

BOT 125 - Plant Morphology

Winter 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 (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, 1–9.
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.***

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1. _____ are never flagellated.
 - a. Anthophyta sperm cells
 - b. Cycadophyta sperm cells
 - c. Ginkgophyta sperm cells
 - d. Lycophyta sperm cells
 - e. Pterophyta sperm cells
 2. _____ are always diploid.
 - a. megaspores
 - b. megasporocytes
 - c. pollen grains
 - d. synergids
 - e. primary endosperm nuclei
 3. _____ are always haploid.
 - a. meiocytes
 - b. nucellus cells
 - c. sarcotesta cells
 - d. tube nuclei
 - e. zygotes
 4. A bract is a
 - a. fascicle of needles
 - b. modified leaf
 - c. modified stem
 - d. sporangiophore
 - e. spur shoot
 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 vascular plant has tiny, bract-like leaves and photosynthetic stems. It has no seeds, and strobili with sporangiophores, so it must be a member of the division
 - a. Gnetophyta
 - b. Lycophyta
 - c. Psilophyta
 - d. Pterophyta
 - e. Sphenophyta
 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 in a fruit
 - c. an egg cell inside an archegonium
 - d. an integumented megasporangium
 - e. an ovary
 10. Endosporic female gametophytes are found in *all* members of the
 - a. Bryophyta
 - b. Chlorophyta
 - c. Cycadophyta
 - d. Lycophyta
 - e. Pterophyta
 11. In Anthophyta, ovules are located inside the
 - a. anther
 - b. archegonium
 - c. cone scale
 - d. megasporangium
 - e. ovary
 12. In flowering plants, pollen tubes begin their growth
 - a. in the egg cell
 - b. in the micropyle
 - c. in the pollen chamber
 - d. on the stigma
 - e. on the style

13. In Gnetophyta, food-conducting cells are called
- hydroids
 - leptoids
 - sieve cells
 - stomata
 - tracheids
14. In heterosporous Lycophyta, gametophytes
- always have meiosporangia
 - are bisexual
 - are endosporic
 - are free-living and photosynthetic
 - have phloem and xylem
15. 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
16. In Lycophyta, water-conducting cells are called
- hydroids
 - leptoids
 - sieve cells
 - stomata
 - tracheids
17. In Sphenophyta, food-conducting cells are called
- hydroids
 - leptoids
 - sieve cells
 - stomata
 - tracheids
18. In the bisexual exosporic gametophytes of Pterophyta, the antheridia and archegonia often develop at different times. The most important purpose of this is to
- form seeds
 - give the meiospores the opportunity to turn into new sporophytes
 - prevent self-fertilization
 - prevent self-pollination
 - prolong the breeding season
19. In the vascular plants, zygotes
- are haploid
 - are the product of syngamy
 - 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
 - occur in all ferns
21. Leafy liverworts
- are heterosporous
 - are thalloid
 - have no midribs on their leaves
 - produce gametophytes with short meiosporangia and elaters
 - produce sporophytes with long setae and peristomes
22. 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 vanilla ice cream. Vanilla is made from the fruit and seeds of an *actual plant*, a tropical vine with an atactostele and leaves with parallel venation, and even though it has added sugar, it's healthier than the stuff you're eating." What Class is the source of vanilla?
- Anthophyta
 - Liliopsida
 - Lycopodiopsida
 - Magnoliopsida
 - Muscopsida
23. Organisms of the division Chlorophyta
- always have multicellular gametophytes
 - have cellulose cell walls
 - have chlorophyll c and γ -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, Psilophyta, Anthophyta
 - Ginkgophyta, Psilophyta, Anthophyta, Pterophyta, Gnetophyta
 - Ginkgophyta, Psilophyta, Pterophyta, Coniferophyta, Anthophyta
25. Pollen and seeds together provide an important and novel adaptation:
- completely internal fertilization
 - embryonic sporophytes
 - endosporic gametophytes
 - the ability to live on land
 - vascular tissue
26. 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

27. *Spirogyra* of the Chlorophyta exhibits “conjugation”. This is another name for
- asexual reproduction
 - binary fission
 - meiosis
 - mitosis
 - syngamy
28. 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
29. The Anthocerotopsida
- are called “liverworts”
 - are called “mosses”
 - have air-filled intercellular spaces in their gametophytes
 - have elaters
 - have single-celled sporophytes
30. 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 photosynthetic pigments
 - their place in the classification in the book
 - their similar fossils
31. The calyptra of Muscopsida
- consists of short filaments of diploid cells
 - contains conductive cells
 - is an important adaptation for spore dispersal
 - is made of diploid cells
 - is the remains of the archegonium sterile jacket
32. 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
33. The cells found in most seed plant pollen grains, but absent in the Anthophyta, are called
- antipodal cells
 - microsporocytes
 - prothallial cells
 - synergids
 - tube nuclei
34. The common food storage product of the Psilophyta is
- floridean starch
 - glycogen
 - mannitol
 - paramylon
 - starch
35. The common food transport product of the Coniferophyta is
- glycogen
 - lipid
 - mannitol
 - paramylon
 - sucrose
36. The Division Bryoophyta is paraphyletic because
- it has elaters
 - it has no common ancestor
 - it is more closely related to birds than to lizards
 - it is more closely related to ferns than to seed plants
 - its common ancestor is also the ancestor of the vascular plants
37. The leaves of living Sphenophyta
- are sporophylls
 - are whorls of non-photosynthetic bracts
 - don't exist
 - have a casparian strip
 - have parallel venation
38. The opening in the integument of an ovule through which the pollen passes is called the
- megaphyll
 - meiophyll
 - microphyll
 - micropyle
 - microspore
39. The Ophioglossophyta
- are completely extinct
 - are heterosporous
 - have leptosporangia
 - may be descendents of the Progymnosperms
 - produce seeds
40. The roots of Psilophyta
- come from branching rhizomes
 - don't exist
 - form a taproot system
 - have protosteles
 - have rhizoids
41. The single living species of the Ginkgophyta is
- Ginkgo antisiphiliticum*
 - Ginkgo biloba*
 - Ginkgo cerevisiae*
 - Ginkgo infestans*
 - Ginkgosporoides chinensis*

42. The sporangia of the LycopHYta are borne on
- dichotomizing photosynthetic stems
 - sporangioPHores
 - the sides of cone scales
 - the top surface of sporophylls
 - the underside of compound leaves
43. 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
44. Typical seeds consist of ___ generation(s): ____.
- 1 ... a gametophyte only
 - 2 ... an embryonic gametophyte and its gametophyte parent
 - 3 ... an embryonic sporophyte, its gametophyte parent, and its sporophyte grandparent
 - 4 ... an embryonic gametophyte, its sporophyte parent, its gametophyte grandparent, and its sporophyte great-grandparent
 - 5 ... an embryonic sporophyte, its gametophyte parent, its gametophyte grandparent, its sporophyte great-grandparent, and its godfather from Garden Grove.
45. *Volvox* of the Chlorophyta is
- a hollow, spherical colony
 - a single large coenocytic cell with many flagella
 - a stage leading to the multicellular Animalia
 - a stage leading to the multicellular Plantae
 - the closest relative of the Anthocerotopsida
46. 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
47. 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
48. 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
49. You are taking a lab exam. The slide is labeled “*Salix*” and the question is “What is the ploidy level of the ovary wall 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
50. You are trapped inside one of the cotyledons of a conifer 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, megaspore cell wall, integument
 - female gametophyte, megaspore cell wall, megasporangium, integument
 - nucellus, endosperm, megaspore cell wall, integument, pericarp