

# BOT 125 - Plant Morphology

## Fall 1997, 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 in the box marked "hour" (sect. 1 = MW 12-3, sect. 2 = TTh 1-4). **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 the Scantron on the front table. ***Please keep this sheet.***

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| <ol style="list-style-type: none"><li>1. _____ are never flagellated.<ol style="list-style-type: none"><li>a. Coniferophyta sperm cells</li><li>b. Ginkgophyta sperm cells</li><li>c. Hepatophyta sperm cells</li><li>d. Lycophyta sperm cells</li><li>e. Pterophyta sperm cells</li></ol></li><li>2. _____ are always diploid.<ol style="list-style-type: none"><li>a. antipodal cells</li><li>b. microspores</li><li>c. pollen grains</li><li>d. sarcotesta cells</li><li>e. triple fusion nuclei</li></ol></li><li>3. _____ are always haploid.<ol style="list-style-type: none"><li>a. generative nuclei</li><li>b. meiocytes</li><li>c. nucellus cells</li><li>d. sarcotesta cells</li><li>e. zygotes</li></ol></li><li>4. A bract is a<ol style="list-style-type: none"><li>a. cone scale</li><li>b. fascicle of needles</li><li>c. modified leaf</li><li>d. modified stem</li><li>e. spur shoot</li></ol></li><li>5. A pollen grain is<ol style="list-style-type: none"><li>a. a microsporocyte</li><li>b. an endosporic male gametophyte</li><li>c. an exosporic female gametophyte</li><li>d. an integumented microsporangium</li><li>e. a seed plant sperm cell</li></ol></li><li>6. A seed plant has needle leaves and resin ducts. It has fruits, so it must be a member of the division<ol style="list-style-type: none"><li>a. Anthophyta</li><li>b. Coniferophyta</li><li>c. Gnetophyta</li><li>d. Psilophyta</li><li>e. Pterophyta</li></ol></li></ol> | <ol style="list-style-type: none"><li>7. A typical seed consists of ___ generation(s): _____.<ol style="list-style-type: none"><li>a. 1 ... a gametophyte only</li><li>b. 2 ... an embryonic gametophyte and its gametophyte parent</li><li>c. 3 ... an embryonic sporophyte, its gametophyte parent, and its sporophyte grandparent</li><li>d. 4 ... an embryonic gametophyte, its sporophyte parent, its gametophyte grandparent, and its sporophyte great-grandparent</li><li>e. 5 ... an embryonic sporophyte, its gametophyte parent, its gametophyte grandparent, its sporophyte great-grandparent, and its godfather from Gorman.</li></ol></li><li>8. An important feature of the vascular plants is branched sporophytes. Why?<ol style="list-style-type: none"><li>a. It causes leaf gaps</li><li>b. It eliminates the need for gametophytes</li><li>c. It increases the number of archegonia per gamete</li><li>d. It increases the number of meiospores per zygote</li><li>e. It prevents self-pollination</li></ol></li><li>9. An ovule can best be described as<ol style="list-style-type: none"><li>a. a female gametophyte</li><li>b. a megaspore in a fruit</li><li>c. an egg cell inside an archegonium</li><li>d. an egg in an ovary</li><li>e. an integumented megasporangium</li></ol></li><li>10. Anthoceroophyta gametophytes most likely have mucilage-filled intercellular spaces<ol style="list-style-type: none"><li>a. because they are diploid</li><li>b. because they are primitive and not much different from algae</li><li>c. to allow free gas exchange in the gametophyte</li><li>d. to help the meiospores disperse</li><li>e. to provide a home for symbiotic cyanobacteria</li></ol></li><li>11. Endosporic male gametophytes are found in <i>no</i> members of the<ol style="list-style-type: none"><li>a. Coniferophyta</li><li>b. Cycadophyta</li><li>c. Hepatophyta</li><li>d. Lycophyta</li><li>e. Pterophyta</li></ol></li></ol> |
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12. In bisexual exosporic gametophytes (such as those of Sphenophyta), the antheridia and archegonia often develop at different times. The most important purpose of this is to
- extend the breeding season
  - give the egg cells the opportunity to turn into new gametophytes
  - increase generation time
  - prevent self-fertilization
  - prevent self-pollination
13. In Bryophyta, food-conducting cells are called
- hydroids
  - leptoids
  - sieve cells
  - stomata
  - tracheids
14. In Cycadophyta, ovules are located
- in a megasporangium
  - inside an ovary
  - on a cone scale
  - on a megasporophyll
  - on a sporangiophore
15. In flowering plants, pollen tubes begin their growth
- in the egg cell
  - in the micropyle
  - in the pollen chamber
  - on the stigma
  - on the style
16. 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 the site of meiosis
17. In LycopHYta, water-conducting cells are called
- hydroids
  - leptoids
  - sieve cells
  - stomata
  - tracheids
18. In the Charophyceae, zygotes
- are haploid
  - are the product of syngamy
  - undergo meiosis to form meiospores
  - turn into gametophytes
  - are replaced by ovules
19. In the Division Anthophyta, microsporangia are clustered together in structures called
- anthers
  - ovaries
  - sepals
  - sori
  - stamens
20. Indusia
- always cover the ovules
  - are associated with sori
  - are associated with sporangiophores
  - are compound microsporangiate strobili
  - are found on the underside of leaves in the LycopHYta
21. Insect pollination
- is common in conifers
  - is found in *all* flowering plants
  - is harmful to plants
  - is never found in flowering plants
  - requires fewer pollen grains per ovule than wind pollination
22. Leafy liverworts
- are heterosporous
  - are more common in the tropics, less common in temperate regions
  - are thalloid
  - produce gametophytes with long setae and peristomes
  - produce sporophytes with long meiosporangia and elaters
23. Organisms of the division Chlorophyta
- always have multicellular gametophytes
  - have cellulose cell walls
  - have chlorophyll c and  $\gamma$ -carotene
  - have peptidoglycan cell walls
  - store food as laminarin
24. Pick the group of divisions that is in the correct order, from the *least* abundant and ecologically important to the *most* abundant and ecologically important:
- Anthophyta, Coniferophyta, Pterophyta, Ginkgophyta
  - Anthophyta, Ginkgophyta, Coniferophyta, Pterophyta
  - Coniferophyta, Ginkgophyta, Pterophyta, Anthophyta
  - Ginkgophyta, Anthophyta, Pterophyta, Gnetophyta
  - Ginkgophyta, Pterophyta, Coniferophyta, Anthophyta
25. Seeds and pollen together provide an important and novel adaptation:
- embryonic sporophytes
  - endosporic gametophytes
  - completely internal fertilization
  - the ability to live on land
  - vascular tissue
26. Sori are
- clusters of meiosporangia
  - commonly located on the upper surfaces of the leaves of eusporangiate ferns
  - located on sporangiophores
  - produced inside meiosporangia
  - types of indusia
27. Sperm cells of the Cycadophyta have \_\_\_ flagella.
- 0
  - 1
  - 2
  - 4-8
  - more than 12

