

BOT 125 - Plant Morphology

Summer 2000, Final

1. Read these directions before you begin.
2. Write your name on your Scantron sheet and make sure it is on the 8½×11 cheat sheet (tests without names will not be graded).
3. Write the number of your lab section on the Scantron sheet in the box marked Hour (sect. 1 = mw 12-3 [Melissa], sect. 2 = MW 3-6 [Jon]). Scantrons without lab sections will have one point deducted from the total.
4. Check this test to make sure it has all pages, 1 4.
5. Mark all answers on the Scantron sheet. There is only one correct answer to each question.
6. When you are finished, turn in both the Scantron and the 8½×11 cheat sheet on the front table. Please keep this sheet.

-
1. _____ are always diploid.
 - a. megaspores
 - b. rhizoids
 - c. sporangiophores
 - d. synergids
 - e. thalli
 2. _____ are always haploid.
 - a. archegoniophores
 - b. elaters
 - c. meiocytes
 - d. nucellus cells
 - e. zygotes
 3. A group of meiosporangia fused together, such as we find in the Psilotophyta and Anthophyta, is called a(n)
 - a. nucellus
 - b. ovary
 - c. sorus
 - d. sporophyll
 - e. synangium
 4. A pollen grain is
 - a. a microspore
 - b. a microsporocyte
 - c. a sperm cell of a seed plant
 - d. an endosporic male gametophyte
 - e. an exosporic female gametophyte
 5. A seed plant lives in the mountains, forms a tall tree, has needle leaves, is dioecious, and has fruits. It must be a member of the division
 - a. Anthophyta
 - b. Coniferophyta
 - c. Cycadophyta
 - d. Psilotophyta
 - e. Pterophyta
 6. A typical seed consists of ____ generation(s): ____.
 - a. 1 a gametophyte only
 - b. 2 an embryonic gametophyte and its sporophyte parent
 - c. 3 an embryonic sporophyte, its gametophyte parent, and its sporophyte grandparent
 - d. 4 an embryonic gametophyte, its sporophyte parent, its gametophyte grandparent, and its sporophyte great-grandparent
 - e. 5 an embryonic sporophyte, its gametophyte parent, its gametophyte grandparent, its sporophyte great-grandparent, and its *doppelganger* from Duarte.
 7. An important feature of the vascular plants is free-living adult sporophytes. Why is this feature important?
 - a. It allows the sporophytes to become large enough to branch and produce more meiosporangia.
 - b. It eliminates the need for gametophytes.
 - c. It increases the number of archegonia per gamete.
 - d. It prevents self-fertilization.
 - e. It transports water to the leaves.
 8. An integument turns into a(n) _____, an ovule turns into a(n) _____, and an ovary turns into a(n) _____.
 - a. nucellus . . . sclerotesta . . . sarcotesta
 - b. nucellus . . . seed coat . . . seed
 - c. seed . . . seed coat . . . fruit
 - d. seed coat . . . egg . . . gametangium
 - e. seed coat . . . seed . . . fruit
 9. An ovule can best be described as
 - a. a female gametophyte
 - b. a megaspore in a pericarp
 - c. an egg in an ovary
 - d. an integumented megasporangium
 - e. an ovum inside an archegonium
 10. *Chara* of the Charophyceae (Chlorophyta) is similar to the land plants because they both have
 - a. gametangia with sterile jackets
 - b. alternation of generations
 - c. stomata
 - d. free-living sporophytes
 - e. stems made of large, multinucleate cells

