

BOT 125 - Plant Morphology
Spring 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. Cotyledons
 - b. Microspores
 - c. Pollen grains
 - d. Synergid cells
 - e. Tube nuclei

2. _____ are always flagellated.
 - a. Conifer sperm cells
 - b. Egg cells
 - c. Fern sperm cells
 - d. Flowering plant sperm cells
 - e. Prothallial cells

3. _____ are always haploid.
 - a. Archegonium jacket cells
 - b. Microsporangia
 - c. Nucelli
 - d. Petals
 - 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 plant 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 cousin from Nevada.

6. An ovule can be characterized as
 - a. a male gametophyte
 - b. a mature seed
 - c. a megasporangium on a stick
 - d. an egg cell inside a protective layer
 - e. an integumented megasporangium

7. Endosporic gametophytes are found in *all* members of the
 - a. Bryophyta
 - b. Gnetophyta
 - c. Psilophyta
 - d. Pterophyta
 - e. Sphenophyta

8. Gametophytes of heterosporous Lycophyta
 - a. are endosporic
 - b. are free-living and photosynthetic
 - c. are bisexual
 - d. have vascular tissue
 - 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. allow the gametophyte to become larger
 - b. extend the breeding season
 - c. force the sperm cells to wait for the next available archegonium
 - d. prevent self-fertilization
 - e. promote self-fertilization
10. In flowering plants, ovules are located inside the
 - a. antheridium
 - b. archegonium
 - c. pistil
 - d. sepal
 - e. stamen
11. 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
12. 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
13. 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. prothalian cells
 - e. protonematic cells
14. Pollen and seeds together provide an important and novel adaptation:
 - a. embryonic sporophytes
 - b. endosporic gametophytes
 - c. fully internal fertilization
 - d. megaphylls
 - e. vascular tissue
15. Sori
 - a. are homologous to meiosporangia
 - b. are located on the upper surfaces of the sporophylls
 - c. are only found in heterosporous ferns
 - d. contain meiosporangia
 - e. never have indusia

16. Sperm cells of the Gnetophyta have ___ flagella.
- 0
 - 1
 - 2
 - 4-8
 - more than 12
17. The common food storage product of the Lycophyta is
- floridean starch
 - glycogen
 - mannitol
 - paramylon
 - starch
18. 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*
19. The function of the pollen tube common to **all** seed plants is
- absorbing nutrients
 - breaking open the microsporangium
 - carrying sperm cells to the archegonium
 - growing from the stigma down to the ovule
 - meiosis
20. The most widespread and economically important division in the Kingdom Plantae is the
- Anthophyta
 - Bryophyta
 - Coniferophyta
 - Cycadophyta
 - Pterophyta
21. The opening in the integument of an ovule through which the pollen passes is called the
- megaphyll
 - megapyle
 - microphyll
 - micropyle
 - microspore
22. The pollination drop is produced by
- the megasporophyll
 - the microsporangium
 - the megasporangium (nucellus)
 - the pollen grain
 - the sperm cells
23. 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
 - were non-photosynthetic
24. The progymnosperms are most closely related to the
- Bryophyta

- b. Lycophyta
 - c. Psilophyta
 - d. Pterophyta
 - e. seed plants
25. The sporangia of the Lycophyta are borne on
- a. cone scales
 - b. dichotomizing photosynthetic stems
 - c. megaphylls
 - d. microphylls
 - e. sporangiophores
26. The stage in the life cycle of seed plants that shows the greatest variation in form is the
- a. egg cell
 - b. microspore
 - c. pollen grain
 - d. sporophyte
 - e. zygote
27. We can always recognize the evolutionary kinship between specific organisms by
- a. how advanced or primitive they are
 - b. the homologies they share
 - c. their cell wall materials
 - d. their position in the classification in the book
 - e. their similar fossils
28. We know that the seed 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
29. You are taking a lab exam. The card says "Identify the structure surrounding this ovule." Unfortunately, the illuminator on the microscope is burned out, and the slide's label only says "Monocot". You have to guess at the answer; only 15 seconds left, so hurry!
- a. It is a cone scale
 - b. It is a microphyll
 - c. It is a nucellus
 - d. It is an ovary
 - e. There is no way to know; it could be anything
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:
- a. Anthophyta
 - b. Cycadophyta
 - c. Pterophyta
 - d. Sphenophyta
 - e. there is no way to know
31. 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
32. You are trapped inside one of the cotyledons of a dicot embryonic sporophyte within a seed. 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).
- a. diploid, triploid, haploid
 - b. haploid, diploid, diploid
 - c. haploid, haploid, triploid
 - d. triploid, diploid, diploid
 - e. triploid, haploid, diploid
33. You are trapped inside one of the cotyledons of a *Ginkgo* 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