

所別：生命科學系碩士班 一般生 科目：植物生理學

Part A -- Simple match (配對題)

Please fill in the letter whose term *is the most* relevant to the question.
(1 points each, 14 points total)

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|-------|-----------------------------------------------------|-------------------|
| _____ | 1. Control apical dominance | A. Auxins |
| _____ | 2. Control cell cycle | B. Gibberellins |
| _____ | 3. Control gravitropism | C. Cytokinins |
| _____ | 4. Control phototropism | D. Abscissic acid |
| _____ | 5. Differentiation of vascular tissue | E. Ethylene |
| _____ | 6. Increase sugarcane yields | |
| _____ | 7. Induce abscission | |
| _____ | 8. Induce seed germination | |
| _____ | 9. Involve epinasty | |
| _____ | 10. Make dwarf plants grow tall | |
| _____ | 11. Promote fruit ripening (e.g. tomato and citrus) | |
| _____ | 12. Promote stem cell to proliferate in culture | |
| _____ | 13. Promote stomatal closure | |
| _____ | 14. Related to water stress responses | |

Part B -- Multiple choice (單選題)

(3 points each, 54 points total)

1. The term IMBIBITION refers to (A) water uptake by root hairs (B) water uptake by dry seeds (C) ion uptake by root hairs (D) symplastic movement of water in root (E) apoplastic movement of water in root.
2. The term VERNALIZATION describes the use of (A) short-day light (B) long-day light (C) low temperature (D) high temperature (E) hormone treatment in order to hasten flowering.
3. Stomatal conductance refers to (A) the electric potential across a guard cell membrane (B) the $[K^+]$ gradient across a guard cell membrane (C) the measure of ease with which gaseous materials pass through stomata (D) the turgor of a guard cell (E) the electric potential between a guard cell and its adjacent subsidiary cell.
4. Which of the following is the most abundant protein in plant photosynthetic organs? (A) Alcohol dehydrogenase (B) Superoxide dismutase (C) Ribulose -1,5-bisphosphate carboxylase-oxygenase (D) Aldolase (E) Phosphoglycerate kinase.
5. Plasmolysis happens when an onion cell is (A) bathed in hypotonic solution (B) frozen (C) placed at high altitude (D) treated with hormone auxin (E) stained with ethidium bromide.
6. Which of the following methods (equipments) can NOT be used to measure plant cell water potential or its components? (A) Tissue weight-changed method (B) Thermocouple psychrometry (C) incipient plasmolysis (D) Cryoscopic methods or freezing point depression (E) Girding.
7. Which of the following is not a light-regulated response in plants? (A) Phototropism (B) Nyctinasty (C) Photoperiodism (D) Etiolation (E) Thigmonastic curling.
8. Seed dormancy could be broken by the following except (A) removing the seed coat (B) low temperature treatment (C) applying plant hormone ABA (D) changing light condition (E) passing the seed through an animal gut.
9. In plant physiology, an organ or tissue that produces more assimilate than it requires for its own metabolism and growth is called a SOURCE. On the other hand, a net importer or consumer of assimilate is called (A) an END (B) a TERMINAL (C) a SINK (D) a BOTTOM (E) a BASE.

注意：背面有試題

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10. Under direct sunlight with sufficient water supply, which of the following is the least possible way employed by a plant to cope with heat stress? (A) Converting saturated fatty acid to unsaturated fatty acid (B) inducing heat shock protein synthesis (C) Enhancing transpiration rate (D) Moving leaves to a more vertical orientation.
11. Differentiated plant cells have the ability to undergo cell division, grow as undifferentiated callus, and eventually to give rise to a new plant. This concept is known as (A) productivity potential (B) reproductive efficacy (C) totipotency (D) reproductive versatility (E) regeneration potential.
12. Which of the following descriptions is not true? (A) Both trichome and root hair are derived from epidermal cells (B) root hairs can help plants to absorb water (C) trichomes can cool a plant leaf by reflecting sunlight (D) both root hairs and trichomes are unicellular (E) Root hairs can penetrate water-containing capillary spaces between soil particles.
13. Crown gall, the neoplastic growth of plant cells results from the infection with the bacterium *Agrobacterium tumefaciens*, is induced by (A) gibberellin (B) auxin (C) cytokinin (D) auxin and ethylene (E) cytokinin and auxin.
14. Which of the following is not required during the initial incorporation of CO₂ in C₄ plant mesophyll? (A) Oxaloacetate (B) Phosphoenol pyruvate (C) Bicarbonate ion HCO₃⁻ (D) Ribulose-1,5-bisphosphate carboxylase-oxygenase (E) Phosphoenol pyruvate carboxylase.
15. The chromophore of plant phytochrome is a (A) carotenoid (B) chlorophyll (C) phycobilin (D) flavonoid (E) betacyanin.
16. Which of the following ions is the most common osmotic regulator in plant cells? (A) K⁺ (B) Ca²⁺ (C) Mg²⁺ (D) Al³⁺ (E) Mn²⁺.
17. Xylem sap exudation is considered to be the result of (A) surface tension (B) transpiration (C) capillarity (D) root pressure (E) evaporation.
18. Which of the following descriptions regarding the light reactions in plant photosynthesis is NOT true? (A) The photosystem II produces a very strong oxidant that can extract electron from H₂O (B) The photosystem I reaction center reduces NADP⁺ (C) Electron flow in the light reactions increases [H⁺] in lumen (D) Cyclic electron flow generates ATP and NADPH.

Part C -- Simple essay (簡答題)

Please compare and explain the terms in each question.

請比較說明下列各題之名詞。

(32 points total)

1. Chromoplast vs. Leucoplast vs. Plastid (6 points)
2. Tunica vs. Corpus (4 points)
3. Soil grown vs. Hydroponic (4 points)
4. Symplast vs. Apoplast vs. Tonoplast (6 points)
5. Circadian rhythm vs. Photoperiodism (4 points)
6. Bundle sheath cell vs. Mesophyll cells (4 points)
7. Nitrogen fixation vs. Nitrification (4 points)