

BOT 125 - Plant Morphology
Fall 1993, Final Exam

Answer all questions on the Scantron sheet. **Please keep this sheet**, and turn in the Scantron only. Write your *lab section* on the scantron. There is only one correct answer to each question.

1. ____ are always diploid.
 - a. Antipodal cells
 - b. Microspores
 - c. Pollen grains
 - d. Radicles
 - e. Synergid cells

2. ____ are always flagellated.
 - a. Anthophyta sperm cells
 - b. Coniferophyta sperm cells
 - c. Egg cells
 - d. Prothallial cells
 - e. Pterophyta sperm cells

3. ____ are always haploid.
 - a. Archegonium jacket cells
 - b. Cotyledons
 - c. Nucelli
 - d. Sporangiphores
 - e. Sporophylls

4. A pollen grain is
 - a. a microspore
 - b. a seed plant sperm
 - c. an endosporic female gametophyte
 - d. an endosporic male gametophyte
 - e. an integumented microsporangium

5. A seed plant has large compound leaves. It does not have fruits, so it must be a member of the division
 - a. Anthophyta
 - b. Coniferophyta
 - c. Cycadophyta
 - d. Ginkgophyta
 - e. Gnetophyta

6. A similarity between the Rhodophyta and Phaeophyta is that virtually all members of both groups
 - a. are unicellular
 - b. have chitin cell walls
 - c. have free-living meiospore-producing sporophytes
 - d. have brown plastids
 - e. have two flagella

7. A typical seed consists of ____ generation(s): ____
 - a. 1 ... a gametophyte only
 - b. 2 ... an embryonic gametophyte and its sporophyte 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 aunt from North Dakota.

8. An ovule can 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 *all* members of the
- a. Bryophyta
 - b. Gnetophyta
 - c. Psilophyta
 - d. Pterophyta
 - e. Sphenophyta
10. Gametophytes of heterosporous Lycophyta
- a. are bisexual
 - b. are endosporic
 - c. are free-living and photosynthetic
 - d. have xylem and phloem
 - e. never have archegonia
11. In bisexual free-living gametophytes (such as those of homosporous ferns), the archegonia and antheridia often develop at different times. The most important purpose of this is to
- a. extend the breeding season
 - b. force the sperm cells to wait for the next available archegonium
 - c. prevent self-fertilization
 - d. prevent self-pollination
 - e. promote self-fertilization
12. In conifers, 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 *Ectocarpus*, meiospores
 - a. are diploid
 - b. are produced in archegonia
 - c. develop into filamentous multicellular gametophytes
 - d. develop into large multicellular sporophytes
 - e. divide once to become gametes
14. In flowering plants, ovules are located inside the
 - a. anther
 - b. antheridium
 - c. archegonium
 - d. ovary
 - e. sepal
15. 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
16. In mosses, the peristome
 - a. consists of haploid cells
 - b. contains conductive cells
 - c. is an important adaptation for spore dispersal
 - d. is the remains of the antheridium
 - e. falls off the capsule before the spores are released
17. In the center of an *Equisetum* stem is ordinarily
 - a. a column of parenchyma cells
 - b. a hollow space
 - c. a strand of phloem
 - d. a strand of xylem
 - e. dirt
18. In the Muscopsida, the calyptra
 - a. consists of diploid cells
 - b. contains conductive cells
 - c. is an important adaptation for spore dispersal
 - d. is the remains of the archegonium
 - e. remains attached to the capsule even after the spores are released
19. In the Rhodophyta, gametophytes
 - a. are always unicellular
 - b. are haploid
 - c. come from zygotes
 - d. have phloem
 - e. produce meiospores

20. In the Rhodophyta, tetrasporophytes
 - a. come from tetraspores
 - b. come from zygotes
 - c. produce carpospores by meiosis
 - d. produce gametes by mitosis
 - e. produce tetraspores by meiosis
21. In *Fucus* and other rockweeds, meiospores
 - a. are diploid
 - b. are produced in archegonia
 - c. develop into large multicellular gametophytes
 - d. develop into large multicellular sporophytes
 - e. divide once to become gametes
22. In a seed plant pollen grain, the cells that are *not* the generative cell are called
 - a. proembryonic cells
 - b. prosenchyma cells
 - c. prothallial cells
 - d. prothonian cells
 - e. protonematic cells
23. 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
24. 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
25. Organisms of the division Rhodophyta
 - a. are never multicellular gametophytes
 - b. have chlorophyll b and b-carotene
 - c. have non-flagellated sperm cells
 - d. have no cell walls
 - e. transport food as mannitol
26. Parenchyma tissue can be found in the gametophytes of the
 - a. Bryophyta
 - b. Chrysophyta
 - c. Phaeophyta
 - d. Pyrrhophyta
 - e. Rhodophyta

