BOT 125 - Plant Morphology
Spring 1995, Final

1. **Read these directions before you begin.**
2. Write your name on your Scantron sheet (**tests without names will not be graded**).
3. Write your ***lab*** section on the Scantron sheet (sect. 1 = MW 12-3, sect. 2 = MW 3-6). **Scantrons without lab sections will have one point deducted from the total.**
4. Check this test to make sure it has all pages, 1–9.
5. Mark all answers on the Scantron sheet. There is *only one* correct answer to each question.
6. When you are finished, turn in the Scantron on the front table. ***Please keep this sheet.***

1. _____ are **always** haploid.
   a. Archegonium jacket cells
   b. Cotyledons
   c. Megasporocytes
   d. Petals
   e. Sporangiophores
2. _____ are **always** diploid.
   a. Generative nuclei
   b. Integuments
   c. Microspores
   d. Pollen grains
   e. Synergid cells
3. _____ are **always** flagellated.
   a. Anthophyta sperm cells
   b. Egg cells
   c. Lycophyta sperm cells
   d. Microspores
   e. Prothallial cells
4. A bract
   a. is a cone scale
   b. is a fascicle of needles
   c. is a modified leaf
   d. is a modified stem
   e. is a spur shoot

5. A pollen grain is
   a. a microspore
   b. a sperm cell of a seed plant
   c. an endosporic male gametophyte
   d. an exosporic male gametophyte
   e. an integumented microsporangium

6. A seed plant has large compound leaves. It has fruits, so it is most likely a member of the division
   a. Anthophyta
   b. Coniferophyta
   c. Cycadophyta
   d. Psilophyta
   e. Pterophyta

7. A typical seed consists of ___ generation(s): _____
   a. 1 ... a gametophyte only
   b. 1 ... a sporophyte only
   c. 2 ... an embryonic gametophyte and its sporophyte parent
   d. 3 ... an embryonic sporophyte, its gametophyte parent, and its sporophyte grandparent
   e. 4 ... an embryonic gametophyte, its sporophyte parent, its gametophyte grandparent, and its sporophyte great-grandparent.
   f. 5 ... an embryonic sporophyte, its gametophyte parent, its gametophyte grandparent, its sporophyte great-grandparent, and its cousin from Cucamonga.

8. An ovule can best be characterized as
   a. a female gametophyte
   b. a megaspore on a stick
   c. an egg cell inside a protective layer
   d. an immature fruit
   e. an integumented megasporangium

9. Endosporic gametophytes are found in *no* members of the
   a. Anthophyta
   b. Gnetophyta
   c. Lycophyta
   d. Pterophyta
   e. Sphenophyta

10. Food-conducting cells in mosses are called
   a. hydroids
   b. leptoids
   c. sieve cells
   d. stomata
   e. tracheids

11. Gametophytes of homosporous Pterophyta
    a. are endosporic
    b. are free-living and photosynthetic
    c. are unisexual
    d. have xylem and phloem
    e. never have archegonia

12. In a Coniferophyta pollen grain, the cells that are *not* the generative cell are called
    a. proembryonic cells
    b. prosenchymatous cells
    c. prothallial cells
    d. protoembryonic cells
    e. protonematic cells

13. In bisexual free-living gametophytes (such as those of homosporous club mosses), the archegonia and antheridia often develop at different times. The most important purpose of this is to
    a. force the sperm cells to wait for the next available archegonium
    b. give the sperm cells the opportunity to turn into new gametophytes
    c. prevent self-fertilization
    d. prevent self-pollination
    e. reduce generation time

14. In conifers, pollen tubes begin their growth
    a. in the archegonium
    b. in the micropyle
    c. in the pollen chamber
    d. on the stigma
    e. on the style

15. In flowering plants, ovules are located inside the
    a. archegonium
    b. cone scale
    c. megasporangium
    d. megaspore
    e. ovary

16. In the Muscopsida, the calyptra
    a. consists of diploid cells
    b. consists of haploid cells
    c. contains conductive cells
    d. is an important adaptation for spore dispersal
    e. is the remains of the antheridium

17. Indusia
    a. always cover the ovules
    b. are associated with sori
    c. are compound microsporangia
    d. are made of haploid tissue
    e. occur in all ferns

