

## BOT 125 - Plant Morphology Winter 1996, 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 = TTh 1-4, sect. 2 = TTh 4-7). **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 never flagellated.
  - a. Coniferophyta sperm cells
  - b. Cycadophyta sperm cells
  - c. Ginkgophyta sperm cells
  - d. Lycophyta sperm cells
  - e. Pterophyta sperm cells
2. \_\_\_\_\_ are always diploid.
  - a. antipodal cells
  - b. microspores
  - c. microsporocytes
  - d. pollen grains
  - e. triple fusion nuclei
3. \_\_\_\_\_ are always haploid.
  - a. meiosporocytes
  - b. nucellus cells
  - c. sarcotesta cells
  - d. tube nuclei
  - e. zygotes
4. A bract is a
  - a. fascicle of needles
  - b. modified leaf
  - c. rhizome
  - d. sporangiophore
  - e. spur shoot
5. A pollen grain is
  - a. a microspore
  - b. an endosporic male gametophyte
  - c. an exosporic female gametophyte
  - d. an integumented microsporangium
  - e. a seed plant sperm cell

6. A seed plant has tiny, bract-like leaves and photosynthetic stems. It has no fruits, so it must be a member of the division
  - a. Anthophyta
  - b. Coniferophyta
  - c. Gnetophyta
  - d. Psilophyta
  - e. Pterophyta
7. A typical seed consists of \_\_\_ generation(s): \_\_\_\_\_.
  - a. 1 ... a gametophyte only
  - b. 2 ... an embryonic gametophyte and its gametophyte 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 stepmother from San Bernardino.
8. An important feature of the vascular plants is branched sporophytes. Why?
  - a. It causes leaf gaps
  - b. It eliminates the need for gametophytes
  - c. It increases the number of archegonia
  - d. It increases the number of meiosporangia
  - e. It prevents self-fertilization
9. An ovule can best be described as
  - a. a female gametophyte
  - b. a megaspore on a stick
  - c. an egg cell inside an archegonium
  - d. an integumented megasporangium
  - e. an ovary
10. Endosporic gametophytes are found in *all* members of the
  - a. Anthophyta
  - b. Bryophyta
  - c. Chlorophyta
  - d. Lycopphyta
  - e. Pterophyta
11. Gametophytes of homosporous Pterophyta
  - a. are dioecious
  - b. are endosporic
  - c. are free-living and photosynthetic
  - d. have phloem and xylem
  - e. never have archegonia
12. In bisexual free-living gametophytes (such as those of Lycopodiopsida), the antheridia and archegonia often develop at different times. The most important purpose of this is to
  - a. extend the breeding season
  - b. give the egg cells the opportunity to turn into new gametophytes
  - c. increase generation time
  - d. prevent self-fertilization
  - e. prevent self-pollination

13. In Coniferophyta, ovules are located on the
  - a. archegonium
  - b. cone scale
  - c. megasporangium
  - d. megasporophyll
  - e. ovary
14. In Gnetophyta, 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 vascular plants, water-conducting cells are called
  - a. hydroids
  - b. leptoids
  - c. sieve cells
  - d. stomata
  - e. tracheids
16. Insect pollination
  - a. is common in conifers
  - b. is found in *all* flowering plants
  - c. is never found in flowering plants
  - d. requires fewer pollen grains per ovule
  - e. requires more pollen grains per ovule
17. Leafy liverworts
  - a. are homosporous
  - b. are less common in the tropics, more common in temperate regions
  - c. have midribs on their leaves
  - d. produce gametophytes with short meiosporangia and elaters
  - e. produce sporophytes with long setae and peristomes
18. Once again, you are eating Creamy California Custard nutrition-free frozen artificially brown-flavored milk-like dessert (you can't get enough of that good brown flavor). You listen carefully as friend says, "Try this chocolate. It's made from the fruit and seeds of an actual plant, and even though it's junk food, it's healthier than the stuff you're eating." What Division is the source of chocolate?
  - a. Anthophyta
  - b. Bryophyta
  - c. Chlorophyta
  - d. Coniferophyta
  - e. Pterophyta
19. Organisms of the division Chlorophyta
  - a. always have multicellular gametophytes
  - b. have cellulose cell walls
  - c. have chlorophyll c and  $\alpha$ -carotene
  - d. have non-flagellated sperm cells
  - e. store food as laminarin

20. Seeds and pollen together provide an important and novel adaptation:
- embryonic sporophytes
  - endosporic gametophytes
  - fully internal fertilization
  - the ability to live on land
  - vascular tissue
21. Sori
- are found only in homosporous ferns
  - are located on sporangiophores
  - are located on the upper surfaces of the leaves of eusporangiate ferns
  - are produced inside meiosporangia
  - contain meiosporangia
22. Sperm cells of the Gnetophyta have \_\_\_ flagella.
- 0
  - 1
  - 2
  - 4-8
  - more than 12
23. *Spirogyra* of the Chlorophyta exhibits “conjugation”. This is another name for
- asexual reproduction
  - binary fission
  - meiosis
  - mitosis
  - syngamy
24. The best evidence for the amount of evolutionary kinship between any two organisms is
- how primitive or advanced they are
  - the homologies they share
  - their food storage materials
  - their place in the classification in the book
  - their similar fossils
25. The cell walls of the Kingdom Plantae are mainly cellulose, but there is another important cell wall material in the vascular plants:
- chitin
  - lignin
  - peptidoglycan
  - silica
  - suberin
26. The cells found in most seed plant pollen grains, but absent in the Anthophyta, are called
- antipodal cells
  - microsporocytes
  - prothallial cells
  - synergids
  - tube nuclei
27. The common food storage product of the Anthophyta is
- floridean starch
  - glycogen
  - mannitol
  - paramylon
  - starch

