AP Plants II Practice test

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

The figure below shows the results of a study to determine the effect of soil air spaces on plant growth. Use these data to answer the following questions.

____ 1. The best conclusion from the data in the figure above is that the plant
   a. grows best without air in the soil.
   b. grows fastest in 5 to 10% air.
   c. grows best in air levels above 15%.
   d. does not respond differently to different levels of air in the soil.
   e. would grow to 24 grams in 40% soil air.

____ 2. An early use of indicator plants (plants that tolerate high levels of heavy metals in the soil) was to locate potential profitable areas to mine for those minerals. A current use for such plants is
   a. to help locate suitable sites for toxic waste storage.
   b. bioremediation to help clean up mine spoils.
   c. to minimize soil erosion in arid lands.
   d. nitrogen fixation by symbiotic bacteria in root nodules.
   e. all of the above

____ 3. Nitrogen fixation is a process that
   a. recycles nitrogen compounds from dead and decaying materials.
   b. converts ammonia to nitrate.
   c. releases nitrate from the rock substrate.
   d. converts nitrogen gas into ammonia.
   e. both A and B

____ 4. Why is nitrogen fixation such an important process?
   a. Nitrogen fixation can only be done by certain prokaryotes.
   b. Fixed nitrogen is most often the limiting factor in plant growth.
   c. Nitrogen fixation is very expensive in terms of metabolic energy.
   d. Nitrogen fixers are sometimes symbiotic with legumes.
   e. Nitrogen-fixing capacity can be genetically engineered.

____ 5. Among important crop plants, nitrogen-fixing root nodules are most commonly an attribute of
   a. corn.
b. legumes.
c. wheat.
d. members of the potato family.
e. cabbage and other members of the brassica family.

6. Which of the following is a true statement about nitrogen fixation in root nodules?
   a. The plant contributes the nitrogenase enzyme.
   b. The process is relatively inexpensive in terms of ATP costs.
   c. Leghemoglobin helps maintain a low O₂ concentration within the nodule.
   d. The process tends to deplete nitrogen compounds in the soil.
   e. The bacteria of the nodule are autotrophic.

7. What is the mutualistic association between roots and fungi called?
   a. nitrogen fixation
   b. *Rhizobium* infection
   c. mycorrhizae
   d. parasitism
   e. root hair enhancement

8. What is the relationship between pollination and fertilization in flowering plants?
   a. Fertilization precedes pollination.
   b. Pollination easily occurs between plants of different species.
   c. Pollen is formed within megasporangia so that male and female gametes are near each other.
   d. Pollination brings gametophytes together so that fertilization can occur.
   e. If fertilization occurs, pollination is unnecessary.

9. Which of the following statements about fruits is false?
   a. Fruits form from microsporangia and integuments.
   b. All normal fruits have seeds inside them.
   c. Green beans, corn, tomatoes, and wheat are all fruits.
   d. Fruits aid in the dispersal of seeds.
   e. During fruit development, the wall of the ovary becomes the pericarp.

10. The first step in the germination of a seed is usually
    a. pollination.
    b. fertilization.
    c. imbibition of water.
    d. hydrolysis of starch and other food reserves.
    e. emergence of the radicle.

11. Under which conditions would asexual plants have the greatest advantage over sexual plants?
    a. an environment that varies on a regular, predictable basis
    b. an environment with irregular fluctuations of conditions
    c. a relatively constant environment with infrequent disturbances
    d. a fire-maintained ecosystem
    e. an environment with many seed predators

12. The step(s) between a plant's perception of a change in the environment and the plant's response to that change is (are) best called
    a. a mutation.
    b. hormone production.
    c. pH change.
    d. signal transduction.
    e. an "all-or-none" response.

13. All of the following may function in signal transduction in plants except
14. In a signal transduction pathway, the transduction stage amplifies the original signal by
a. involving more than one receptor molecule to receive the stimulus.
b. having each receptor molecule produce multiple secondary messengers.
c. having each secondary messenger activate numerous specific enzymes.
d. B and C only
e. A, B, and C

15. Plants growing in a partially dark environment will grow toward light in a response called phototropism.
Choose the incorrect statement regarding phototropism.
   a. It is caused by a chemical signal.
   b. One chemical involved is auxin.
   c. Auxin causes a growth increase on one side of the stem.
   d. Auxin causes a decrease in growth on the side of the stem exposed to light.
   e. Removing the apical meristem prevents phototropism.