11. Cyanobacteria that are symbiotic in plants provide _____ and get _____ in return
- fixed nitrogen . . . light, protection, and nutrients
 - fixed nitrogen . . . nothing
 - food . . . light
 - food . . . nothing
 - nothing . . . light, protection, and nutrients
12. Endosporic male gametophytes are found in *all* members of the
- Anthoceroophyta
 - Anthophyta
 - Lycophyta
 - Pterophyta
 - Sphenophyta
13. Flowers are unique among the strobili of all living seed plants because
- a single strobilus can contain both pollen and seeds
 - each microsporophyll can hold more than one microsporangium
 - they are formed by sporophytes
 - they have cone scales instead of megasporophylls
 - they produce seeds
14. Gametophytes of heterosporous Pterophyta
- are diploid
 - are endosporic
 - are free-living and photosynthetic
 - have phloem and xylem
 - never have antheridia
15. Hepatophyta
- are called stoneworts
 - are homosporous
 - never have leaves
 - produce sporophytes with long setae and peristomes
 - produce xylem and phloem
16. In most seed plants, pollen tubes begin their growth _____, but in Anthophyta, they begin their growth _____.
- in the egg cell . . . in the sperm cell
 - in the micropyle . . . in the anther
 - in the pollen chamber . . . on the stigma
 - on the stigma . . . in the pollen chamber
 - on the style . . . in the nucellus
17. In addition to the large generative cell, most seed plant pollen grains contain several additional small cells called
- antipodal cells
 - microsporocytes
 - prothallial cells
 - protonema
 - tube nuclei
18. In *all* seed plants, the pollen tube
- absorbs nutrients for the developing sperm
 - carries the sperm cells to the egg
 - grows from the stigma down the style to the ovule
 - grows through the micropyle
 - is diploid
19. In Anthophyta, ovules are located inside the
- anther
 - archegonium
 - cone scale
 - megasporangium
 - ovary
20. In Bryophyta and Hepatophyta, parts of the archegonium form a thin sheet of cells called the *calyptra* that covers the developing sporophyte. The calyptra must be
- diploid
 - haploid
 - it has no ploidy level, since the archegonium is not made of cells
 - its ploidy level cannot be determined
 - triploid
21. In Bryophyta, food-conducting cells are called
- hydroids
 - leptoids
 - stomata
 - tracheids
 - trumpet cells
22. In endospermous seeds, food is stored
- in the cotyledons
 - in the endosperm
 - in the female gametophyte
 - in the nucellus
 - in the style and stigma
23. In Ginkgophyta, water-conducting cells are called
- hydroids
 - leptoids
 - sieve cells
 - stomata
 - tracheids
24. In the Psilotophyta, both the gametophytes and the sporophytes have a symbiotic relationship with a fungus. The relationship of the gametophyte is an example of _____ and the relationship of the sporophyte is an example of _____.
- commensalism parasitism
 - mutualism commensalism
 - mutualism parasitism
 - parasitism mutualism
 - parasitism parasitism

25. In the seeds of flowering plants, endosperm and embryo
- are mother and daughter
 - both come from the antipodal cells
 - both die shortly after fertilization
 - have the same parents
 - ordinarily have the same ploidy level
26. Most land plants are protected from ultraviolet radiation by chemical compounds called
- cuticles
 - flavonoids
 - lignins
 - mannitols
 - stomata
27. One of the ways to recognize paraphyletic groups such as the Magnoliopsida is that they have no features unique to them. The Liliopsida are monophyletic, though; what is one feature that is found in all Liliopsida and no other flowering plants?
- flower parts in 4 or 5
 - one cotyledon
 - roots
 - siphonostele
 - wood
28. Organisms that are K-selected
- always exceed the carrying capacity of the environment
 - are ordinarily weeds
 - produce large numbers of low-cost offspring
 - produce few offspring and care for them well
 - usually live in unstable habitats
29. Rhizomes are
- always haploid
 - filaments of one or more cells in contact with the soil or other substrate
 - never found on sporophytes
 - roots
 - underground stems
30. Seed plants reproduce by seeds. Most other land plants reproduce by
- carpospores
 - clonal spores
 - meiospores
 - pollen grains
 - zoospores
31. Some members of the Cycadophyta are pollinated by insects, but the modern Phylum with the greatest number of insect-pollinated species is the
- Anthophyta
 - Coniferophyta
 - Ginkgophyta
 - Gnetophyta
 - Pterophyta
32. The Anthophyta
- are called hornworts
 - are called stoneworts
 - are homosporous
 - have endosporic gametophytes
 - have no sporophytes
33. The basic food storage product of the Cycadophyta is
- glycogen
 - laminarin
 - mannitol
 - paramylon
 - starch
34. The cell walls of the land plants are mainly cellulose, but there is another important cell wall material found only in the vascular plants:
- chitin
 - laminarin
 - lignin
 - silica
 - tannin
35. The combination of pollen and seeds provides an important and novel adaptation:
- embryonic sporophytes
 - endosporic gametophytes
 - fully internal fertilization
 - the ability to live on land
 - vascular tissue
36. The common food transport product of the Anthophyta is
- flavonoid
 - glycogen
 - lignin
 - lipid
 - sucrose
37. The elaters of the Sphenophyta differ from those of the Hepatophyta because
- Hepatophyta elaters are a part of the meiospores
 - Hepatophyta elaters are haploid
 - Sphenophyta elaters are a part of the meiospores
 - Sphenophyta elaters are each made of several cells
 - Sphenophyta elaters are not involved in meiospore dispersal
38. The intercellular spaces in the gametophytes of Anthocerophyta are filled with mucilage instead of air. This is most likely
- because they are diploid
 - because they are primitive and similar to green algae
 - to help the meiospores disperse
 - to permit free gas exchange among the cells
 - to provide a home for symbiotic cyanobacteria

