

※ 注意：請於試卷內之「非選擇題作答區」依序作答，並應註明作答之大題及小題題號。

A. 單選題(1~5 題)， 每題 2 分

1. All plant hormones:
 - (A) are inorganic substances.
 - (B) act in the tissues where they are produced.
 - (C) are stimulatory.
 - (D) are active in large quantities.
 - (E) communicate information.
2. Which of the following statements about hormone action is FALSE?
 - (A) Hormones influence the rate of cell division.
 - (B) Hormones influence the rate of cell expansion.
 - (C) Hormones influence the direction of cell expansion.
 - (D) All hormones act by stimulating gene expression.
 - (E) All hormones act as chemical messengers.
3. The rapid closure of leaves of the Venus flytrap is now thought to be due to:
 - (A) changes in turgor pressure in the mesophyll cells underlying the epidermis.
 - (B) changes in turgor pressure in the upper epidermis.
 - (C) changes in turgor pressure in cells of the pulvinus.
 - (D) acid-induced wall loosening of motor cells.
 - (E) Unloading of sucrose from the phloem.
4. Strictly speaking, the vascular cambium refers to the:
 - (A) cambial zone.
 - (B) single radial file of derivatives.
 - (C) single radial file of initials.
 - (D) initials plus their immediate derivatives.
 - (E) initials, their immediate derivatives, and the most recent xylem and phloem.
5. Which type(s) of plants, when grown under noninductive conditions, can be induced to flower if the light period is interrupted by darkness?
 - (A) only long-day plants
 - (B) only short-day plants
 - (C) only day-neutral plants
 - (D) both long-day and short-day plants
 - (E) both short-day and day-neutral plants

見背面

B. 問答題 (中、英文回答皆可)(總共 90 分)

1. What is meant by “acid growth” (3 points) and what protein has been shown to mediate it? (2 points) Describe the experiments that led to the discovery of this protein. (5 points)
2. What is the primary function of the CLAVATA genes? (2 points) Diagram a model for CLV1 and CLV3 action and regulation at the molecular level. (4 points)
3. Describe the phenotypes of the following homeotic mutant of Arabidopsis. (4 points)
 - a. Loss of B function
 - b. Loss of C function
 - c. Loss of A function
 - d. Complete loss of A, B, and C functions
4. Discuss the relationship between vernalization and the gene FLOWERING LOCUS C (FLC). (5 points)
5. What is “florigen,” and what is the early experimental evidence used to demonstrate its existence? (5 points)
6. Discuss the role of auxin and polar auxin transport in embryo development. (5 points)
7. What is cryptochrome? (2 points) Describe the properties and postulated role of cryptochrome in blue light-dependent inhibition of stem elongation. (3 points)
8. On a cold and rainy day, do you think what is the main driving force to push xylem sap up to the leaves? And explain your answer. (6 points)
9. Why does a water molecule have cohesion and adhesion? (2 points)
10. The water balance of plants is very important. The balance is between water uptake by roots and water loss from leaves. Please give two factors that influence water uptake by roots and water loss from leaves, respectively. (8 points)
11. Please list 3 factors that affect the absorption of mineral nutrients by roots. (6 points)
12. Compare xylem transport and phloem transport by (1) cell types (2) driving forces. (12 points)
13. What is the net electron donor and acceptor of respiration? (4 points)
14. Explain how ATP is synthesized by chemiosmosis in photosynthesis. (4 points)
15. Compare acclimation and adaptation. (4 points)
16. What organelle will be degraded first during leaf senescence? And why? (4 points)