1. Which of the following adaptations is common to all seed plants?
   1. Ovules
   2. Pollen
   3. Reduced gametophyte
   4. Heterospory
   5. All are correct
2. Which of the following is true of seed plants but not seedless plants
   1. The spore is the main means of dispersing the offspring.
   2. A film of water is necessary for sperm to come in contact with eggs.
   3. The gametophyte is reduced and dependent on the sporophyte.
   4. The sporophyte is large, and the gametophyte is small and independent.
   5. The sporophyte is dependent on the gametophyte.
3. The cells within pollen grains are \_\_\_\_\_\_\_\_\_\_ and together comprise the \_\_\_\_\_\_\_\_\_\_.
   1. diploid ... spores
   2. diploid ... a new sporophyte
   3. haploid ... male gametophyte
   4. diploid ... sperm nuclei
   5. haploid ... spores
4. What is located in the scalelike structures packed densely in pollen cones?
   1. developing seedlings
   2. sporophytes
   3. sporangia
   4. megasporocytes
   5. developing pollen tubes
5. Each pollen grain of a gymnosperm contains a \_\_\_\_\_\_\_\_\_\_.
   1. fertilized ovule
   2. megasporocyte
   3. microsporocyte
   4. ginkgophyte
   5. male gametophyte
6. In ovulate cones, megasporocytes undergo \_\_\_\_\_\_\_\_\_\_ and produce \_\_\_\_\_\_\_\_\_\_ megaspores.
   1. meiosis ... diploid
   2. meiosis ... haploid
   3. mitosis ... diploid
   4. mitosis ... haploid
   5. Depending on environmental conditions, any of the listed responses may occur.
7. The diploid generation of the plant life cycle always \_\_\_\_\_\_\_\_\_\_.
   1. produces spores
   2. is called the gametophyte
   3. is larger and more conspicuous than the haploid stage
   4. produces gametes (eggs and sperm)
   5. develops from a spore
8. The portion of a flower that receives the pollen is the \_\_\_\_\_\_\_\_\_\_.
   1. stigma
   2. style
   3. filament
   4. ovary
   5. anther
9. During pollination, pollen grains are transferred from the \_\_\_\_\_\_\_\_\_\_ to the \_\_\_\_\_\_\_\_\_\_.
   1. anther ... sepal
   2. stigma ... ovary
   3. carpel ... stigma
   4. ovary ... anther
   5. anther ... stigma
10. Which of the following best describes the function of fruits?
    1. eward for pollinators
    2. protection and dispersal of seeds
    3. food storage for the plant to use over the winter
    4. to distract herbivores from eating the leaves
    5. Depending on the plant species, any of the listed responses are possible.
11. A plant is said to be cross-pollinated if \_\_\_\_\_\_\_\_\_\_.
    1. it is pollinated by insects
    2. it is pollinated by wind
    3. pollen grains are transferred from a different flower on the same plant
    4. pollen grains are transferred to a flower on a different plant
    5. its source of pollen is a different species of plant
12. In angiosperms, the pollen tube releases two sperm cells into the embryo sac. The result of this is the \_\_\_\_\_\_\_\_\_\_.
    1. union of the two sperm nuclei, forming a zygote
    2. union of one sperm nucleus with the egg nucleus and the disintegration of the other sperm nucleus
    3. union of one sperm nucleus with the egg nucleus and of the other sperm nucleus with two nuclei of the central cell, forming a triploid nucleus called the endosperm
    4. formation of a gametophyte
    5. fusion of both sperm nuclei with the egg nucleus and the formation of a triploid zygote
13. Of the following, which is a difference in how reproduction occurs in gymnosperms compared to angiosperms?
    1. nly the sperm of angiosperms combine with two central cell nuclei to form triploid endosperm.
