Q: Choose the right answer:

1- ---------- have megaphyllous leaves, which are large, compound with dissected veins.

a) *Selaginella* b) *Lycopodium* c) *Marsilea*

2- In pteridophytes, sporangia are born on special leaves called ----------.

a) foliage leaves b) scale leaves c) sporophylls

3- In pteridophyte, when sporophyte produce one type of spore called ----------.

a) heterosporous sporophyte b) homothallic sporophyte c) homosporous sporophyte

4- In ----------, antheridia and archegonia are bearing on antheridiophore and archegoniophore respectively.

a) *Anthoceros* b) *Funaria* c) *Marchantia*

5- Root is absent in bryophytes, the ---------- perform the function of roots

a) rhizoids b) scales c) specialized cell in epiderm

6- Pteridophytes fall into 4 distinct groups on the basis of----------

a) vegetative structure b) sporangial structure and manner in which sporangia are borne c) both (a & b)

7- Pteridophytes are ---------- vascular plants.

a) seed producing b) seedless c) flowering

8- In hornworts, sporogenous cells is ---------- in origin.

a) amphithecial b) endothecial c) endothecial or amphithecial

9- Growth of anthocerotopsida sporophyte is --------

a) determinate b) indeterminate c) laterally

10- Prteridophytes differ from bryophytes in having ---------- independent plant at maturity.

a) both sporophyte and gametophyte b) only gametophyte c) only sporophyte

11- Antheridia and archegonia are embedded in the ---------- of the anthoceros thallus

a) ventral surface b) dorsal surface c) apical notch

12- The sporophyte of *Riccia* consist of ----------

a) only capsule b) foot and capsule c) foot, seta and capsule

13- In *Anthoceros*, during development of sporophyte, columella is formed by ----------

a) endothecium b) amphithecium c) both a & b

14- The primitive type of stellar construction in pteridophytes is ----------

a) siphonostele b) protostele c) dictyostele

15- Production of sporophyte from gametophyte without any gametic union is called ----------
a) Apospory b) Apogamy c) Parthenogenesis

16- The sporophyte of *Anthoceros* consist of ----------
a) only capsule b) foot and capsule c) foot, seta and capsule

17- In *Marchantia* the ----------are dispersed into the winds by the twisting motions of numerous elaters
a) gametes b) spores c) zygotes

18-*Funaria* is ----------because the male (antheridium) and female (archegonium) reproductive structure are developed on separate shoots of the same plants.
a) synoicous b) autoicous monoiceous c) paroicous

19- Mature gametophyte in bryopsida is differentiated into ----------
a) dorsoventrally thallus b) upright branched axis and spirally arranged leaves c) dorsoventrally undifferentiated thallus

20- In ---------- the female sex organs is called archegonium.
a) Bryophytes b) pteridophytes c) both (a & b)

21- More advanced sporophyte of prteridophytes are ----------
a) homosporous b) homothallic c) heterosporous

22- Stele with leaf gap always have ---------- leaves
a) sporophyllous b) microphyllous c) megaphyllous

23- Bryophytes have ecological importance they are ----------
a) capture and recycle nutrients that are washed with rain water from the canopy b) bind the soil to keep it from eroding c) both a & b

24- In Anthoceros, the columella is a sold column of sterile tissue situated at ---------- part of capsule
a) peripheral b) basal c) central

25- In V.T.S. of *Marchantia* thallus, storage region appear to be a compact zone comprised of polygonal ----------
a) chloroplast containing parenchymatous cell b) parenchymatous cell devoid of chloroplast c) collenchyma cell

26- The internal structure of *Anthoceros* gametophyte or thallus show ----------
a) differentiation of tissue b) no differentiation of tissue c) a very complex cellular structure

27- The great majority of Eubrya have the upper part of a capsule maturing into --------
a) apophysis b) collumella c) operculum and peristome

Q: Fill the blanks below with suitable words

1- In protosetele, ---------- are more primitive than actionostele and the most advanced actinostele is ----------.

2- The antheridia are develop on antheridiophore in *Marchantia*, in a rows in a cropetalous manner, i.e., the ---------- and ----------.

3- According to the presence or absence of leaf gaps, the vascular plants are divided into 2 groups, the ---------- and ----------.

4- In mosses, the ---------- leaves immediately next to the sex organs, may different in size and shape from foliage leaves on lower stem.

