

**PG and Research Department of Botany**  
**Pteridophytes, Gymnosperms and Paleobotany**

**Part-A**

1. The vascular tissue is confined to the central region of the stem forming:  
(a) Bundles (b) **stele** (c) Cortex (d) Pericycle
2. The leaves which bear the sporangia are called:  
(a) **sporophylls** (b) Bract (c) Cone (d) Strobilus
3. One or two peripheral layers persist for the nourishment of the developing spores. These nourishing cells form:  
(a) Elators (b) Soprores (c) Jacket (d) **tapetum.**
4. Match gametophyte with one of the followings:  
(a) **Prothallus** (b) Thallus (c) Cone (d) Strobilus
5. Selaginella belongs to division  
(a) **Lycopsida** (b) Pteropsida (c) Psilopsida (d) Sphenopsida
6. Hone tails are:  
(a) Lycopsida (b) Pteropsida (c) Psilopsida (d) **Sphenopsida**
7. Marsilea belongs to:  
(a) Lycopsida (b) **Pteropsida** (c) Psilopsida (d) Sphenopsida
8. Which of the followings is fern?  
(a) Psilopsida (b) **Pteropsida** (c) Lycopsida (d) Sphenopsida
9. Which of the followings is most primitive division?  
(a) Lycopsida (b) Pteropsida (c) **Psilopsida** (d) Sphenopsida
10. Club mosses are:  
(a) **Lycopsida** (b) Pteropsida (c) Psilopsida (d) Sphenopsida
11. The protosteles in which xylem core is smooth and rounded is:  
(a) **Haplostele** (b) Actinostelele (c) Plectostele (d) Siphonostele
12. The protosteles in which xylem core is star like is called:  
(a) Haplostele (b) **Actinostelele** (c) Plectostele (d) Siphonostele
13. The siphonostele in which two cylinders of vascular tissue are present in the stele is:  
(a) Haplostele (b) Actinostelele (c) **Plectostele** (d) Polycyclic
14. In Xylem in which protoxylem is lying in the middle of Metaxylem is:  
(a) Exarch (b) Mesarch (c) Endarch (d) **Diarch**
15. The stele in which xylem forms several plates is:  
(a) Haplostele (b) **Actinostelele** (c) Plectostele (d) Polycyclic
16. The xylem in which protoxylem is lying on the periphery of metaxylem is:  
(a) **Exarch** (b) Mesarch (c) Endarclt (d) Diarch
17. The triad of sporangia is called:  
(a) hirers (b) **syngonium** (c) Jacket (d) tapetum
18. The primary androgonial cell divides to produce a mass of:  
(a) Androgonial (b) **androcytes** (c) Antherozoid (d) None
19. Match ligule with one of the followings:

- (a) Root (b) **Leaf** (c) stem (d) Rhizome
20. Many sporophylls form:  
 (a) **cones** (b) Spores (c) Sporangia (d) None
21. The inner most layer of sporangium of Selaginella is:  
 (a) Elators (b) synangium (c) Jacket (d) **tapetum**
22. Primary ventral cell is formed from:  
 (a) Cover cell (b) Cap cell (c) **Central cell** (d) Axial cell
23. The primary ventral cell give rises to  
 (a) Jacket (b) Tapetum (c) **Oosphere** (d) Oospore
24. The oospore divides into two cells. The upper cell enlarges. It is called:  
 (a) **Suspensor** (b) Cotyledon (c) Embryonal (d) Protonema
25. Mature vascular bundles have a canal called:  
 (a) **carinal** (b) Vellular (c) Central (d) None
26. The stele present in Equisetum is:  
 (a) Haplostele (b) Actinostelele (c) Plectostele (d) **Siphonostele**
27. The outer most layer episope splits to form four bands. These bknds separate from the spore wall on drying. These bands are called:  
 (a) Jacket (b) Tapetum (c) Oosphere (d) **Elators**
28. Sporocarp is formed in:  
 (a) Adiantum (b) **Marsilea** (c) Equisetum (d) Polypodium
29. The son i are produced in hard fruit-bodies in Marsilea called:  
 (a) Sporangia (b) Sporophylls (c) Ovule (d) **sporocarps**
30. In the megasporangium only one spore develops further. All others disintegrate forming a mucilaginous mass or:  
 (a) Jacket (b) Tapetum (c) **plasmodium** (d) Elators
31. Number of layers in the Tapetum of Polypodium is  
 (a) One (b) **Two** (c) Three (d) Four
32. Spore bearing organ of a fern is called  
 (a) **sporophyll** (b) Sorus (c) ramenta (d) none of these
33. Sporophyte of Pteris  
 (a) **is independent of gametophyte from the beginning**  
 (b) is dependent on the gametophyte only in the beginning  
 (c) supplies water and inorganic salt to the gametophyte  
 (d) none of these
34. The number of megaspores in Selaginella rupestris is  
 (a) **one** (b) two (c) three (d) four
35. Stem is polystelic in  
 (a) **Selaginella** (b) Cycas (c) Pinus (d) All of these
36. Circinate venation is found in  
 (a) Cycas (b) Fern (c) **Both (a) and (b)** (d) None of these

