

BOT 125 - Plant Morphology
Winter 1994, Final Exam

Follow these directions in order:

- A. Write your name on your scantron sheet.
- B. Write your lab section number on your scantron sheet (Section 1 = 1 pm-4 pm, Section 2 = 4 pm-7 pm, Section 3 = 7 pm-10 pm)
- C. Answer the questions below, marking the correct answers on your scantron sheet. There is *only one* correct answer to each question.
- D. When you are finished, turn in the scantron on the front table. *Please keep this sheet.*

1. _____ are **always** diploid.
 - a. Antipodal cells
 - b. Megaspores
 - 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. Cotyledons
 - b. Nucelli
 - c. Petals
 - d. Polar nuclei
 - e. Sporangiphores
4. A pollen grain is
 - a. a meiospore
 - b. a sperm cell of a seed plant
 - c. an endosporic female gametophyte
 - d. an endosporic male gametophyte
 - e. an exosporic male gametophyte

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. Gnetophyta
 - e. Pterophyta

6. A typical seed consists of ____ generation(s): _____
 - a. 1 ... a sporophyte 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.

7. An ovule can best be characterized as
 - a. a female gametophyte
 - b. a megaspore on a stick
 - c. an egg cell inside an archegonium
 - d. an immature fruit
 - e. an integumented megasporangium

8. Endosporic gametophytes are found in *no* members of the
 - a. Anthophyta
 - b. Gnetophyta
 - c. Lycophyta
 - d. Pterophyta
 - e. Sphenophyta

9. Gametophytes of homosporous Lycophyta
 - a. are endosporic
 - b. are free-living and photosynthetic
 - c. are unisexual
 - d. have xylem and phloem
 - e. never have archegonia

10. In bisexual free-living gametophytes (such as those of Sphenophyta), the archegonia and antheridia often develop at different times. The most important purpose of this is to
 - a. extend the breeding season
 - b. give the sperm cells the opportunity to turn into new gametophytes
 - c. prevent self-fertilization
 - d. prevent self-pollination
 - e. promote self-fertilization

11. In cycads, 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

12. In flowering plants, ovules are located inside the
 - a. anther
 - b. antheridium
 - c. archegonium
 - d. ovary
 - e. sepal
13. 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
14. 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
15. Insect pollination
 - a. is common in conifers
 - b. is detrimental to plants
 - c. is never found in flowering plants
 - d. promotes hybridization
 - e. reduces hybridization
16. Organisms of the division Chlorophyta
 - a. are never multicellular gametophytes
 - b. have chlorophyll b and β -carotene
 - c. have non-flagellated sperm cells
 - d. have silica cell walls
 - e. store food as mannitol
17. Phycoplast cell division
 - a. includes microtubules oriented at right angles to the mitotic spindle
 - b. is always found in organisms with a multi-layered structure
 - c. is found only in the Charophyceae
 - d. is the ancestral ("primitive") form of cell division
 - e. only happens in meiosis
18. Pollen and seeds together provide an important and novel adaptation:
 - a. embryonic sporophytes
 - b. endosporic gametophytes
 - c. fully internal fertilization
 - d. the ability to live on land
 - e. vascular tissue

19. 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
20. Sperm cells of the Coniferophyta have ___ flagella.
- 0
 - 1
 - 2
 - 4-8
 - more than 12
21. Thalloid liverworts
- are most common in the tropics, less common in temperate regions
 - have gametophytes with meiosporangia
 - have midribs on their leaves
 - have true stomata
 - produce sporophytes with short setae and elaters
22. 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
23. The center of an *Equisetum* stem is ordinarily filled with
- a continuous column of parenchyma cells
 - a strand of xylem
 - air
 - dirt
 - vacuum
24. The common food storage product of the Gnetophyta is
- floridean starch
 - glycogen
 - mannitol
 - paramylon
 - starch
25. 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*

