BOT 125 - Plant Morphology
Fall 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 exam guide (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 [Dr. Clark], sect. 2 = MW 3-6 [Kim]). 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 exam guide on the front table. Please keep this sheet.

---

1. _____ are always diploid.
   a. antipodal cells
   b. endotesta cells
   c. pollen grains
   d. sperm cells
   e. synergids
2. _____ are always haploid.
   a. endotesta cells
   b. meiocytes
   c. nucelli
   d. polar nuclei
   e. sporophylls
3. A seed plant lives in the mountains, forms a tall tree, has needle leaves with resin ducts, is dioecious, and has fruits. It must be a member of the division
   a. Anthophyta
   b. Coniferophyta
   c. Cycadophyta
   d. Gnetophyta
   e. Pterophyta
4. 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.
5. An ovary turns into a(n) _____, an ovule turns into a(n) _____, and an integument turns into a(n) _____.
   a. egg … gametangium … seed coat
   b. fruit … seed … seed coat
   c. nucellus … seed coat … seed
   d. sarcotesta … sclerotesta … nucellus
   e. seed … seed coat … fruit
6. Cyanobacteria that are symbiotic in plants provide _____ and get _____ in return
   a. fixed nitrogen … light, protection, and nutrients
   b. fixed nitrogen … nothing
   c. food … light
   d. food … nothing
   e. nothing … light, protection, and nutrients
7. Endosporic female gametophytes are found in *all* members of the
   a. Anthocerophyta
   b. Anthophyta
   c. Lycophyta
   d. Pterophyta
   e. Sphenophyta
8. Flowers are unique among the strobili of all living seed plants because
   a. a single strobilus can contain both pollen and seeds
   b. each microsporophyll can hold more than one microsporangium
   c. they are formed by sporophytes
   d. they have cone scales instead of megasporophylls
   e. they produce seeds
9. Fully internal fertilization (sperm cells do not require environmental water) is a feature of all
   a. eukaryotes
   b. green plants
   c. land plants
   d. seed plants
   e. vascular plants
10. Gametophytes of heterosporous Lycophyta
    a. are diploid
    b. are endosporic
    c. are free-living and photosynthetic
    d. have phloem and xylem
    e. never have antheridia

11. Hepatophyta
    a. are called “stoneworts”
    b. are homosporous
    c. never have leaves
    d. produce sporophytes with long setae and peristomes
    e. produce xylem and phloem
12. In most seed plants, pollen tubes begin their growth ____, but in Anthophyta, they begin their growth ___.
    a. in the egg cell … in the sperm cell
    b. in the micropyle … in the anther
    c. in the pollen chamber … on the stigma
    d. on the stigma … in the pollen chamber
    e. on the style … in the nucellus
13. In addition to the large generative cell, most seed plant pollen grains contain several additional small cells called
    a. antipodal cells
    b. microsporocytes
    c. prothallial cells
    d. protonema
    e. tube nuclei
14. In *all* seed plants, the pollen tube
    a. absorbs nutrients for the developing sperm
    b. carries the sperm cells to the egg
    c. grows from the stigma down the style to the ovule
    d. grows through the micropyle
    e. is diploid
15. In Anthophyta, food-conducting cells are called
    a. hydroids
    b. leptoids
    c. stomata
    d. tracheids
    e. trumpet cells
16. In Anthophyta, ovules are located inside the
    a. anther
    b. archegonium
    c. cone scale
    d. megasporangium
    e. ovary
17. In Bryophyta, water-conducting cells are called
    a. hydroids
    b. leptoids
    c. sieve cells
    d. stomata
    e. tracheids
18. In cotyledonous seeds, food is stored
    a. in the cotyledons
    b. in the endosperm
    c. in the female gametophyte
    d. in the nucellus
    e. in the style and stigma
19. In Hepatophyta and Bryophyta, part of the archegonium forms a thin sheet of cells called the *calyptra* that covers the developing sporophyte. The calyptra must be
    a. diploid
    b. haploid
    c. it has no ploidy level, since the archegonium is not made of cells
    d. its ploidy level cannot be determined
    e. triploid
20. In seed plants, the endosporic male gametophyte is also called a(n)
    a. anther
    b. microspore
    c. ovule
    d. pollen grain
    e. sperm cell
21. In the Psilotophyta, both the sporophytes and the gametophytes have a symbiotic relationship with a fungus. The relationship of the sporophyte is an example of _____ and the relationship of the gametophyte is an example of _____.
    a. commensalism … parasitism
    b. mutualism … commensalism
    c. mutualism … parasitism
    d. parasitism … mutualism
    e. parasitism … parasitism
22. In the Psilotophyta, eusporangiate Pterophyta, and Anthophyta, we saw groups of meiosporangia fused together. These are called
    a. nucelli
    b. ovaries
    c. sori
    d. sporophylls
    e. synangia
23. In the seeds of Anthophyta (but not other seed plants), endosperm and embryo
    a. are mother and daughter
    b. both come from the antipodal cells
    c. both die shortly after fertilization
    d. have the same parents
    e. ordinarily have the same ploidy level
24. Most embryophytes are protected from ultraviolet radiation by chemical compounds called
    a. cuticles
    b. flavonoids
    c. lignins
    d. mannitols
    e. stomata
25. Organisms that are r-selected
    a. do poorly in disturbed environments
    b. never exceed the carrying capacity
    c. produce few offspring and care for them well
    d. produce large numbers of low-cost offspring
    e. usually live in stable habitats