18. Insect pollination
    a. is common in ferns
    b. is detrimental to plants
    c. is found in *all* flowering plants
    d. promotes hybridization
    e. reduces hybridization

19. Leafy liverworts
    a. are most common in the tropics, less common in temperate regions
    b. have gametophytes with meiosporangia
    c. have midribs on their leaves
    d. have true stomata
    e. produce sporophytes with long setae and peristomes

20. Pollen and seeds together provide an important and novel adaptation:
    a. embryonic sporophytes
    b. fully internal fertilization
    c. heterospory
    d. the ability to live on land
    e. vascular tissue

21. Sori
    a. are located on sporangiophores
    b. are located on the upper surfaces of the sporophylls
    c. are only found in heterosporous ferns
    d. are the same as meiosporangia
    e. contain meiosporangia

22. Sperm cells of the Cycadophyta have ___ flagella.
    a. 0
    b. 1
    c. 2
    d. 4-8
    e. more than 12

23. The Anthocerotopsida
    a. are called “hornworts”
    b. are called “liverworts”
    c. have conductive cells in their gametophytes
    d. have mucilage-filled intercellular spaces in their gametophytes
    e. have single-celled sporophytes

24. The center of an *Equisetum* stem is ordinarily filled with
    a. a continuous column of parenchyma cells
    b. a hollow space
    c. cortex
    d. soil
    e. vascular tissue

25. The common food storage product of the Bryophyta is
    a. floridean starch
    b. glycogen
    c. mannitol
    d. paramylon
    e. starch

26. The compound megasporangiate strobilus (seed cone) of a conifer is homologous to
    a. a cluster of microsporangiate strobili of a conifer
    b. a flower
    c. a single microsporangiate strobilus of a conifer
    d. the megasporangiate strobilus of a cycad
    e. the strobilus of the Sphenophyta

27. The dicots (Class Magnoliopsida) are paraphyletic because
    a. their common ancestor is also the ancestor of the monocots
    b. they are more advanced than the gymnosperms
    c. they are more closely related to gymnosperms than they are to angiosperms
    d. they have no common ancestor
    e. they have two cotyledons

28. The division of the Kingdom Plantae with the fewest species is the
    a. Anthophyta
    b. Cycadophyta
    c. Ginkgophyta
    d. Gnetophyta
    e. Sphenophyta

29. The *second* most abundant and ecologically dominant division of seed plants is the
    a. Anthophyta
    b. Coniferophyta
    c. Cycadophyta
    d. Ginkgophyta
    e. Pterophyta

30. The function of the pollen tube common to *all* seed plants is
    a. meiosis
    b. nutrient absorption
    c. producing the pollination drop
    d. producing the prothallial cells
    e. transporting sperm cells to the egg

31. The opening in the integument of an ovule through which the pollen passes is called the
    a. megapyle
    b. microphyll
    c. micropore
    d. micropyle
    e. microspyll

32. The pores of the gametophytes of the Hepaticopsida
    a. allow air exchange to the tissues below
    b. are identical to the stomata of vascular plants
    c. are only found on the gametangia
    d. are only found on the sporangia
    e. produce asexual reproductive structures called *gemmae*.

33. The progymnosperms (the ancient group of plants that gave rise to the seed plants)
    a. are represented today by the Ophioglossophyta
    b. never had secondary growth
    c. produced seeds
    d. were always heterosporous
    e. were small plants, less than a meter tall

34. The roots of Psilophyta
    a. are imaginary; there are no roots
    b. form a fibrous root system
    c. have microphylls
    d. have protosteles
    e. have rhizoids

35. The single living species of the Ginkgophyta is
    a. *Ginkgo biloba*
    b. *Ginkgo infestans*
    c. *Ginkgo microsporangia*
    d. *Ginkgophyton ornatum*
    e. *Gnetum antisyphiliticum*

36. The sporangia of the Psilophyta are borne on
    a. cone scales
    b. dichotomizing photosynthetic stems
    c. megaphylls
    d. microphylls
    e. sporangiophores

37. The structure at the opening of a moss capsule that consists of teeth that flex with changes in humidity is called a
    a. elater
    b. operculum
    c. pericarp
    d. peristome
    e. seta

