

BOT 125 - Plant Morphology
Summer 1992
Final Exam

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

1. _____ are always diploid.
 - a. Epicotyls
 - b. Microspores
 - c. Pollen grains
 - d. Synergid cells
 - e. Tube nuclei

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

3. _____ are always haploid.
 - a. Cotyledons
 - b. Megasporangia
 - c. Polar nuclei
 - d. Sepals
 - e. Sporangiphores

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

5. 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 niece from New Jersey.

6. An ovule can be characterized as
 - a. a female gametophyte
 - b. a fruit
 - c. a megasporangium on a stick
 - d. an egg cell inside a protective layer
 - e. an integumented megasporangium
7. Endosporic gametophytes are found in *no* members of the
 - a. Anthophyta
 - b. Gnetophyta
 - c. Lycophyta
 - d. Pterophyta
 - e. Sphenophyta
8. 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
9. 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
10. 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
11. In flowering plants, ovules are located inside the
 - a. anther
 - b. antheridium
 - c. archegonium
 - d. ovary
 - e. sepal

12. In the center of an *Equisetum* stem is ordinarily
 - a. a continuous column of parenchyma cells
 - b. a strand of phloem
 - c. a strand of xylem
 - d. air
 - e. dirt
13. Pollen and seeds together provide an important and novel adaptation:
 - a. embryonic sporophytes
 - b. endosporic gametophytes
 - c. fully internal fertilization
 - d. heterospory
 - e. the ability to live on land
14. Sori
 - a. are located on the upper surfaces of the sporophylls
 - b. are only found in heterosporous ferns
 - c. are the same as meiosporangia
 - d. contain meiosporangia
 - e. never have indusia
15. Sperm cells of the Ginkgophyta have ___ flagella.
 - a. 0
 - b. 1
 - c. 2
 - d. 4-8
 - e. more than 12
16. The cells that are *not* found in flowering plant pollen grains are called
 - a. proembryonic cells
 - b. prosenchyma cells
 - c. prothallial cells
 - d. procyonic cells
 - e. protonematic cells
17. The common food storage product of the Sphenophyta is
 - a. floridean starch
 - b. glycogen
 - c. mannitol
 - d. paramylon
 - e. starch
18. The compound megasporangiate strobilus (seed cone) of a conifer is homologous to
 - a. a cluster of microsporangiate strobili of a conifer
 - b. a flower
 - c. a single microsporangiate strobilus of a conifer
 - d. the megasporangiate strobilus of a cycad
 - e. the oogonium of *Chara*
19. The function of the pollen tube common to *all* seed plants is
 - a. breaking open the anther
 - b. growing from the stigma down the style to the ovule
 - c. meiosis
 - d. nutrient absorption
 - e. transporting sperm cells to the ovum
20. The most abundant and ecologically dominant division in the Kingdom Plantae is the
 - a. Anthophyta

- b. Bryophyta
 - c. Coniferophyta
 - d. Cycadophyta
 - e. Pterophyta
21. The opening in the integument of an ovule through which the pollen passes is called the
- a. megaphyll
 - b. megapyle
 - c. microphyll
 - d. micropore
 - e. micropyle
22. The pollination drop is produced by
- a. the egg cell
 - b. the megasporangium (nucellus)
 - c. the microsporangium
 - d. the pollen grain
 - e. the sperm cells
23. The progymnosperms (the group of extinct plants that gave rise to the seed plants)
- a. included tall trees
 - b. never had secondary growth
 - c. produced fruits
 - d. were always heterothallic
 - e. were non-photosynthetic
24. The sporangia of the Sphenophyta are borne on
- a. cone scales
 - b. dichotomizing photosynthetic stems
 - c. megaphylls
 - d. microphylls
 - e. sporangiophores

25. The stage in the life cycle of seed plants that shows the greatest variation in appearance is the
- egg cell
 - megaspore
 - pollen grain
 - sporophyte
 - zygote
26. 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
27. We know that the flowering plants are a monophyletic group (they all descend from a common ancestor) because they all have
- endosporic gametophytes
 - flowers
 - non-motile sperm
 - seeds
 - xylem
28. You are lost on an uninhabited island between the Philippines and Indonesia. You seem to remember that the pith of the abundant sago palms is edible, so you cook some up and eat it. To get to it, you had to cut through the _____ of this cycad.
- atactostele
 - eustele
 - integument
 - protostele
 - siphonostele
29. You are shocked to learn from your companion on the island that sago palms can be poisonous, so you decide instead to eat the endosperm of coconuts. As you drink the liquid and spoon up the soft pulp, you are eating
- diploid tissue
 - female gametophyte
 - haploid tissue
 - male gametophyte
 - triploid tissue

30. 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
31. 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
32. You are taking a lab exam. The next station is a sectioned cycad 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
33. You are trapped inside the cotyledon of a monocot 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