※ 本大題請於試卷內之「選擇題作答區」依序作答。

A. 單選題(1~6 題，每題 2 分；7~10 題，每題 1 分)

1. Basipetal transport in plants:
   (A) refers to polar transport in general.
   (B) refers to a type of nondirectional transport.
   (C) can refer to transport in the stem from the soil surface toward the tip.
   (D) can refer to transport in the root from the soil surface toward the tip.
   (E) can refer to transport in the root from the tip toward the soil surface.
2. If cell wall microfibrils are oriented transversely, the cell normally expands:
   (A) in all directions.
   (B) at an oblique angle.
   (C) first laterally and then longitudinally.
   (D) laterally.
   (E) longitudinally.
3. An etiolated eudicot seedling:
   (A) has a short stem.
   (B) has small leaves.
   (C) is green.
   (D) lacks plastids.
   (E) cannot undergo further growth.
4. After a plant has been exposed to noontime sunlight for a few minutes:
   (A) all the P_r has been converted to P_{fr}.
   (B) all the P_{fr} has been converted to P_r.
   (C) P_r is converted to P_{fr} faster than P_{fr} is converted to P_r.
   (D) P_{fr} is converted to P_r faster than P_r is converted to P_{fr}.
   (E) the proportion of P_{fr} is greater than that of P_r.
5. A high level of _____ in the middle of the dark period will inhibit flowering in _____ plants that otherwise would have flowered.
   (A) P_r; long-day
   (B) P_r; short-day
   (C) P_{fr}; day-neutral
   (D) P_{fr}; short-day
   (E) P_{fr}; long-day

見背面

6. In studies of leaf senescence, when an excised leaf containing radioactive amino. acids with a kinetin-containing solution, the spot:
   (A) turns yellow and becomes nonradioactive.
   (B) turns yellow and becomes more radioactive.
   (C) remains green and becomes nonradioactive.
   (D) remains green and becomes more radioactive.
   (E) turns brown and becomes nonradioactive.
7. Water movement in plants is driven by water potential. Which statement is true about water movement?
   (A) Water moves from high water potential to low water potential.
   (B) Water movement requires energy.
   (C) Water molecule needs membrane proteins to cross cell membrane.
   (D) The higher solute concentration is, the higher water potential is.
8. What hormones are involved in leaf senescence?
   (A) GAs and SA
   (B) Auxin and ABA
   (C) ABA and ethylene
   (D) Auxin and ethylene
9. What statement is not correct about water?
   (A) Water has polarity.
   (B) Water forms covalent bonds with other water molecules.
   (C) Water is a good solvent.
   (D) Water has high heat of vaporization, so it can help plants to cool down.
10. Which statement is correct about solute transport?
    (A) Channels can mediate active transport.
    (B) Carrier proteins can only mediate passive transport.
    (C) Primary and secondary active transport use different energy sources.
    (D) As long as the solute is small enough, it can cross cell membrane directly.

B. 問答題（中、英文回答皆可）(**84 points**)

1. The GA and phytochrome pathways are integrated. Compare and contrast the GA signaling pathways in dark-grown (tall) and light-grown (short) Arabidopsis hypocotyls. (**5 points**)
2. Describe the unique features of embryogenesis in Arabidopsis (**3 points**) and discuss the role of auxin and polar auxin transport in embryo development (**5 points**).

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3. Compare and contrast gametophytic versus sporophytic self-incompatibility (**5 points**). How do they differ at the biochemical level (**5 points**)?
4. Describe the mechanism of action of florigen in stimulating flowering in Arabidopsis (**5 points**). What other factors influence flowering (**3 points**)?
5. What is the apical dominance (**2 points**)? Describe the interactions of hormones and sucrose in the regulation of axillary bud growth in stems (**5 points**).
6. What are the end products of light reaction and Calvin cycle, respectively, in photosynthesis? (**6 points**)
7. (1) What are the functions of stomata on the leaves? (**6 points**) (2) How do stomata close and open in response to stimuli? (**6 points**)
8. Compare the xylem transport with phloem transport by using following points: (1) driving forces; (2) direction; (3) functions. (**12 points**)
9. Soil is very complex. What properties of soil will affect nutrient uptake by plant roots? (**6 points**)
10. (1) Explain how ATP is produced by chemiosmosis? (**6 points**) (2) Which organelles in plant cells use chemiosmosis to generate ATP? (**4 points**)

試題隨卷繳回