37. Fern differs from moss because it has  
 (a) swimming antherozoids (b) independent gametophyte  
 (c) **multiciliate sperms** (d) buihate sperms
38. In Pteris, the petiole has a groove and its stele is  
 (a) **Horse shoe shaped** (b) W-shaped (c) M-shaped (d) Without any definite shape
39. Leptosporangiate sporangium is  
 (a) single-celled (b) multiceiled and formed from many cells  
 (c) multicellular (d) **multiceiled and formed from a single cell**
40. The stele of Lycopodium is  
 (a) polystele (b) siphonostele (c) haplostele (d) **actinostele**
41. Multiflagellate sperms are the characteristic of  
 (a) Mosses (b) Riccia (c) **Ferns** (d) Pogonatum
41. Microsporangia and macrosporangia are found in the same cone of  
 (a) Dryopteris (b) **Selaginella** (c) Psilotum (d) Equisetum
42. In Selaginella, an "organ suigeneris" is  
 (a) rhizoid (b) root (c) ligule (d) **rhizophore**
43. Vessels are not found in the  
 (a) **Dryopteris** (b) Mango (c) Guava (d) Gnetum
44. Gametes are produced in prothallus by  
 (a) anthers and archegonia (b) ascogonium and anthers  
 (c) **antheridia and archegonia** (d) none of these
45. Most primitive living vascular plants are  
 (a) Brown algae (b) Sphagnum (c) Cycads (d) **Ferns**
46. Stele includes  
 (a) vascular tissue (b) vascular tissue and pith  
 (c) **vascular tissue, pith and pericycle** (d) pith, pericycle and endodermis
47. Meristemes are found in  
 (a) pinus needle (b) fern leaf (c) cycas stem (d) **fern rhizome**
48. Foliar gap in vascular cylinder of fern is  
 (a) **Parenchymatous zone** (b) air spaces

(c) exclusively xylem area (d) exclusively phloem area

49. Pith is absent in

(a) siphonostele (b) solenostele (c) dictyostele (d) **protostele**

50. Simplest stele is

(a) **protostele** (b) dictyostele (c) stenostele (d) plectostele

51. Parthenocarpic fruits with no seeds are

(a) bananas (b) pineapples (c) oranges (d) **all of the above**

52. Apospory is direct formation of

(a) **Gametophyte from sporophyte** (b) Gametophyte from gametophyte  
(c) Sporophyte from gametophyte (d) Sporophyte from sporophyte

53. Parthenogenesis is development of new individual from

(a) **A single gamete without fertilization** (b) Fertilization of female gamete with female gamete  
(c) Fertilization of male gamete with male gamete (d) Vegetative structure