28. The common food transport product of the Coniferophyta is
- glycogen
  - lipid
  - mannitol
  - paramylon
  - sucrose
29. The dicots (Class Magnoliopsida) are paraphyletic because
- their common ancestor is also the ancestor of the monocots
  - they are more closely related to birds than they are to lizards
  - they are more closely related to gymnosperms than they are to angiosperms
  - they have no common ancestor
  - they have two cotyledons
30. The function of the pollen tube common to *all* seed plants is
- growing from the stigma down the style to the ovule
  - growing through the micropyle
  - meiosis
  - nutrient absorption
  - transporting sperm cells to the egg
31. The haploid structure that briefly covers a moss capsule as it develops is called a
- calyptra
  - elater
  - operculum
  - peristome
  - seta
32. The leaves of Psilophyta
- are microphylls
  - are non-photosynthetic bracts
  - don't exist
  - have a casparian strip
  - have parallel venation
33. The Muscocerotopsida
- are called "liverworts"
  - are called "mosses"
  - have elaters
  - have mucilage-filled intercellular spaces in their gametophytes
  - have single-celled sporophytes
34. The opening in the integument of an ovule through which the pollen passes is called the
- megaphyll
  - megapyle
  - microphyll
  - micropyle
  - microspore
35. The most abundant and ecologically dominant division of *non-seed* vascular plants is the
- Anthophyta
  - Gnetophyta
  - Psilophyta
  - Pterophyta
  - Sphenophyta

36. The peristome of Muscopsida
- consists of haploid cells
  - consists of short filaments of diploid cells
  - contains conductive cells
  - is an important adaptation for spore dispersal
  - is the remains of the antheridium
37. The Ophioglossophyta
- are heterosporous
  - are tall trees
  - have leptosporangia
  - may be descendents of the Progymnosperms
  - produce seeds
38. The single living species of the Ginkgophyta is
- Ginkgo biloba*
  - Ginkgo cerevisiae*
  - Ginkgo infestans*
  - Ginkgosporum ginkgoides*
  - Gnetum antisiphiliticum*
39. The sporangia of the Lycophyta are borne on
- the sides of cone scales
  - dichotomizing photosynthetic stems
  - the underside of compound leaves
  - the top surface of microphylls
  - sporangiophores
40. The sterile jacket of the oogonium of *Chara* is probably an adaptation
- to allow colonization of the land
  - to prevent fertilization
  - to produce vascular tissue
  - to protect the zygote
  - to provide nutrients to the developing sporophyte
41. The most abundant and ecologically dominant division of seed plants is the
- Anthophyta
  - Coniferophyta
  - Cycadophyta
  - Ginkgophyta
  - Gnetophyta
42. We know that the seed plants are a monophyletic group (they all descend from a common ancestor) because they all have
- endosporic gametophytes
  - flowers
  - non-motile sperm
  - seeds
  - xylem

43. You are reading an article in *American Journal of Botany* about a newly discovered moss that has diploid gemmae. Knowing that gemmae are asexual, you realize that these gemmae must have been formed by the \_\_\_\_\_, unlike those of the \_\_\_\_\_ that you learned about in class.
- gametophyte . . . Anthocerotopsida
  - gametophyte . . . Hepaticopsida
  - seta . . . Muscopsida
  - sporophyte . . . Hepaticopsida
  - sporophyte . . . Lycopodiopsida
44. You are taking a lab exam. The card says “What division does this exosporic gametophyte belong to?” There is a microscope, but, strangely, the slide is missing. The correct answer is:
- Psilophyta
  - Sphenophyta
  - Lycophyta
  - Pterophyta
  - there is no way to know
45. 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
46. You are taking a lab exam. The slide is labeled “*Glyptostrobus*” and the question is “What is the ploidy level of the nucellus at the pointer. What should you answer?”
- diploid
  - haploid
  - no answer—we don’t have to know genera, and without the Division, there is no way to know the ploidy level.
  - seed
  - sterile jacket
47. You are trapped inside one of the cotyledons of a monocot embryonic sporophyte within a seed and fruit. You have been provided with a dull razor blade 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).
- archegonium, antheridium, meiosporangium, perithecium, ascus
  - endosperm, nucellus, inner integument, outer integument, pericarp
  - female gametophyte, megasporangium, megaspore cell wall, integument
  - female gametophyte, megaspore cell wall, megasporangium, integument
  - nucellus, endosperm, megaspore cell wall, integument, pericarp
48. You are trapped inside the Climatron (a large greenhouse) at Missouri Botanical Garden (in St. Louis) over a long holiday weekend. While searching for food, you find the rare “double coconut” tree, and break open one of its seeds. You hungrily scoop out the sweet endosperm. The part of the female gametophyte that contributed to your meal was
- the polar bodies
  - the antipodals
  - the synergids
  - the egg
  - the nucellus

49. The “rain machine” turns on and you take shelter under the broad leaves of a tropical flowering plant. You sneeze as pollen drifts down from its flowers. The flowers are part of a \_\_\_\_\_ and the pollen grains are \_\_\_\_\_.
- a. gametophyte . . . sperm cells
  - b. gametophyte . . . sporophytes
  - c. seaweed . . . conceptacles
  - d. sporophyte . . . gametophyte
  - e. sporophyte . . . sperm cells
50. You finally manage to turn off the rain by poking at a valve with a long pole made of wood. The pole was probably **not** made from a member of the
- a. Anthophyta
  - b. Coniferophyta
  - c. Ginkgophyta
  - d. Gnetophyta
  - e. Psilophyta