms from Angiosperms based on reproductive structures and vascular tissues.

- C0:2 12. (a) Describe the internal structure of *Cycas* leaflet with a labeled
K:3 diagram.

(OR)

- (b) Explain the morphological adaptations of *Pinus* that enable it to survive in xerophytic conditions.

CO:3 13. (a) Demonstrate the principle and practical use of radiocarbon
K:3 dating in paleobotanical studies.

(OR)

(b) Discuss the importance of coal balls in analyzing fossilized plant structures.

CO:4 14. (a) Analyze the internal stem anatomy of *Rhynia* and explain its
K:4 significance in early vascular plant evolution.

(OR)

(b) Examine the structure and significance of strobili in *Lepidodendron*.

CO:5 15. (a) Explain the chemiosynthetic theory of origin of life.

K:4

(OR)

(b) Explain mutation theory and its importance in evolution.

PART - C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

CO:1 16. (a) Explain the classification of Gymnosperms according to
K:3 Sporne (1954) up to order level.

(OR)

(b) Discuss the economic importance of Gymnosperms.

CO:2 17. (a) Critically examine the reproductive structures of *Cycas*.

K:4

(OR)

(b) Analyze the life cycle of *Pinus* highlighting the alternation of generations.

CO:3 18. (a) Analyze the different types of plant fossils and their
K:4 importance in paleobotany.

(OR)

(b) Evaluate the contributions of Birbal Sahni to paleobotany.

CO:4 19. (a) Assess the ecological and geological importance of
K:5 *Lepidodendron* during the Carboniferous period.

(OR)

(b) Critically evaluate the gymnospermous affinities of *Lyginopteris* based on its morphological and reproductive features.

CO:5 20. (a) Design an explanation for how natural selection works according to Darwin's theory with examples.
K:6

(OR)

(b) Elaborate how the modern synthetic theory integrates various mechanisms of evolution.