

BOT 125 - Plant Morphology

Spring 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 = TTh 1-4, sect. 2 = TTh 4-7, sect. 3 = MW 12-3; *these are the correct section numbers*). **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.***

-
-
1. _____ are never flagellated.
 - a. Coniferophyta sperm cells
 - b. Cycadophyta sperm cells
 - c. Ginkgophyta sperm cells
 - d. Lycopphyta sperm cells
 - e. Pterophyta sperm cells
 2. _____ are always diploid.
 - a. antipodal cells
 - b. microspores
 - c. megasporocytes
 - d. pollen grains
 - e. triple fusion nuclei
 3. _____ are always haploid.
 - a. meiocytes
 - b. sarcotesta cells
 - c. sieve cells
 - d. tube nuclei
 - e. zygotes
 4. A bract is a
 - a. fascicle of needles
 - b. modified leaf
 - c. modified root
 - d. modified stem
 - e. sporangiophore
 5. A pollen grain is
 - a. a microspore
 - b. an endosporic male gametophyte
 - c. an exosporic male gametophyte
 - d. an integumented microsporangium
 - e. a seed plant sperm cell
 6. A seed plant has needle leaves and resin ducts. It has 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 godmother from Goleta.
 8. An ovule can best be described as
 - a. a female gametophyte
 - b. a megaspore in a fruit
 - c. an egg cell inside an archegonium
 - d. an integumented megasporangium
 - e. an ovary
 9. Anthoceroophyta gametophytes most likely have mucilage-filled intercellular spaces
 - a. because they are diploid
 - b. because they are primitive and not much different from algae
 - c. to allow free gas exchange in the gametophyte
 - d. to help the meiospores disperse
 - e. to provide a home for symbiotic cyanobacteria
 10. Endosporic female gametophytes are found in *all* members of the
 - a. Bryophyta
 - b. Cycadophyta
 - c. Hepatophyta
 - 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 Anthophyta, ovules are located inside the
- anther
 - archegonium
 - cone scale
 - megasporangium
 - ovary
13. 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
14. 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
15. In heterosporous ferns such as *Marsilea*, gametophytes
- always have meiosporangia
 - are bisexual
 - are endosporic
 - are free-living and photosynthetic
 - have phloem and xylem
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 the Division Anthophyta, microsporangia are clustered together in structures called
- anthers
 - ovaries
 - sepals
 - sori
 - stamens
18. In the Kingdom Plantae, _____ have sterile jackets.
- antheridia
 - archegonia
 - gametangia
 - meiosporangia
 - meiosporangia, antheridia, and archegonia
19. In the vascular plants, zygotes
- are diploid
 - are the product of meiosis
 - undergo meiosis to form meiospores
 - turn into gametophytes
 - are replaced by ovules
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 Lycopphyta
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 less common in the tropics, more common in temperate regions
 - are thalloid
 - produce gametophytes with long setae and peristomes
 - produce sporophytes with short meiosporangia and elaters
23. Once again, you are eating California Creamy Cow Custard nutrition-free partially-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*, a woody tropical tree, and even though it's junk food, it's healthier than the stuff you're eating." What Class is the source of chocolate?
- Anthophyta
 - Liliopsida
 - Lycopodiopsida
 - Magnoliopsida
 - Selaginellopsida
24. One important feature of the vascular plants is branched sporophytes. Why?
- Branched sporophytes can produce more archegonia
 - Branched sporophytes can produce more meiosporangia
 - Branched sporophytes don't need vascular tissue
 - It eliminates the need for gametophytes
 - It prevents self-fertilization
25. 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, Psilophyta, Anthophyta
 - Ginkgophyta, Psilophyta, Anthophyta, Pterophyta, Gnetophyta
 - Ginkgophyta, Psilophyta, Pterophyta, Coniferophyta, Anthophyta

26. The combination of seeds and pollen provides an important and novel adaptation:
- embryonic sporophytes
 - endosporic gametophytes
 - fully internal fertilization
 - the ability to live on land
 - vascular tissue
27. Sori
- are located on the upper surfaces of the leaves of eusporangiate ferns
 - are only found in heterosporous ferns
 - are found only in homosporous ferns
 - are produced inside meiosporangia
 - contain meiosporangia
28. Sperm cells of the Anthophyta have ___ flagella.
- 0
 - 1
 - 2
 - 4-8
 - more than 12
29. The single living species of the Ginkgophyta is
- Ginkgo antisiphiliticum*
 - Ginkgo biloba*
 - Ginkgo cerevisiae*
 - Ginkgo infestans*
 - Ginkgosporoides chinensis*
30. The _____ is a sheet of cells that forms between the primary xylem and primary phloem, and in the areas of parenchyma cells between the vascular bundles.
- endodermis
 - epidermis
 - rhizoid
 - stele
 - vascular cambium
31. The Anthocerophyta
- are called "mosses"
 - are called "stoneworts"
 - have air-filled intercellular spaces in their gametophytes
 - have elaters
 - have no sporophytes
32. 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
33. 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 diploid cells
 - is the remains of the archegonium sterile jacket
34. 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
 - mannitol
 - peptidoglycan
 - silica
35. The cells found in most seed plant pollen grains, but absent in the Anthophyta, are called
- antipodal cells
 - microsporocytes
 - prothallial cells
 - synergids
 - tube nuclei
36. The common food transport product of the Anthophyta is
- glycogen
 - lipid
 - mannitol
 - paramylon
 - sucrose
37. 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
38. The leaves of Psilophyta
- are all capable of becoming sporophylls
 - are whorls of non-photosynthetic bracts at each node
 - don't exist
 - have a casparian strip
 - have parallel venation
39. The opening in the integument of an ovule through which the pollen passes is called the
- megaphyll
 - meiopyle
 - microphyll
 - micropyle
 - microspore
40. The Ophioglossophyta
- are completely extinct
 - are heterosporous
 - have leptosporangia
 - may be descendants of the Progymnosperms
 - produce seeds

41. The peristome of Bryophyta
- 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
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. We know that the Anthophyta are a monophyletic group (they all descend from a common ancestor) because they all have
- endosporic gametophytes
 - flowers
 - non-motile sperm
 - seeds
 - xylem
44. 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 have a diploid integument
 - they have diploid gametophytes
 - they have no vascular tissue in their sporophytes
 - they are homosporous
 - they have exosporic gametophytes
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 "*Betula*" and the question is "What is the ploidy level of the antipodal cell 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.
 - endosperm
 - gametophyte
47. You are trapped inside one of the cotyledons of a *Ginkgo* 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
48. It is the year 2001. You are trapped inside the newly built Biological Sciences greenhouse at Cal Poly over a long holiday weekend. While searching for food, you find a bag of wheat grains (mature fruits containing seeds), the same *Triticum* that you looked at in lab. You hungrily gobble them up. You have eaten cells that are
- diploid only
 - diploid and triploid
 - haploid, diploid, and triploid
 - haploid and diploid
 - triploid only
49. The fog system 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 _____.
- gametophyte . . . sperm cells
 - gametophyte . . . sporophytes
 - seaweed . . . conceptacles
 - sporophyte . . . gametophyte
 - sporophyte . . . sperm cells
50. You finally manage to turn off the fog by poking at a valve with a long pole made of wood. The pole was probably **not** made from a member of the
- Anthophyta
 - Coniferophyta
 - Ginkgophyta
 - Gnetophyta
 - Psilophyta