26. The dicots (Class Magnoliopsida) are paraphyletic because
- their common ancestor is also the ancestor of the monocots
 - they are more advanced than the gymnosperms
 - they are more closely related to birds than they are to lizards
 - they have no common ancestor
 - they have two cotyledons
27. The division of the Kingdom Plantae with the fewest species is the
- Coniferophyta
 - Cycadophyta
 - Ginkgophyta
 - Gnetophyta
 - Sphenophyta
28. 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
 - meiosis
 - nutrient absorption
 - transporting sperm cells to the egg
29. The haploid structure that covers a moss capsule is called a(n)
- calyptra
 - elater
 - operculum
 - peristome
 - seta
30. The most abundant and ecologically dominant division in the Kingdom Plantae is the
- Anthophyta
 - Bryophyta
 - Coniferophyta
 - Cycadophyta
 - Pterophyta
31. The opening in the integument of an ovule through which the pollen passes is called the
- megaphyll
 - megapyle
 - microphyll
 - micropyle
 - microspore
32. The pollination drop is produced by
- the egg cell
 - the megasporangium (nucellus)
 - the microsporangium
 - the pollen grain
 - the sperm cells

33. The pores of the gametophytes of the Hepaticopsida
- allow air exchange to the tissues below
 - are homologous with the stomata of vascular plants
 - are only found on the gametangia
 - are only found on the sporangia
 - produce asexual reproductive structures called *gemmae*.
34. The progymnosperms (the group of extinct plants that gave rise to the seed plants)
- included tall trees
 - never had secondary growth
 - produced compound strobili
 - were always heterothallic
 - were non-photosynthetic
35. The sporangia of the Pterophyta are borne on
- cone scales
 - dichotomizing photosynthetic stems
 - megaphylls
 - microphylls
 - sporangiophores
36. The sterile jacket of the oogonium of *Chara* is most likely 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
37. 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
38. *Volvox* of the Chlorophyta
- is a hollow, spherical colony
 - is a single large multinucleate cell with many flagella
 - is a stage leading to multicellular animals
 - is a stage leading to the multicellular Rhodophyta
 - is the closest relative of the Kingdom Plantae
39. Water-conducting cells in mosses are called
- hydroids
 - leptoids
 - sieve cells
 - trumpet cells
 - tracheids

40. We can always recognize the evolutionary kinship between any two organisms by
- 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
41. 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
42. You are taking a lab exam. The card says “What division does this heterosporous plant belong to?” There is a pot with soil, but the plant is missing. The correct answer is:
- Anthophyta
 - Coniferophyta
 - Pterophyta
 - Lycophyta
 - there is no way to know
43. You are taking a lab exam. The card says “What is the name of the structure surrounding these ovules.” Unfortunately, the illuminator on the microscope is burned out, and the slide’s label only says “Dicot”. You have to guess at the answer; only 20 seconds left, so hurry!
- It is a cone scale
 - It is a microsporangium
 - It is a nucellus
 - It is an ovary
 - There is no way to know; it could be anything
44. 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?
- embryo
 - female gametophyte
 - nucellus
 - sarcotesta
 - sclerotesta
45. 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).
- 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

46. You are trapped inside the cotyledon of an embryonic sporophyte within the cotyledonous seed of a dicot (it is probably a bean), still inside its fruit. You have been provided with a dull razor blade and must hack your way out. Name the ploidy level of the layers of cells you will cross in order to reach freedom (not including the cotyledon you are already in).
- diploid, diploid, diploid
 - haploid, diploid, diploid, diploid
 - haploid, diploid, triploid, triploid
 - haploid, triploid, diploid, haploid
 - triploid, diploid, diploid, diploid
47. You are lost on an uninhabited island near New Zealand. To protect yourself from the driving rain, you build a shelter of the stems and fronds of the abundant tree ferns. To cut down a tree fern, you had to cut through its _____.
- atactostele
 - eustele
 - pericarp
 - protostele
 - siphonostele
48. As you await rescue, you eat large quantities of the seeds of a native grass (a monocot). What is the ploidy level of the tissues you are eating?
- diploid, haploid, and triploid
 - diploid and haploid
 - diploid and triploid
 - haploid only
 - triploid only
49. To keep warm at night, you wrap up in thick mats of moss (the real thing, not club moss or Spanish moss). The ploidy level of your bed is
- entirely diploid
 - entirely triploid
 - mainly diploid with a small amount of haploid
 - mainly diploid with some haploid and some triploid
 - mainly haploid with a small amount of diploid
50. In the forest that surrounds you are many tall trees with woody trunks and simple (not compound) leaves. Since they are not flowering plants, they are most likely members of the division
- Anthophyta
 - Chlorophyta
 - Coniferophyta
 - Cycadophyta
 - Sphenophyta