39. The meristematic region that produces secondary xylem and phloem is called the
- apical meristem
 - axillary meristem
 - basal meristem
 - eustele
 - vascular cambium
40. The opening in the integument of an ovule through which the pollen passes is called the
- megapyle
 - meiophyll
 - microphyll
 - micropyle
 - microspore
41. The Phylum of seed plants with the greatest number of species is the
- Anthophyta
 - Coniferophyta
 - Cycadophyta
 - Ginkgophyta
 - Gnetophyta
42. The pollen cones and ovules of the Ginkgophyta are produced on the
- gametophytes
 - leaves
 - long shoots
 - roots
 - spur shoots
43. The single living species of the Ginkgophyta is
- Ginkgo antisiphiliticum*
 - Ginkgo biloba*
 - Ginkgo cerevisiae*
 - Ginkgo flavus*
 - Ginkgoxylon infestans*
44. The structure at the opening of a moss capsule that is made of teeth that flex with changes in humidity is called a
- calyptra
 - columella
 - elater
 - operculum
 - peristome
45. We know that the vascular plants are a monophyletic group (they are all descended from a common ancestor) because they all share a unique homology:
- embryonic sporophytes
 - flowers
 - non-motile sperm
 - seeds
 - xylem
46. You are facing a huge green bean fruit (a giant version of the one you saw sectioned in lab). Inside a cotyledon of an embryo is the answer key to this exam. You have a small chain saw; name the cell layers you will cut through, in the order you encounter them, to reach the key (including the cotyledon that contains it).
- exosperm, endosperm, megasporangium, female gametophyte, cotyledon
 - integument, endosperm, nucellus, pericarp, cotyledon
 - pericarp, integument, nucellus, cotyledon
 - pericarp, integument, nucellus, female gametophyte, cotyledon
 - sarcotesta, sclerotesta, papery layer, nucellus, female gametophyte, cotyledon
47. You are looking at a lichen with apothecia. The fungus that forms it is certainly a member of the _____ and the alga is most likely in the Phylum _____.
- Ascomycota . . . Chlorophyta
 - Ascomycota . . . Cyanobacteria
 - Basidiomycota . . . Chlorophyta
 - Basidiomycota . . . Cyanobacteria
 - Rhodophyta . . . Zygomycota
48. You are looking at the cross-section of a stem, perhaps of a plant in the Lycopphyta. There is a single vascular bundle in the center of the section. This is an example of a
- atactostele
 - dictyostele
 - eustele
 - protostele
 - siphonostele
49. You are reading an article in American Journal of Botany about a newly discovered Phylum of vascular plants. They have many unique features, but you are *not* surprised to find that they
- are heterosporous and homothallic
 - are unable to produce lignin
 - have diploid gametophytes
 - have free-living adult sporophytes
 - have haploid sporophylls
50. You are taking a lab exam. The next station is a sectioned Ginkgo seed. The card says What is the name of the haploid structure at the pin? But the pin is missing. What is the right answer?
- embryo
 - female gametophyte
 - nucellus
 - sarcotesta
 - sclerotesta