26. Rhizoids are
    a. always haploid
    b. filaments of one or more cells in contact with the soil or other substrate
    c. never found on sporophytes
    d. roots
    e. underground stems
27. Seed plants reproduce by seeds. Most other land plants reproduce primarily or exclusively by
    a. carpospores
    b. clonal spores
    c. meiospores
    d. pollen grains
    e. zoospores
28. Seeds of non-flowering seed plants consist 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 mentor from Monrovia.
29. The Anthophyta
    a. are called “hornworts”
    b. are called “stoneworts”
    c. are heterosporous
    d. have exosporic gametophytes
    e. have no sporophytes
30. The basic food storage product of the Anthocerophyta is
    a. glycogen
    b. laminarin
    c. mannitol
    d. paramylon
    e. starch
31. The cell walls of the land plants are mainly cellulose, but vascular plants have an additional cell wall material:
    a. chitin
    b. laminarin
    c. lignin
    d. silica
    e. tannin
32. The cells found in most seed plant pollen grains, but absent in the Anthophyta, are called
    a. antipodal cells
    b. microsporocytes
    c. prothallial cells
    d. synergids
    e. tube nuclei
33. The common food transport product of the Coniferophyta is
    a. flavonoid
    b. glycogen
    c. lignin
    d. lipid
    e. sucrose
34. The description “an integumented megasporangium” best applies to a(n)
    a. archegonium
    b. fruit
    c. ovule
    d. pollen grain
    e. strobilus
35. The elaters of the Hepatophyta differ from those of the Sphenophyta because
    a. Hepatophyta elaters are haploid
    b. Hepatophyta elaters form a part of the meiospores
    c. Sphenophyta elaters are each made of several cells
    d. Sphenophyta elaters do not help to disperse the meiospores
    e. Sphenophyta elaters form a part of the meiospores
36. The intercellular spaces in the gametophytes of Anthocerophyta are filled with mucilage instead of air. This is most likely
    a. because they are diploid
    b. because they are primitive and similar to green algae
    c. to help the meiospores disperse
    d. to permit free gas exchange among the cells
    e. to provide a home for symbiotic cyanobacteria
37. The meristematic region that produces secondary xylem and phloem is called the
    a. apical meristem
    b. axillary meristem
    c. basal meristem
    d. eustele
    e. vascular cambium

38. The opening in the integument of an ovule through which the pollen passes is called the
    a. antipodal cell
    b. microphyll
    c. micropyle
    d. microspore
    e. sporangiophore
39. The Phylum of seed plants with the greatest number of species is the
    a. Anthophyta
    b. Coniferophyta
    c. Cycadophyta
    d. Ginkgophyta
    e. Gnetophyta
40. The single living species of the Ginkgophyta is
    a. *Ginkgo antisyphiliticum*
    b. *Ginkgo biloba*
    c. *Ginkgo cerevisiae*
    d. *Ginkgo flavus*
    e. *Ginkgoxylon infestans*
41. The sporangia of the Lycophyta are borne on
    a. ovules
    b. sporangiophores
    c. the sides of cone scales
    d. the top surface of sporophylls
    e. the underside of compound leaves
42. The structure at the opening of a moss capsule that is made of teeth that flex with changes in humidity is called a _____; it is _____.
    a. calyptra … haploid
    b. columella … diploid
    c. elater … haploid
    d. operculum … diploid
    e. peristome … diploid
43. We know that the Anthophyta are a monophyletic group (they are all descended from a common ancestor) because they all share a unique homology:
    a. embryonic sporophytes
    b. flowers
    c. non-motile sperm
    d. seeds
    e. xylem
44. You are facing a huge, disgustingly smelly *Ginkgo* seed. Inside the hypocotyl of its embryo is the answer key to this exam. You have a small, exceedingly sharp hatchet; name the cell layers you will cut through, in the order you encounter them, to reach the key (not including the hypocotyl that contains it).
    a. egg, archegonium, sporophyll, strobilus
    b. female gametophyte, nucellus, integument
    c. pericarp, integument, nucellus, endosperm
    d. sarcotesta, sclerotesta, endotesta, nucellus, female gametophyte
    e. sclerotesta, nucellus, endotesta, endosperm
45. 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 _____.
    a. Ascomycota … Chlorophyta
    b. Ascomycota … Cyanobacteria
    c. Basidiomycota … Chlorophyta
    d. Basidiomycota … Cyanobacteria
    e. Rhodophyta … Zygomycota
46. You are looking at the cross-section of a stem, perhaps of a plant in the Psilotophyta. There is a single vascular bundle in the center of the section. This is an example of a(n)
    a. atactostele
    b. dictyostele
    c. eustele
    d. protostele
    e. siphonostele
47. 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
    a. are homosporous and heterothallic
    b. are unable to produce lignin
    c. have haploid sporophytes
    d. have unicellular sporophytes
    e. have diploid sporophylls
48. You are sampling algae in a pond much like the Cal Poly duck pond (except that it has coots instead of ducks). The majority of the algae have β-carotene and store starch. They are members of the division
    a. Anthophyta
    b. Anthocerophyta
    c. Bryophyta
    d. Chlorophyta
    e. Ginkgophyta
49. 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?
    a. embryo
    b. endosperm
    c. female gametophyte
    d. nucellus
    e. sarcotesta
50. You have found a plant that is ordinarily pollinated by insects. It is most likely a member of the phylum
    a. Anthophyta
    b. Coniferophyta
    c. Ginkgophyta
    d. Gnetophyta
    e. Pterophyta