27. Phycoplast cell division
- includes microtubules oriented at right angles to the mitotic spindle
 - is always found in organisms with a multi-layered structure
 - is found only in the Charophyceae
 - is the ancestral ("primitive") form of cell division
 - only happens in meiosis
28. Pollen and seeds together provide an important and novel adaptation:
- embryonic sporophytes
 - endosporic gametophytes
 - fully internal fertilization
 - the ability to live on land
 - vascular tissue
29. Sori
- are located on the upper surfaces of the sporophylls
 - are only found in heterosporous ferns
 - are the same as meiosporangia
 - contain meiosporangia
 - never have indusia
30. Sperm cells of the Ginkgophyta have ___ flagella.
- 0
 - 1
 - 2
 - 4-8
 - more than 12
31. The Anthocerotopsida
- are called "liverworts"
 - are called "mosses"
 - have conductive cells in their gametophytes
 - have mucilage-filled intercellular spaces in their gametophytes
 - have single-celled sporophytes
32. The common food storage product of the Gnetophyta is
- floridean starch
 - glycogen
 - mannitol
 - paramylon
 - starch
33. The compound megasporangiate strobilus (seed cone) of a conifer is homologous to
- a cluster of microsporangiate strobili of a conifer
 - a flower
 - a single microsporangiate strobilus of a conifer
 - the megasporangiate strobilus of a cycad
 - the oogonium of *Chara*

34. The division of the Kingdom Plantae with the fewest species is the
- Coniferophyta
 - Cycadophyta
 - Ginkgophyta
 - Gnetophyta
 - Sphenophyta
35. The division Rhodophyta
- contains more unicellular than multicellular species
 - contains organisms that play an important ecological role along both tropical and temperate coastlines
 - contains fewer than 200 species
 - is the closest relative to the kingdom Plantae
 - is the source of all edible seaweed and seaweed products
36. The function of the pollen tube common to *all* seed plants is
- breaking open the anther
 - growing from the stigma down the style to the ovule
 - nutrient absorption
 - producing the prothallial cells
 - transporting sperm cells to the egg
37. The haploid structure that covers a moss capsule is called a(n)
- calyptra
 - elater
 - operculum
 - peristome
 - seta
38. The most abundant and ecologically dominant division in the Kingdom Plantae is the
- Anthophyta
 - Bryophyta
 - Coniferophyta
 - Cycadophyta
 - Pterophyta
39. The opening in the integument of an ovule through which the pollen passes is called the
- megaphyll
 - megapyle
 - microphyll
 - micropyle
 - microspore
40. The pollination drop is produced by
- the egg cell
 - the megasporangium (nucellus)
 - the megasporophyll
 - the pollen grain
 - the sperm cells
41. The pores of the gametophytes of the Hepaticopsida
- allow air exchange to the tissues below
 - are identical to the stomata of vascular plants
 - are only found on the gametangia
 - are only found on the sporangia
 - produce asexual reproductive structures called *gemmae*.
42. The progymnosperms (the group of extinct plants that gave rise to the seed plants)
- included tall trees
 - never had secondary growth
 - produced flowers
 - were always heterosporous

- e. were non-photosynthetic
43. The sterile jacket of the oogonium of *Chara* most likely benefits the organism by
 - a. allowing it to colonize of the land
 - b. preventing fertilization
 - c. producing vascular tissue
 - d. protecting the zygote
 - e. providing 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
 - a. calyptra
 - b. elater
 - c. operculum
 - d. peristome
 - e. seta
 45. Water-conducting cells in mosses are called
 - a. hydroids
 - b. leptoids
 - c. sieve cells
 - d. stomata
 - e. tracheids
 46. 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 food storage materials
 - d. their place in the classification in the book
 - e. their similar fossils
 47. 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
 48. You are lost on an uninhabited island between the Philippines and Indonesia. You decide to eat the endosperm of coconuts. As you drink the liquid and spoon up the soft pulp, you are eating
 - a. diploid tissue
 - b. female gametophyte
 - c. haploid tissue
 - d. male gametophyte
 - e. triploid tissue
 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 pointer?" But the pointer is missing. What is the right answer?
 - a. embryo
 - b. female gametophyte
 - c. nucellus
 - d. sarcotesta
 - e. sclerotesta
 50. You are trapped inside one of the cotyledons of a cycad 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

Special Survey Question

Answer on the back of your Scantron:

If you had to take another lab exam, would you prefer to have the vocabulary words on the back of the answer sheet, and be expected to spell them correctly, or have no vocabulary words, and have no penalty for misspelling unless the word is not recognizable? If you would prefer to have the vocabulary words, mark choice **“a”** on question **51**. If you would prefer **not** to have the vocabulary words, mark choice **“a”** on question **52**. This question will not affect your grade on the test.