

※ 注意：全部題目均請作答於試卷內之「非選擇題作答區」，請標明題號依序作答。

A. 解釋名詞 (10%)

- (1) Two-component regulatory system 與 Triple response
- (2) Photomorphogenesis 與 Shade avoidance response
- (3) Gametophytic self-incompatibility 與 Sporophytic self-incompatibility
- (4) Climacteric fruit 與 Non-climacteric fruit
- (5) MADS-box genes 與 Basic helix-loop-helix genes

B. 簡答題

1. What are plant cell wall proteins? Give 2 examples of them (2 points). Describe main functions of these 2 cell wall proteins (5 points).
2. Describe the roles of phytochrome interacting factors (PIFs) in photomorphogenesis. (5 points)
3. Describe the role of auxin and polar auxin transport in embryo development (5 points).
4. What is the starch-statolith hypothesis in relation to gravitropism in roots (5 points)? Compare functional roles of auxin involved in phototropism and gravitropism (5 points).
5. Describe the interactions of hormones and sucrose in the regulation of axillary bud growth in stems (5 points).
6. Discuss the mechanism of action of florigen in stimulating flowering in Arabidopsis (5 points). What other factors influence flowering (3 points)?
7. What is "plant physiology" and why do we study it? (8 points)
8. In your opinions, what are the urgent problems needed to be solved in agriculture? (3 points)
9. The functions of xylem and phloem are similar to the blood vessels in our bodies, but the working mechanisms are different. Please describe the mechanisms of how xylem and phloem function, respectively, in vascular plants. (10 points)
10. What are the final products of the light reaction in photosynthesis? (6 points)
11. About solute movement in plant cells: (1) Please compare the differences among passive transport, primary active transport, and secondary active transport. (2) Give one transport protein as an example to every one of them. (9 points)

見背面

12. Microbiota is a hot topic recently. Soil contains numerous microorganisms that interact with plants. Please give two examples of mutualism between plants and microorganisms in soil. (4 points)
13. The plant respiration includes four steps: glycolysis, oxidative pentose phosphate pathway, citric acid cycle (TCA cycle), and oxidative phosphorylation (electron transfer chain). Which step(s) does(do) the CO₂ production occur? (4 points)
14. Light reaction and oxidative phosphorylation (electron transfer chain) are very similar processes, but with several differences. For example, what are the differences in (1) the initial electron donor(s), and (2) the final electron acceptor(s) between these two processes? (6 points)

試題隨卷繳回