Multiple Choice Questions

1. Which of the following pertain to movement of plants?

A) seismonastic movements
B) sleep movements
C) phototropism
D) gravitropism
E) all of the choices are correct

Answer: E

2. Which of the following ions are affected by gibberellins and is also involved in signal transduction?

A) H+
B) Ca2+
C) Na+
D) Mg2+
E) Nitrate

Answer: B

3. Pinching the top off a plant to create fuller growth involves which of the following hormones?

A) auxins
B) ethylene
C) gibberellins
D) cytokinins
E) abscisic acid

Answer: A

4. The general sequence by which a plant responds to stimuli is

A) chloroplast-vascular bundle-sap.
B) reception-transduction-response.
C) sensory nerve-interneuron-motor nerve.
D) input-reflex-output.

E) leaf-stem-root.

Answer: B

5. Which of these terms refers to a growth of the plant toward light?

A) negative gravitropism
B) positive gravitropism
C) thigmotropism
D) negative phototropism
E) positive phototropism

Answer: E

6. The response of roots growing downward is referred to as

A) negative gravitropism
B) positive gravitropism
C) thigmotropism
D) negative phototropism
E) positive phototropism

Answer: B

7. Pea vines twining around a wire support is an example of

A) negative gravitropism
B) positive gravitropism
C) thigmotropism
D) negative phototropism
E) positive phototropism

Answer: C

8. Plant hormones are generally produced in _____ tissues.

A) cortical (cortex)
B) epidermal
C) meristem
D) vascular

E) floral

Answer: C

9. The Latin root words meaning "about" and "day" are the basis for the term A) auxin.

B) tropism.

C) nastic.

D) circadian.

E) phytochrome.

Answer: D

10. Which statement about plant hormones is NOT true?

A) Plant hormones include at least one form that is a gas.

B) Each naturally occurring hormone has a specific chemical structure.

C) Hormones are among the principal internal regulators of plant growth.

D) Responses to plant hormones may be observed in nearly any part of a plant.

E) All known growth regulators of plant activities are chemicals produced naturally in plants.

Answer: E

11. Which of these plant hormones is a growth inhibitor?

A) abscisic acid

B) auxin

C) cytokinin

D) gibberellin

E) IAA

Answer: A

12. Which of these plant hormones was studied in the 1880s by Charles and Francis Darwin in experiments on phototropism?

A) abscisic acid

B) auxin

C) cytokinin

D) ethylene

E) gibberellin

Answer: B

13. Which plant hormone was discovered in infected rice seedlings that grew extremely tall and slender?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: E

14. Which plant hormone, developing in an apical bud, inhibits the growth of lower axillary buds?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: B

15. Indoleacetic acid (IAA) is the most commonly occurring form of which plant hormone?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: B

16. Dormancy in seeds and buds can be broken by application of which plant hormone?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: E

17. A hormone that causes cell division and is found in coconut milk or in dividing root tissue is A) abscisic acid.

B) auxin.
C) cytokinin.
D) ethylene.
E) gibberellin.

Answer: C

18. Which of the following is/are an effect(s) of auxin?

A) Applied to a woody cutting, it causes roots to develop.
B) Auxin production by seeds promotes the growth of fruit.
C) Trees sprayed with auxin will keep mature fruit from falling to the ground.
D) Under the effect of gravity, auxin moves to the lower surface of roots and stems, causing roots to curve downward and stems to curve upward. E) All of the choices are effects of auxin.

Answer: E

19. How does auxin actually work?

A) In the presence of blue light, it triggers additional photosynthesis and growth.
B) In the presence of light, it increases the turgor pressure of the cell and accelerates growth.
C) In the presence of light, it increases the formation of hydrolytic enzymes that release energy needed for growth purposes.
D) In the presence of light, it moves toward the light source and activates a protein that binds to DNA and starts enzyme production.
E) In the presence of unidirectional light, it moves to the shady side and activates an ATP-driven proton pump that results in weakened cell walls and eventual elongation.

Answer: E

20. How does gibberellin actually work?

A) In the presence of blue light, it triggers additional photosynthesis and growth.

B) In the presence of light, it increases the turgor pressure of the cell and accelerates growth.

C) In the presence of light, it increases the formation of additional DNA that codes for additional plant structures.

D) In the presence of unidirectional light, it moves to the shady side and activates an ATP-driven proton pump that results in weakened cell walls and eventual elongation.

E) It attaches to a plasma membrane receptor and results in gene activation to produce the enzyme amylase that releases sugars for additional cell growth, division, and elongation.

Answer: E

21. A chemical messenger from the embryo that apparently stimulates a seed to digest the endosperm is A) abscisic acid.

B) auxin.

C) cytokinin.

D) ethylene.

E) gibberellin.