28. *Spirogyra* of the Chlorophyta exhibits “conjugation”. This is another name for
- asexual reproduction
  - binary fission
  - meiosis
  - mitosis
  - syngamy
29. The single living species of the Ginkgophyta is
- Ginkgo antisiphiliticum*
  - Ginkgo biloba*
  - Ginkgo cerevisiae*
  - Ginkgo flavus*
  - Ginkgo infestans*
30. The Anthoceroophyta
- are called “mosses”
  - are called “stoneworts”
  - have air-filled intercellular spaces in their gametophytes
  - have elaters
  - have no sporophytes
31. 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 place in the classification in the book
  - their place on a cladogram
  - their similar fossils
32. The calyptra of Bryophyta
- consists of all the sepals taken together
  - contains leptoids and hydroids
  - is an important adaptation for spore dispersal
  - is made of haploid cells
  - is the remains of the antheridium sterile jacket
33. The cell walls of the Kingdom Plantae are mainly cellulose, but there is another important cell wall material found only in the vascular plants:
- chitin
  - lignin
  - peptidoglycan
  - silica
  - suberin
34. The cells found in most seed plant pollen grains, but absent in the Anthophyta, are called
- antipodal cells
  - microsporocytes
  - prothallial cells
  - synergids
  - tube nuclei
35. The center of the stems of Sphenophyta is ordinarily filled with
- air
  - parenchyma cells of the cortex
  - parenchyma cells of the pith
  - phloem
  - xylem
36. The common food storage product of the Bryophyta is
- floridean starch
  - glycogen
  - laminarin
  - paramylon
  - starch
37. The common food transport product of the Anthophyta is
- glycogen
  - lipid
  - mannitol
  - paramylon
  - sucrose
38. 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
39. The leaves of Psilophyta
- are all capable of becoming sporophylls
  - are whorls of non-photosynthetic bracts at each node
  - bear the synangia
  - don't exist
  - have a casparian strip
40. The opening in the integument of an ovule through which the pollen passes is called the
- megapyle
  - meiophyll
  - microphyll
  - micropyle
  - microspore
41. The Ophioglossophyta
- are completely extinct
  - are heterosporous
  - have leptosporangia
  - may be descendents of the Progymnosperms
  - produce seeds
42. The sporangia of the Lycophyta are borne on
- ovules
  - sporangiophores
  - the sides of cone scales
  - the top surface of sporophylls
  - the underside of compound leaves

43. 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
44. The structure at the opening of a moss capsule that consists of teeth that flex with changes in humidity is called a
- calyptra
  - elater
  - operculum
  - peristome
  - seta
45. The vascular cambium is responsible for forming
- pith
  - primary phloem
  - secondary xylem
  - the eustele
  - the integument
46. *Volvox* of the Chlorophyta is
- a hollow, spherical colony of filaments
  - a hollow, spherical colony of flagellated cells
  - a single large multinucleate cell with many flagella
  - a stage leading to multicellular animals
  - a stage leading to the multicellular Plantae
47. We know that the vascular plants are a monophyletic group (they all descend from a common ancestor) because they all have
- endosporic gametophytes
  - flowers
  - non-motile sperm
  - seeds
  - xylem
48. You are reading an article in *American Journal of Botany* about a newly discovered Division of seed plants. They have many unique features, but you are *not* surprised to find that
- they are homosporous
  - they have a haploid integument
  - they have diploid gametophytes
  - they have endosporic gametophytes
  - they have no vascular tissue in their sporophytes
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?
- embryo
  - female gametophyte
  - nucellus
  - sarcotesta
  - sclerotesta
50. You are trapped inside one of the cotyledons of a cycad embryonic sporophyte within a seed. 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 sterile jacket, megaspore cell wall, integument
  - female gametophyte, megaspore cell wall, megasporangium sterile jacket, integument
  - nucellus, endosperm, megaspore cell wall, integument, pericarp