    2. Only angiosperm pollen grains form pollen tubes.
    3. Only gymnosperms can contain male and female sporangia on the same plant.
    4. Double fertilization only occurs in gymnosperms.
    5. Only angiosperms have reduced gametophytes.
14. In angiosperms, the triploid nucleus of the embryo sac develops into the \_\_\_\_\_\_\_\_\_\_.
    1. seed
    2. carpel
    3. embryo
    4. endosperm
    5. fruit
15. Which of the following lists of features characterizes eudicots?
    1. one cotyledon, vascular bundles in rings, pollen grains with three openings
    2. pollen grains with three openings, floral parts in multiples of three, netlike veins
    3. scattered vascular bundles, netlike veins, floral parts in multiples of five
    4. two cotyledons, netlike veins, taproot usually present
    5. leaves with parallel veins, taproot usually present, vascular bundles arranged in rings
16. Leaves occur at intervals along the plant stem. What is the region where a leaf is attached to the stem?
    1. shoot apex
    2. internode
    3. petiole
    4. node
    5. None of the listed responses is correct.
17. A region of dividing cells in a plant is called a \_\_\_\_\_\_\_\_\_\_.
    1. ground tissue
    2. cortex
    3. dermal tissue
    4. meristem
    5. periderm
18. Which example below is the site of primary growth that results in the plant’s increasing in height?
    1. axillary buds
    2. nodes
    3. lateral meristems
    4. apical meristems
    5. bud scales
19. Most of the photosynthesis in plants takes place in specialized \_\_\_\_\_\_\_\_\_\_ cells called the \_\_\_\_\_\_\_\_\_\_.
    1. vascular ... collenchyma
    2. sclerenchyma ... palisade mesophyll cells
    3. dermal ... mesophyll
    4. parenchyma ... pith
    5. parenchyma ... mesophyll
20. A cross section of a plant part exposes epidermis, a thick cortex, and a central cylinder of xylem and phloem. This part is a \_\_\_\_\_\_\_\_\_\_.
    1. meristem
    2. stem
    3. bud
    4. root
    5. leaf
21. Which of the following correctly describes a feature unique to monocot stems?
    1. Ground tissue consists mainly of parenchyma.
    2. Vascular tissue is located all in the center.
    3. Vascular bundles are scattered throughout the stem.
    4. Lateral shoots cannot originate near the surface.
    5. Vascular bundles are arranged in a ring.
22. In most leaves, chloroplast-containing cells are most closely compacted in the \_\_\_\_\_\_\_\_\_\_.
    1. upper epidermis
    2. vein (vascular bundle)
    3. lower epidermis
    4. palisade mesophyll
    5. pith
23. Guard cells \_\_\_\_\_\_\_\_\_\_.
    1. are necessary for water absorption from the environment
    2. are responsible for gas exchange through the stomata
    3. protect the plant's roots from infection
    4. control water and solute intake by roots
    5. The first and second responses are correct
24. In the alternation of generations in plants, \_\_\_\_\_\_\_\_\_\_.
    1. the sporophyte is the haploid generation
    2. the gametes are produced by the gametophyte through mitosis and cellular differentiation
    3. the spores are produced by the gametophyte by meiosis and cellular differentiation
    4. a sporophyte grows from a spore
    5. the gametes are produced by the gametophyte through meiosis and cellular differentiation
25. Which association below is correct?
    1. stamens, development of female gametophytes
    2. stamens, development of filament and anther
    3. sepals, containment of sporangia
    4. carpels, attraction of pollinators
    5. carpels, development of male gametophytes
26. Which two structures of a flower bear sporangia?
    1. sepal and the filament
    2. ovules and anthers
    3. ovaries and the receptacle
    4. ovules and stamens
    5. ovaries and anthers
27. A generative cell and a tube cell originate when \_\_\_\_\_\_\_\_\_\_.
    1. A microsporocyte undergoes mitosis and cytokinesis
    2. a microsporocyte undergoes meiosis
    3. a microspore undergoes meiosis and cytokinesis
    4. a microspore undergoes mitosis and cytokinesis
    5. a microsporocyte undergoes mitosis
28. What is the purpose of synergids in an ovule?
    1. Synergids divide, producing one large cell with eight haploid nuclei.
    2. Synergids help to attract and guide the pollen tube to the embryo sac.
    3. Synergids are the polar nuclei that share the cytoplasm of the large central cells of the embryo sac.
    4. The function of synergids is unknown.
    5. Synergids divide, producing megaspores.
29. In an environment that is very stable, with reliable moisture and temperature, what type of reproduction would be most advantageous for a plant and why?