Answer: E

22. Application of which hormone prevents plant tissues from senescing, or aging?

A) abscisic acid

B) auxin

C)cytokinin

D) ethylene

E) gibberellin

Answer: C

23. Which plant hormone is a gas?

A) abscisic acid

B) auxin

C) cytokinin

D) ethylene

E) gibberellin

Answer: D

24. Which plant hormone stimulates the ripening of fruit and inhibits plant growth?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: D

25. Which plant hormone is called the stress hormone because it produces dormancy in seeds and buds?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: A

26. Which plant hormone is associated with the closure of the stomates in a plant under water stress?

A) abscisic acid
B) auxin
C) cytokinin
D) ethylene
E) gibberellin

Answer: A

27. Which statement is NOT correct about a circadian rhythm?

A)These rhythms tend to persist even in the absence of daily light cues.
B) An example is the opening of stomata in the morning and their closing at night.
C) If plants are maintained in total darkness or total light, their circadian rhythm acts on a faster time scale.
D) The primary usefulness of circadian rhythms seems to be to measure day-length changes so plants respond appropriately to seasonal environmental changes.
E) All of these are correct statements.

Answer: C

28. Which is NOT a physiological change related to photoperiodism? A) seed germination

B) root branching
C) breaking bud dormancy
D) some flowering
E) onset of senescence

Answer: B

29. The prayer plant, Maranta leuconeura, folds up its leaves each night in accordance with a circadian rhythm. If we were to ship this plant halfway around the world to a location where it is daytime there when it is night here, the plant will

A) slowly adjust to synchronize with the new day-night cycle.
B) immediately switch to a new cycle and begin to open leaves in day and close them at night.
C) detect the change but remain on its original cycle and therefore still fold leaves in day and open them at night.
D) not detect the change and therefore remain on its original cycle.
E) cease to exhibit the behavior at all.

Answer: A

30. Which statement is NOT true about photoperiodism?

A) A short-day plant flowers when the day length is shorter than some critical length.
B) A day-neutral plant flowers according to some form of regulation other than photoperiodism.
C) A long-day plant will flower even when the day period is not long enough if there is a short period of light during the dark period.
D) The phytochrome form Pfr is converted to Pr in daylight, producing the active form that induces flowering in longday plants.
E) All of these statements are true.

Answer: D

31. The Greek root words meaning "plant" and "color" are the basis for the term

A) auxin.
B) tropism.
C) nastic.
D) circadian.
E) phytochrome.

Answer: E

32. How do some plants seeds "know" when it is day and night, and perhaps when to germinate?
A) They chemically count the circadian cycles.
B) All plant hormones are products of photosynthetic systems.
C) Photosynthetic rates provide direct evidence of sunproduced food.
D) Phytochromes cycle between red and far-red absorption and light levels can inhibit germination. E) All of the choices are correct.

Answer: D

33. Gravitropism in roots
A) is positive when plant roots grow downward.
B) is due to statoliths in the root cap cells.
C) is due to auxins.
D) is due to amyloplasts E) All of the choices are true.

Answer: E

34. Apical dominance in plants is due to which of the following plant hormones?
A) ethylene
B) gibberellin
C) auxins
D) cytokinins
E) abscisic acid

Answer: C

35. Which of the following is/are true regarding gibberellins?
A) there are about 70 chemically different gibberellins
B) are growth promoters causing stem elongation
C) these hormones can break seed and bud dormancy

D) can induce plant growth and increase flower size
E) all of the choices are true

Answer: E

36. Cytokinins

A) are plant hormones that promote cell division.
B) are used in combination with auxin to produce plants from undifferentiated callose tissue.
C) also work with oligosaccharins to effect tissue differentiation.
D) are produced in actively dividing tissues.
E) All of these are true regarding cytokinins.

Answer: E

Matching Questions

Use the following to answer questions 37-41:

Match the plant hormones below with the statements that follow.

A. Auxin
B. Gibberellin
C. Abscisic acid
D. Ethylene
E. Cytokinin

37. Ripens fruit; controls abscission

Answer: D

38. Induces amylase production in seeds

Answer: B

39. Influences phototropism

Answer: A

40. Affects stomatal response to water stress

Answer: C

41. Promotes cell division

Answer: E

Essay Questions

42. Plants, like animals must be able to respond to environmental stimuli in order to survive. Choose three of the following responses and in each case, describe how the stimulus is received (reception) and how the stimulus is converted within the plant into a reaction that causes the particular response in the plant (transduction).

a. Phototropism
b. Gravitropism
c. Stomatal opening
d. Flowering in short day plants

Answer:

a. Phototropism: light received/detected by photoreceptor in plant, causes auxin to migrate to shady side of stem. Cells on shady side elongate at a greater rate pushing stem over towards light. Correct answer can also include discussion of the action of auxin, i.e.: auxin activates a proton pump resulting in acidic conditions that break down cellulose fibers and auxin causes production of growth factors in affected cells.

b. Gravitropism: gravity detected by statoliths in root cap cells. Statoliths contact ER which releases calcium ions which leads to auxin entering the cells. Auxin inhibits cell elongation and upper cells therefore elongate faster causing root to be pushed downward.

c. stomatal opening: answer can discuss the action of the flavin receptors detecting blue light and leading to potassium ions entering the guard cells and/or the possibility of carbon dioxide receptors in the guard cell membrane which inactivates the proton pump and therefore potassium movement which will shut down stomata (high carbon dioxide means no photosynthesis occurring and therefore no need for stomata to be open).

d. Flowering: answer should include discussion of phytochromes being the receptors of light and the interaction of phytochrome red and phytochrome far-red and how they interact to suppress or "desuppress" flowering. Phytochrome far-red is the chemically reactive form. In sufficient quantities it suppresses

flowering. If enough is converted to phytochrome red during a long night (short day), flowering will occur.