**Semester-II**

**Core Course IV: Archegoniate Course Code: BOTACOR04T**

**Unit 4: Pteridophytes & Unit 5: Type Studies- Pteridophytes**

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**Few important short questions and model answers**

1. **Distinguish between microsporophylls and megasporophylls ?**

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| --- | --- |
| **Microsporophyll** | **Megasporophyll** |
| 1. Small in size
 | 1. Large in size
 |
| 1. It is provided with unbranched midrib
 | 1. It is provided with branched mid rib
 |
| 1. Leaf traces are without leaf gaps
 | 1. Leaftraces are with leaf gaps
 |
| 1. Leaf margins are always entire
 | 4.The leaf margins may be lobed |
| 1. These are sessile
 | 5.May be sessile or petiolate |
| 1. Leaves are always simple
 | 6.Leaves are may be simple or compound |
| 1. Phyllogenetically primitive
 | 7.Phyllogenetically advanced. |
| 1. E.g. *Lycopodium, Selaginella*
 | 8.E.g. *Marsilea, Adiantum* |

1. **What is indusium ? Where it is found?**

The covering of sorus in ferns are called indusium. It is two layered in *Marsilea*.

1. **Distinguish between *Equisetum* and *Calamites*** ?

|  |  |
| --- | --- |
| ***Equisetum*** | ***Calamites*** |
| 1. Plant body is extant
 | 1. Plant body is extint
 |
| 1. Presence of central cavity in place of pith
 | 2.This cavity is absent |
| 1. Presence of incipient heterospory
 | 3.This phenomenon is absent |
| 1. Presence of elater for spore dispersal
 | 4.Elater is absent |

1. **Comment on the trilobed sporangium of *Psilotum***
2. Bierhorst (1956) believes that the trilocular sporangium is cauline in origin and develops early as an outgrowth. The bifid appendage develops from the base of the sporangial stalk.
3. Synangium is formed by the fusion of three sporangia. Rarely more than 3 sporangia may also found.
4. **Highlight the importance of heterospory**.

Heterospory is the most important evolutionary development in vascular plants, as it ultimately leads to seed development. It is rather pre-requisite to seed habit. It is now generally believed that heterosporus habit arose as a result of reduction of spore mother cells in a sporangium, as is seen in *Selaginella.* In the said genus, all the spore mother cells of a megasporangium die, leaving only one. The functional megaspore mother cell forms haploid megaspores, which receive all the food matters from the degenerated spores, thus making the surviving spores larger in size, resulting in the formation of heterospory.

1. **Define rhizophore. Give example.**

In majority of the species of *Selaginella*, at the ventral surface of each dichotomy, a cylindrical, colourless, leaf less, prop root like structure develops, called as rhizophore. Rhizophore is absent in *Selaginella selaginoides*.

1. **Write the diagnostic features of Progymnosperm**.
2. Progymnosperm having gymnospermic secondary wood with free sporing pteridophytic reproduction.
3. The vascular systems were of different types, ranging from a protostele to a eustele with mesarch primary xylem.
4. The plants produced fusiform sporangia, that were borne along the adaxial or lateral surface of branches or on modified leaves.
5. The plants were either homosporus or heterosporus.
6. The plants showed a pseudomonopodial branching pattern without forming any axillary bud.
7. **Mention the anatomical differences in the nodal and intermodal regions of *Equisetum.***
8. Pith is present in nodal region, whereas in intermodal region it is absent.
9. Internodal region is ribbed, nodal region is not.
10. **What is trabeculae? Name the genus where it is found.**

In *Selaginella* (Stem anatomy), cortex is limited due to the presence of a large air filled cavity. At the centre of which lies a vascular bundle, remain suspended by radially placed trabeculae. Actually, trabeculae are the modified endodermis, connected between the inner most region of cortex and outer most layer of endodermis.

Trabeculae is present in *Selaginella.*

1. **Enumerate the similarities between *Rhynia* and *Psilotum*.**

Leaf less, root less, dichotomously branched plant body. Vascular bundle protostelic.

1. **Differentiate carinal canal from vallecular canal.**

In the cortical region of the rhizome of *Equisetum*, a large air filled cavity is present, called as vallecular cavity or vallecular canal.

In each vascular bundle of rhizome of *Equisetum*, a large airfilled cavity is present, formed by the breakdown of the protoxylem element of vascular bundles. This cavity is called carinal cavity or carinal canal.

1. **What is synangium?**

Synangium is a number of sporangium, group together in such a way that, their walls fuse with each other and the sporangia become inseparable from each another. Synangium is present in *Psilotum.*

1. **What is peltate sporangiophore? Where is it found?**

In *Equisetum*, each sporangiophore consist of a short cylindrical stalk, with a terminal flattened disc, situated in a peltate manner. Each plate contains 5-10 sporangia. This type of sporangiophore is called peltate sporangiophore.

E.g. -*Equisetum*

1. **What is elater? What is its function?**

Mature spore of Equisetum has 4 layered wall, from inside to out side they are intine, exine, middle layer and outer most layer the epispore or perispore. The outer most layer split open to form 4 ribbon shape structure, with spathulated ends, called as elater.

Elater help in the dispersal of the spore of *Equisetum.*

1. **Comment on the primitive characters of *Psilotum****.*

a. Presence of synangium

b. Presence of enation

1. **Explain incipient heterospory**.

In *Equisetum*, the spores are morphologically similar, but on germination they may give rise either dioecious prothallus or monoecious prothallus. So the heterospory of Equisetum is incipient type.

1. **What is telome?**

Zimmermann defines the telome as the single nerved extreme portion (At base or apex) of the plant body from the tip to the next point of branching. The telome may be fertile, bearing sporangium or sterile when it is called as phylloid.

1. **Xerophytic and hydrophytic characters of Horsetails**

**Xerophytic characters:**

1. Stems are photosynthetic, leaves are non photosynthetic
2. Aerial axis remain covered with silica
3. Inter nodes are with ribbed

**Hydrophytic characters:**

1. Presence of carinal cavity
2. Presence of vallecular cavity
3. Presence of central cavity in place of pith