    1. sexual reproduction, because it is always better to increase genetic variation
    2. asexual reproduction, because it ensures that the gene combinations that have proven to adapt the plant well to the environment will be passed on to the next generation
    3. sexual reproduction, because it will ensure that the most advantageous genes are passed on to the next generation
    4. asexual reproduction, because it increases the genetic variation within the population
    5. sexual reproduction, because it requires less energy
30. Which of the following accurately describes double fertilization in angiosperms?
    1. One sperm fuses the egg, one sperm fuses an anti-podal cell
    2. One sperm fuses the polar nuclei, one sperm fuses a synergid cell
    3. One sperm creates the pollen tube, one sperm fuses the egg
    4. One sperm fuses the egg, one sperm fuses with the polar nuclei
    5. One sperm fuses with polar nuclei, one sperm fuses with an anti-podal cell
31. Where in an angiosperm would you find a megasporangium?
    1. inside the tip of a pollen tube
    2. within an ovule contained within an ovary of a flower
    3. packed into pollen sacs within the anthers found on a stamen
    4. enclosed in the stigma of a flower
    5. in the style of a flower
32. With respect to angiosperms, which of the following is incorrectly paired with its chromosome count?
    1. egg—n
    2. sperm—n
    3. zygote—2n
    4. microspore—n
    5. megaspore—2n
33. A life cycle that exhibits alternation of generations has the following:
    1. a unicellular haploid stage and diploid multicellular organisms
    2. multicellular haploid organisms and multicellular diploid organisms
    3. multicellular haploid organisms and a diploid unicellular stage
    4. haploid multicellular organisms only
34. In plants, the \_\_\_\_\_\_\_\_ produces haploid gametes (eggs and sperm) by mitosis, whereas the \_\_\_\_\_\_\_\_ produces haploid spores by meiosis.
    1. zygote; embryo
    2. gametophyte; sporophyte
    3. embryo; zygote
    4. sporophyte; gametophyte
35. In plants, which of the following are produced by meiosis?
    1. diploid gametes
    2. haploid gametes
    3. haploid spores
    4. diploid spores
36. Which one of the following statements is true?
    1. Monocot stems have scattered vascular tissue, whereas eudicot stems have vascular tissue arranged in a ring.
    2. Monocot flowers are orange, yellow, or red, whereas eudicot flowers are blue or purple.
    3. Monocots have one conidium, whereas eudicots have two.
    4. Monocot pollen is larger than eudicot pollen.
37. Two unique reproductive adaptations of angiosperms are
    1. asexual and sexual reproduction.
    2. vessels and tracheids.
    3. flowers and fruits.
    4. sporophytes and gametophytes.