5- The capsule of *Anthoceros* is surrounded by a tubular sheath called ----------.

6- Sporophyte of pteridophyte may be ----------, produce one type of spores or ----------, produce two type of spores.

7- Apogamy and apospory are known to be very widespread among ---------- and frequently a plant is both apogamous and aposporous.

8- Gemma is ---------- they are produced in gemma cup scattered over the ----------.

9- Scales in *Marchantia* are of two types ---------- and ----------.

10- The stalk of archegoniophore in *Marchantia* begins to elongate just after----------.

11- During development of *Funaria* sporophyte, both hypobasal and epibasal cells divided to form an embryo with ---------- at the ----------.

12- Bryophytes have a sharply defined ---------- alternation of generations in which the sporophyte although ---------- distinct from gametophyte attached to it and never become independent plant.

13- The vascular connection between the stele and the base of a leaf in pteridophytes is called ------.

14- Gametophytes of Eubrya are differentiates into two portions, a prostrate ---------- and upright ----------.

15- The typical life cycle of pteridophytes consist of ---------- alternation of sporophytic and gametophytic generation where both generation is nutritionally ----------.

16- Embryophytes are the plants where the zygote forms an ----------.

17- The ventral surface of *Marchantia* bears two type of unicellular rhizoid ---------- and ----------.

18- In hepaticopsida, protonema is ---------- and form a ---------- bud.

19- ---------- Reproduction is completely absent in bryophytes.

20- In bryophyte the female sex organ called ---------- are ---------- Shaped.

21-Production of gametophyte from sporophyte without any spore formation is ----------.

22- Rays of archegoniophore in *Marchantia* are long stout and green ---------- that give the mature female receptacle an umbrella like appearance.

23- During development of *Funaria* sporophyte the ---------- enlarges and form calyptra which covers the capsule till maturity.

24- Bryophytes is the first group of plants to invade the land, though they require water for ----------.

Q: Indicate True or False statement.

1- Unlike most of the higher plants, bryophytes are not found as single individuals but in groups that grow closely packed together in mats or cushions.

2- In the leafy forms of liverworts, the leaves are arranged on the stem in two ventral and one lateral rows or ranks.

3- In pteridophytes, the *tracheid* is the fundamental element of the xylem and is matured from a single embryonic cell.

4- Sporophyte of pteridophytes is predominate plant body, it is differentiated into rhizoids, stem and leaves.

5- Development of sporangia may be Eusporangiate (development of sporangium from single initials) or Leptosporangiate (development of sporangium from several initials).

6- The liverworts disperse the entire spore mass of a single capsule in just a few months.

7- Epidermal cells at the base of an operculum of Eubrya, enlarge radially to form an *annulus* whose lowermost cells are thick walled at maturity

8- More advanced siphonosteles have the distal end of the trace divided into more than one strand or have a leaf supply consisting of more than one trace.

9- When spores that produced by homospourous sporophyte of pteridophytes, germinate they develop into unisexual gametophyte (prothallium)

10-The capsule wall of *Anthoceros* have photosynthetic paranchmatous cell thuse sporophyte can produce their s own food by photo synthesis

Q: What are the similar features between bryophytes and pteridophytes that make a reason for thinking of presence a phylogenetic relation between them?

Q: Answer only one:

1- Draw and labels developmental stages in *Funaria* arechegonia.

2- Draw and label types of protostele in pteridophytes.

Q: Mosses are differs from both liverworts and hornworts in three main characters, mention them?

Q: Write the differences between megaphyllous and microphyllous leaves.

Q: Answer only one

A) Draw and label developmental stages in archegonia in *Marchantia*.

B) Draw and labels types of siphonostele in pteridophytes.

Q: Define (5) of the following:

Archegonium, Pseudoelaters, Apospory, Scales, Antheridiophore, gemma in *Marchantia*, Elaters

Q: Answer only (2) of the following:

A: Compare between **Anthocerotopsida** and **Bryopsida** in the following aspects:

1- Gametophyte 2- Sporophyte 3- Capsule 4- Origin of sporogenous cells

B: Mention orders belong to class **Hepaticopsida**

C: Write down types of vegetative reproduction in ***Anthoceros*** in detail**.**

Q4: Draw and label the stages in the development of Antheridium in *Marchantia*.