## Chapter-3 : Plant Kingdom

1. **(d)** Phanerogams means seed bearing plants. Gymnosperms and angiosperms both possess seeds.
2. **(a)** Algae possess a definite cell wall containing cellulose, galactans and mannans.
3. **(b)** 4. **(a)** 5. **(a)** 6. **(c)**
7. **(c)** Heterospory is the production of spores of two different sizes and of two different developmental patterns–smaller male or microspores and larger female or megaspores. Heterospory is the most important evolutionary development in the vascular plant because it has ultimately led to seed development e.g., *Selaginella*, *Salvinia*, *Azolla*, etc.
8. **(b)** Bryophytes show two morphologically distinct heteromorphic generations, *i.e.*, gametophytic and sporophytic generations. Gametophytic generation is the dominant phase of life cycle and in general term 'plant body' is used to represent this phase. In bryophytes, sporophyte is originally attached and is nutritionally dependent upon the gametophyte.
9. **(d)** 10. **(a)** 11. **(b)** 12. **(b)**
13. **(b)** 14. **(d)** 15. **(d)** 16. **(b)**
17. **(b)** 18. **(c)** 19. **(d)** 20. **(d)**
21. **(b)** *Volvox* is colonial green alga. The cells are like unicelled alga *chlamydomonas* and are definitely organized in the form of a colony called coenobium. The coenobia of *Volvox* are largest, highly differentiated and well evolved among motile forms. Each coenobium is motile, the movement is brought about by the joint action of the flagella of individual cell.
22. **(b)** Gymnosperms are heterosporous, *i.e.*, produce two different kinds of spores — the male (microspores) and the female (megaspores). The spores are borne inside the sporangia. The two types of sporangia (microsporangia and megasporangia) are borne on special leaf-like structures, called microsporophylls (= stamens) and megasporophylls (= carpels) respectively. The sporophylls are usually aggregated in the form of compact structures called cones or strobili. The cones are generally unisexual, *i.e.*, the male cones are microsporangiate (pollen cones) and the female cones are megasporangiate (seed cones).
23. **(c)**
24. **(a)** *Funaria* exhibits gametophytic ($n$) as well as sporophytic ($2n$) generation in its life cycle. The gametophytic generation is represented by a short lived protonema which produces spermatozoids in antheridium of male shoot and egg in archegonium of female shoot. Sporophyte of *Funaria* has embedded foot, an elongated curved seta and a terminal pyriform capsule. Sporophyte is nutritionally dependent on gametophyte.
25. **(b)**
26. **(b)** Endosperm is haploid ($n$) because it is formed before fertilisation. Megaspore mother cell divides reductionally to form a linear tetrad of haploid megaspores and microspore (= pollen grain), which is the first stage of the gametophyte ($n$).
27. **(d)** *Sphagnum* is a bryophyte in which male and female gametophytes are independent and free living. In *Pinus* (a gymnosperm), mustard and castor (angiosperm), the main plant body is sporophytic while gametophyte is highly reduced and is completely dependent on sporophyte.
28. **(d)**
29. **(d)** Unlike bryophytes and pteridophytes, in gymnosperms the male and female gametophyte do not have an independent free living existence. They remain within the sporangia retained on sporophyte.
30. **(a)** Archegonia are not formed in *Ginkgo*.

**31.** **(c)** The given life cycle is haplo-diplontic or diplo-haplontic life cycle, in which haploid gametophytic phase and diploid sporophytic phase alternate with each other. The gametophytic plant ($n$) produces gametes ($n$), which fuse to give rise diploid zygote ($2n$). Zygote grows to form sporophytic plant body ($2n$). Meiosis occurs in the sporophyte at the time of formation of spores and the spores germinate to produce gametophytic plants. Bryophytes and pteridophytes exhibit this life cycle pattern. Algae exhibit haplontic life cycle pattern and gymnosperms and angiosperms follow diplontic life cycle pattern.

**32.** **(c)** In the prothallus of a vascular cryptogams, the antherozoids and eggs mature at different times which result in failurity of self-fertilisation.

**33.** **(a)** Some red algae deposit calcium carbonate on their surface. They are called coralline algae. They help to develop coral reefs along with corals.

**34.** **(d)** **35.** **(b)** **36.** **(b)**

**37.** **(c)** Rarely three filaments may take part in scalariform conjugation. Here the central filament shows relative sexuality and behave as male to one and female to other so that zygospore are formed in either central or lateral filaments.

**38.** **(a)** The number of chromosomes of the second generation will be same because no reduction division takes place.

**39.** **(d)**

**40.** **(b)** Capsule wall is a diploid part of sporophyte, if protonema is develops from its cells, it must be diploid.

**41.** **(a)** Because endosperms of *Pinus* are always haploid and is formed before fertilization in ovules.

**42.** **(b)** **43.** **(b)** **44.** **(b)**

**45.** **(b)** Pteridophytes are vascular cryptogams. They are the first vascular land plants.

**46.** **(a)**

**47.** **(c)** The male gametes of bryophytes are biflagellated and those of pteridophytes are multiflagellated, except *Selaginella* having biflagellated gametes. The male gametes of gymnosperms are non motile except those of *Cycas* having multiciliate gametes.

**48.** **(d)** Male and female gametophytes of *Cedrus* do not have free living independent existence. *Cedrus* belongs to conifer (gymnosperm).

**49.** **(b)** **50.** **(c)** **51.** **(a)** **52.** **(a)**

**53.** **(a)** **54.** **(b)**

**55.** **(c)** Cryptogams are the plants without seeds. In the given flowchart, 'P' represents algae in which sex organs are usually unicellular and non-jacketed. 'Q' represents pteridophytes, in which both sporophytic and gametophytic generations are independent. 'R' represents bryophytes in which diploid sporophyte lives as a parasite on an independent haploid gametophyte. All known members of bryophytes have been found to be homosporous. 'S' and 'T' respectively represent angiosperms and gymnosperms, which are included under phanerogams. Gymnosperms evolved earlier and thus are more ancient than angiosperms. Gymnosperms formed dominant flora on earth about 200 million years ago in the mesozoic era.

**56.** **(c)** Require water for fertilization as their sperms are motile.