54. Union of two gametes of one sex is known as

(a) Apogamy (b) Parthenoapogamy (c) **Parthenogamy** (d) Parthenogenesis

55. Which of the followings is correct for vascular bundle of gymnosperms?

(a) Stele (b) Exarch (c) **Collateral** (d) Conjoint

56. Secondary growth occurs by the activity of:

(a) Phloem (b) Xylem (c) **Cambium** (d) Bark

57. Which of the followings is absent in the xylem of gymnosperms?

(a) Tracheids (b) Parenchyma (c) Fibers (d) **Vessels**

58. Bark is produced by the activity of:

(a) Phloem (b) Xylem (c) Cambium (d) **Phellogen**

59. Generative cell represents the reduced:

(a) **Antheridium** (b) Archegonium (c) Oogonium (d) Antherozoids

60. The unutilized prothallial cell becomes:

(a) **Endosperm** (b) Archegonium (c) Oogonium (d) Antherozoids

61. Adventitious root system is found in:

(a) **Pteridophytes** (b) Gymnosperm (c) Bryophyte (d) All

62. Endosperm in gymnosperm is:

(a) **Haploid** (b) Diploid (c) Triploid (d) None

63. Endosperm in Angiosperms is:

(a) Haploid (b) Diploid (c) **Triploid** (d) None

64. Ovule is absent in:

(a) **Pteridophytes** (b) Gymnosperm (c) Angiosperm (d) All

65. Egg is present in:

- (a) Ovule (b) **Venter** (c) Neck (d) None
66. Which of the following is called living fossil?  
 (a) Ephedra (b) Pinus (c) **Cycas** (d) Ginko
67. The outer most layer of the sporogenous tissue forms the  
 (a) **Tapetum** (b) Spores (c) Neck (d) Wall
68. Megasporangium is  
 (a) Pollen sac (b) **Ovule** (c) Seed (d) Venter
69. Sago is a starch obtained from the pith and cortex of the stem of  
 (a) *Cycas revolute* (b) *Ephedra* (c) *Pinus* (d) *Williamsonia*
70. Ephedrine, an alkaloid extracted from  
 (a) ***Ephedra*** (b) *Cycas* (c) *Pinus* (d) *Taxus*
71. Canadabalsam is a resin obtained from  
 (a) ***Abies balsamea*** (b) *Araucaria* (c) *Pinus* (d) *Sequoia*
72. In which of the following group would you place a plant which produce seeds but lacks flower.  
 (a) Fungi (b) Pteridophytes (c) Bryophytes (d) **Gymnosperms**
73. A gymnospermic plant  
 (a) Bear flower (b) Exhibit no vascular tissue  
 (c) **Produces seeds in cones** (d) Does not produce seeds in cones
74. Megasporophyll is the term used in gymnosperm to denote  
 (a) **Carpels** (b) Stamens (c) Leaves (d) Female cone
75. A megasporium is also known as  
 (a) ovule (b) **nucells** (c) fruit (d) micropyle
76. Perisperm is  
 (a) out growth of the outer integument (b) **serviving nucells in the seed**  
 (c) out growth of funicles (d) all of these.
77. Gymnosperm differ from angiosperm  
 (a) having seeds (b) having fruits (c) **having naked ovules** (d) none of these
78. Alternation of generation is exhibited by  
 (a) bryophytes (b) pteridophytes (c) gymnosperms (d) **all plants**
79. In which of the following feature angiosperm resemble gymnosperm  
 (a) presence of ovules (b) **presence of vessel** (c) nature of endosperm (d) mode of fertilization
80. Endosperm in gymnosperm is formed  
 (a) at the time of fertilization (b) **before fertilization**  
 (c) after fertilization (d) along with the development of embryo.
81. In gymnosperm pollination is exclusively by  
 (a) animals (b) **wind** (c) insects (d) water.
82. Phloem of gymnosperm differ from angiosperm is  
 (a) having parenchyma (b) **having no companion cells**

(c)having no sieve tubes      (d)having no sclerenchyma

83. Largest sperms are found in

(a) *Pinus*      (b) ***Cedrus***      (c) *Cycas*      (d) *Gnetum*

84. Zooidogamy is seen in

(a) ***Cycas***      (b) *Gnetum*      (c) *Pinus*      (d) *Angiosperm*

85. Coralloid roots are found in

(a) ***Cycas***      (b) *Pinus*      (c) *Dryopteris*      (d) *Lycopodium*

86. The most advanced order in gymnosperms

(a) Cycadales      (b) Coniferales      (c) **Gnetales**      (d) Taxales

87. The most common ornamental species of *Cycas* is

(a) *Cycas circinalis*      (b) ***Cycas revolute***      (c) *Cycas ramphii*      (d) *Cycas beddomei*

88. Which of the following is considered as “living fossil”

(a) *Pinus*      (b) ***Cycas***      (c) *Zamia*      (d) *Podocarpus*

89. The leaves of *Cycas* is

(a) **Pinnately compound**      (b) palmately compound      (c) simple      (d) solitary

90. Special type of roots inhabited by microbes in *Cycas* is called

(a) adventitious root      (b) microbial root      (c) N<sub>2</sub> fixing roots      (d) **coralloid roots**

91. The wood of *Cycas* is

(a) **manoxylic**      (b) pycnoxylic      (c) comoact wood      (d) duramen

92. A characteristic feature of stem of *Cycas* is

(a) monopodial      (b) erect      (c) **presence of large number of leaf traces**      (d) dichotomous

93. Coralloid roots are

(a) **dichotomously branched and negatively geotropic**

(b) dichotomously branched and positively geotropic

(c) extensively branched and negatively phototropic

- (d) dichotomously branched with horizontal growth
94. The tissue involved in lateral conduction of leaflets in *Cycas* is  
(a) conductive tissue (b) lateral conductive tissue (c) **transfusion tissue** (d) transportation tissue
95. *Cycas* plants are  
(a) homosporous and dioecious (b) homosporous and monoecious  
(c) **heterosporous and dioecious** (d) heterosporous and monoecious
96. *Cycas* has the largest ovule among spermatophyte and is  
(a) **orthotropus** (b) anatropus (c) camphylotropus (d) amphitropus
97. Which of the following plant has the largest sperm in the plant kingdom  
(a) *Gnetum* (b) *Pinus* (c) *Agathis* (d) *Cycas*
98. Endosperm in *Cycas* is  
(a) **haploid and pre fertilization product** (b) diploid and pre fertilization product  
(c) haploid and post fertilization product (d) diploid and post fertilization product
99. *Cycas* stem is good source of edible starch called  
(a) cyco (b) **sago** (c) *Cycas* starch (d) sigo
100. Cycadales originated in  
(a) Mesozoic era (b) coenozic era (c) **Paleozoic era** (d) none of these

## **Part-B**

### **Unit-1**

1. Write about general lifecycle of pteridophytes.
2. Write down the characteristic features of Pteridophytes.
3. Write a short note on gametophyte of *Psilotum*.
4. Explain about anatomy of *Lycopodium clavatum*.
5. Write a short note on embryogeny of Lycopsidea.