38. Water-conducting cells in vascular plants are called
    a. hydroids
    b. leptoids
    c. sieve cells
    d. trumpet cells
    e. tracheids

39. We can always recognize the evolutionary kinship between any two organisms by
    a. how primitive or advanced they are
    b. the homologies they share
    c. their photosynthetic pigments
    d. their place in the classification in the book
    e. their similar fossils

40. We know that the flowering plants are a monophyletic group (they all descend from a common ancestor) because they all have
    a. endosporic gametophytes
    b. flowers
    c. non-motile sperm
    d. seeds
    e. xylem

41. You are taking a lab exam. The card says "What division does this homosporous plant belong to?" There is a pot with soil, but the plant is missing. The correct answer is:
    a. Lycophyta
    b. Psilophyta
    c. Pterophyta
    d. Sphenophyta
    e. there is no way to know

42. You are taking a lab exam. The card says "What is the name of the structure surrounding these ovules." Unfortunately, the illuminator on the microscope is burned out, and the slide's label only says "Monocot". You have to guess at the answer; only 15 seconds left, so hurry!
    a. It is a cone scale
    b. It is a microsporangium
    c. It is a nucellus
    d. It is an ovary
    e. There is no way to know; it could be anything

43. 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 pointer?" But the pointer is missing. What is the right answer?
    a. embryo
    b. female gametophyte
    c. nucellus
    d. sarcotesta
    e. sclerotesta

44. You are taking a lab exam. The slide is *Porella* of the Hepaticopsida, and the question asks "What is the ploidy level of the sessile gamete at the pointer?" The illuminator is not working. What should you answer?
    a. diploid
    b. egg cell
    c. haploid
    d. no answer—its ploidy level cannot be determined without the pointer.
    e. oocyte

45. You are trapped inside one of the cotyledons of a *Ginkgo* embryonic sporophyte within a seed. You have been provided with a small, exceedingly sharp sword and must hack your way out. Name the layers you will cross in order to reach freedom (not including the cotyledon you are already in).
    a. archegonium, antheridium, meiosporangium, perithecium, ascus
    b. endosperm, nucellus, inner integument, outer integument, pericarp
    c. female gametophyte, megasporangium, megaspore cell wall, integument
    d. female gametophyte, megaspore cell wall, megasporangium, integument
    e. nucellus, endosperm, megaspore cell wall, integument, pericarp

46. You are trapped inside the cotyledon of an embryonic sporophyte within the endospermous seed of a monocot (it is probably **not** a grass), still inside its fruit. You have been provided with a dull razor blade and must hack your way out. Name the ploidy level of the layers of cells you will cross in order to reach freedom (not including the cotyledon you are already in).
    a. diploid, diploid, diploid
    b. haploid, diploid, diploid, diploid
    c. haploid, diploid, triploid, triploid
    d. haploid, triploid, diploid, haploid
    e. triploid, diploid, diploid, diploid

47. You are lost on an uninhabited island between the Philippines and Indonesia. You seem to remember that the pith of the abundant sago palms is edible, so you cook some up and eat it. To get to it, you had to cut through the _____ of this cycad.
    a. atactostele
    b. eustele
    c. integument
    d. protostele
    e. siphonostele

48. You are shocked to learn from your companion on the island that sago palms can be poisonous, so you decide instead to eat large quantities of the seeds of a native grass (a monocot). What is the ploidy level of the tissues you are eating?
    a. diploid, haploid, and triploid
    b. diploid and haploid
    c. diploid and triploid
    d. haploid only
    e. triploid only

49. In the forest that surrounds you are many tall trees with woody trunks and needle leaves. Since they are not flowering plants, they are most likely members of the division
    a. Anthophyta
    b. Chlorophyta
    c. Coniferophyta
    d. Cycadophyta
    e. Sphenophyta

50. To keep warm at night, you wrap up in thick mats of moss (the real thing, not club moss or Spanish moss). The ploidy level of your bed is
    a. entirely diploid
    b. entirely triploid
    c. mainly diploid with a small amount of haploid
    d. mainly diploid with some haploid and some triploid
    e. mainly haploid with a small amount of diploid