16. We know from the experiments of the past that plants bend toward light because
a. they need sunlight energy for photosynthesis.
   b. the sun stimulates stem growth.
   c. cell expansion is greater on the dark side of the stem.
   d. auxin is inactive on the dark side of the stem.
   e. phytochrome stimulates florigen production.

17. Which of the following is not presently considered a major mechanism whereby hormones control plant
development?
   a. affecting cell respiration via regulation of the citric acid cycle
   b. affecting cell division via the cell cycle
   c. affecting cell elongation through acid growth
   d. affecting cell differentiation through altered gene activity
   e. mediating short-term physiological responses to environmental stimuli

18. Vines in tropical rain forests must grow toward large trees before being able to grow toward the sun. To reach
a large tree, the most useful kind of growth movement for a tropical vine presumably would be the opposite of
a. positive thigmotropism.
   b. positive phototropism.
   c. positive gravitropism.
   d. sleep movements.
   e. circadian rhythms.

19. Plant hormones can have different effects at different concentrations. This explains how
   a. some plants are long-day plants and others are short-day plants.
   b. signal transduction pathways in plants are different from those in animals.
   c. plant genes recognize pathogen genes.
   d. auxin can stimulate cell elongation in apical meristems, yet will inhibit the growth of
      axillary buds.
   e. they really don't fit the definition of "hormone."

20. Which of the following has not been established as an aspect of auxin's role in cell elongation?
   a. Auxin instigates a loosening of cell wall fibers.
   b. Auxin increases the quantity of cytoplasm in the cell.
   c. Through auxin activity, vacuoles increase in size.
21. Ethylene, as an example of a plant hormone, may have multiple effects on a plant, depending on all of the following except the
   a. site of action within the plant.
   b. developmental stage of the plant.
   c. concentration of ethylene.
   d. altered chemical structure of ethylene from a gas to a liquid.
   e. readiness of cell membrane receptors for the ethylene.

22. Auxin is responsible for all of the following plant growth responses except
   a. phototropism.
   b. formation of adventitious roots.
   c. apical dominance.
   d. the detection of photoperiod.
   e. cell elongation.

23. Plants often use changes in day length (photoperiod) to trigger events such as dormancy and flowering. It is logical that plants have evolved this mechanism because photoperiod changes
   a. are more predictable than air temperature changes.
   b. alter the amount of energy available to the plant.
   c. are modified by soil temperature changes.
   d. can reset the biological clock.
   e. are correlated with moisture availability.

24. A long-day plant will flower if
   a. the duration of continuous light exceeds a critical length.
   b. the duration of continuous light is less than a critical length.
   c. the duration of continuous darkness exceeds a critical length.
   d. the duration of continuous darkness is less than a critical length.
   e. it is kept in continuous far-red light.

25. If you take a short-day plant and put it in a lab under conditions where it will flower (long nights and short days), but interrupt its day period with a few minutes of darkness, what will happen?
   a. It will flower.
   b. It will not flower.
   c. It will die.
   d. It will lose its ability to photosynthesize.
   e. It will form new shoots from the axillary buds.

26. A botanist discovers a plant that lacks the ability to form starch grains in root cells, yet the roots still grow downward. This evidence refutes the long-standing hypothesis that
   a. falling statoliths trigger gravitropism.
   b. starch accumulation triggers the negative phototropic response of roots.
   c. starch grains block the acid growth response in roots.
   d. starch is converted to auxin, which causes the downward bending in roots.
   e. starch and downward movement are necessary for thigmotropism.

27. The initial response of the root cells of a tomato plant watered with seawater would be to
   a. rapidly produce organic solutes in the cytoplasm.
   b. rapidly expand until the cells burst.
   c. begin to plasmolyze as water is lost.
   d. actively transport water from the cytoplasm into the vacuole.
   e. actively absorb salts from the seawater.

28. In general, which of the following is not a plant response to herbivores?
a. domestication, so that humans can protect the plant
b. attracting predatory animals, such as parasitoid wasps
c. chemical defenses, such as toxic compounds
d. physical defenses, such as thorns
e. production of volatile molecules
## AP Plants II Practice test
### Answer Section

### MULTIPLE CHOICE

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