6. Explain briefly about sporophyte of Psilotopsida.
7. Write short note sporophyte of Lycopsida.
8. Explain about embryogeny of Psilotopsida.
9. Draw a neat sketch on anatomy of *Psilotum*.
10. Explain briefly about sporophyte of sphenopsida.

### **Unit-2**

11. Write a short note on gametophyte of Pteropsida.
12. Write a short note on sporophyte of Pteropsida.
13. Explain about embryogeny of Pteropsida.
14. Write about types of sori development in ferns.
15. Write short on classification of Pteropsida.
16. What is mean by heterospory and seed habit?
17. Explain about apospory, apogamy and parthenogenesis.
18. Listout the economic importances of Pteridophytes.
19. Explain about orgin of Pteridophytes
20. Explain about evolution of Pteridophytes
21. Write short note on anatomy of *Equisetum*.

### **Unit-3**

22. Point out the characteristic features of gymnosperms.
23. Write about general lifecycle of gymnosperms.
24. Explain about morphology and anatomy of *Ephedra*.
25. Give the brief note on pentoxylales.
26. Explain about morphology and vegetative reproduction of *Cycas*.
27. Write brief note on *Pentoxylon*.
28. Write about anatomy and embryogeny of *Williamsonia*.

29. Give a brief note on Pteridospermales.
30. Write about general characters of Pteridospermales.
31. Explain about sexual reproduction of *Cycas*.

#### **Unit- 4**

32. Give a general note on Coniferales in brief.
33. Write about morphology, anatomy of *Pinus*.
34. Compare the morphology and anatomy of *Ginkgo* with *Gnetum*.
35. Write down the affinities of Gymnosperms with Angiosperms.
36. Write about affinities of Gymnosperms with Pteridophytes.
37. Explain about sexual reproduction of *Gnetum*.
38. Write a short note on *Araucaria*.
39. Explain about morphology and eubryogeny of *Podocarpus*.
40. Explain the family Cupressaceae and its sub families.
41. Write about anatomy and morphology of *Taxus*.

#### **Unit- 5**

42. What are fossils? Explain about it.
43. Write about types of fossils with diagram.
44. How the fossil plants are named?
45. Write short note Indian contribution towards fossil resources.
46. Give a brief note on radiocarbon dating.
47. Write about contribution of Prof. Birbal Sahni in palaeobotany.
48. List out the uses of radiocarbon dating
49. Write short note on fossilization.
50. Explain about palaeobotany.
51. How fossil plants are named?

## **Part- C**

### **Unit- 1**

1. Explain about sporne classification of Pteridophytes.
2. What are the types of life cycles seen in Pteridophytes.
3. Explain about sporophyte, gametophyte and embryogeny of Psilotopsida.
4. Explain about sporophyte, gametophyte and embryogeny of Lycopsidea.
5. Explain about sporophyte, gametophyte and embryogeny of Sphenopsida.

### **Unit- 2**

6. Explain the types of stele and its evolution in detail.
7. Give a detailed note on gametophyte, sporophyte and embryogeny of *Ophioglossum*.
8. Write about sporophyte of Eusporangiate.
9. Explain about anatomy of Leptosporangiate.
10. Give detailed note on anatomy and embryogeny of marsileales.

### **Unit-3**

11. Write down the classification of gymnosperms by sporne (1965).
12. Explain about classification and affinities of Pteridospermales.
13. Compare the morphology, anatomy, reproduction and phylogeny of *Ephedra* with *Cycas*.
14. Explain about Benettitales in detail.
15. Write a detailed note on Ephedrales.

### **Unit- 4**

16. Write about economic importance of Gymnosperms.
17. Explain about the affinities of Gymnosperms with Angiosperms and Pteridophytes.
18. Write about morphology, anatomy, reproduction and phylogeny of Gnetum.
19. Compare the characters of *Pinus* with *Araucaria*.
20. Write a detailed note on coniferales.

## **Unit- 5**

21. Write about Geological time scale.
22. Explain about fossils and fossilization.
23. Write about nomenclature of fossil plants.
24. Explain the techniques involved in radiocarbon dating.
25. Write about Contribution of Prof. Birbal Sahni in the field of paleobotany.