38. In moving to land, which of the following challenges did plants have to overcome?
39. Less available CO2 in the atmosphere than in the oceans
40. Desiccation
41. Competition from other photosynthetic organisms such as cyanobacteria
42. Many herbivores on land
43. All of the listed responses are correct.
44. Alternation of generations \_\_\_\_\_\_\_\_\_.
45. Is unique to plants
46. Is distinguished by a unicellular haploid stage and a multicellular diploid generation
47. Is distinguished by haploid and diploid stages that are both multicellular
48. Consists of a diploid gametophyte stage alternating with a haploid sporophyte stage
49. Is distinguished by a multicellular haploid generation and a unicellular diploid generation
50. The development of the \_\_\_\_\_\_\_ prevents plants from drying out and protects them from microbes.
51. Stomata
52. Gametangia
53. Apical meristem
54. Peristomes
55. Cuticle
56. The gametophyte stage of the plant life cycle is most conspicuous in \_\_\_\_\_\_\_\_.
57. Mosses
58. Club mosses
59. Ferns
60. Horsetails
61. Seed plants
62. When you see a green, “leafy” moss, you are looking at the \_\_\_\_\_\_\_\_.
63. Gametophyte generation
64. Structure that results directly from a fertilized egg
65. Sporophyte generation
66. Spore-producing structure
67. Structure where meiosis occurs
68. Which of the following produces eggs and sperm?
69. Moss gametophytes
70. Megaspores
71. Moss sporangia
72. Megaphylls
73. Fern sporophytes
74. Fertilization in moss occurs when sperm swim from a(n) \_\_\_\_\_\_\_ and down the neck of a(n) \_\_\_\_\_\_\_\_.
75. Sporangium … archegonium
76. Antheridium … sporangium
77. Archegonium … antheridium
78. Antheridium … archegonium
79. Sporangium … antheridium
80. The gametophyte generation of a moss \_\_\_\_\_\_\_.
81. Is rarely encountered, compared with the sporophyte
82. Is dependent on the sporophyte
83. Is haploid
84. Produces spores
85. Has tracheids, but no vessel elements
86. How are gametes produced by bryophytes?
87. By mitosis of spores
88. By meiosis of spores
89. By meiosis of sporophyte cells
90. By mitosis of gametophyte cells
91. By meiosis of gametophyte cells
92. In which bryophyte structure specifically does a zygote develop into an embryo?
93. Seta
94. Archegonium
95. Antheridium
96. Stomata
97. Peristome
98. In the life cycle of a fern, the multicellular male gametangium (the sex organ that produces sperm cells) is called a(n) \_\_\_\_\_\_\_\_\_\_\_\_.
99. Antheridium
100. Archegonium
101. Sporangium
102. Rhizoid
103. Frond
104. In the life cycle of ferns, the multicellular female gametangium (the sex organ contains an egg) is called a(n) \_\_\_\_\_\_\_\_\_\_\_\_.
105. Archegonium
106. Rhizome
107. Frond
108. Antheridium
109. Sporangium
110. What is the evolutionary significance of megaphylls?
111. They increase the surface area for photosynthesis.
112. They provide a way to transport water and nutrients throughout the plant’s body.
113. They allow plants to grow taller.
114. They are modified leaves that have sporangia
115. They increase the surface area for absorption of nutrients.
116. The “dots” on the underside of a fern frond are spore cases; therefore, what is true of the plant to which the frond belongs?
117. It is a gametophyte.
118. It is a spermatophyte
119. It is a spore.
120. It is a gamete.
121. It is a sporophyte.
122. To examine meiosis in ferns, you would study \_\_\_\_\_\_\_.
123. The archegonia
124. The antheridia
125. Both the antheridia and the archegonia
126. The sporangia
127. Both the archegonia and the sporangia
128. Vascular tissues of plants include \_\_\_\_\_\_\_\_\_.
129. Cuticles for conducting water, and phloem for conducting organic molecules
130. Xylem for conducting organic molecules, and phloem for conducting water and minerals
131. Lignin for conducting organic molecules, and phloem for conducting sugars
132. Phloem for conducting water and minerals, and lignin for conducting organic molecules
133. Xylem for conducting water and minerals, and phloem for conducting dissolved organic molecules
134. Heterosporous plants produce \_\_\_\_\_\_\_\_\_.
135. Megaspores that develop into female gametophytes and microspores that develop into male gametophytes
136. Megaspores that develop into male gametophytes and microspores that develop into female gametophytes
137. Seeds
138. Spores the produce both archegonia and antheridia
139. Megaspores that bear antheridia and microspores that bear archegonia
140. In sporophyte ferns, the leaves are \_\_\_\_\_\_\_\_\_.
141. Microphylls
142. Sporangia
143. Megaphylls
144. Blades
145. Protonemata