

- I. 單選題：(30 分, 每題 3 分) * 注意：請於試卷「選擇題作答區」依題號作答。
1. When growing plants in culture, IAA is used to stimulate cell enlargement. Which plant growth regulator has to now be added to stimulate cell division?
a. auxin; b. ethylene; c. cytokinin. d. gibberellin.
 2. If a farmer wanted more loosely packed clusters of grapes, he would most likely spray the immature bunches with:
a. gibberellins; b. auxin. c. cytokinins; d. abscisic acid.
 3. A botanist discovers a new species of plant in a tropical rain forest. After observing its anatomy and life cycle, he notes the following characteristics: flagellated sperm, xylem with tracheids, separate gametophyte and sporophyte generations with the sporophyte dominant, and no seeds. This plant is probably most closely related to:
a. mosses; b. ferns; c. flowering plants; d. gymnosperms.
 4. Angiosperm double fertilization is so-called because it features the formation of
a. two embryos from one egg and two sperm cells; b. one embryo from one egg fertilized by two sperm cells; c. one embryo from two eggs fertilized by a single sperm cell; d. one embryo involving one sperm cell and an endosperm involving a second sperm cell.
 5. Which of the following flower parts develops into the pulp of a fleshy fruit?
a. ovule; b. ovary; c. stigma; d. style.
 6. Studies using *Arabidopsis thaliana* as a model system have led to important advances in all of the following *except*
a. gene mapping; b. evolutionary history of plants; c. gene expression during plant development; d. impact of point mutations on gene function
 7. According to the ABC model of floral development, which genes would be expressed in a showy ornamental flower with multiple sepals and petals but no stamens or carpels?
a. A genes only; b. B genes only; c. A and B genes only; d. A and C genes only
 8. When you eat onion, what are you eating?
a. large axillary buds; b. immature cotyledons; c. storage leaves d. storage roots
 9. What drives the flow of water through the xylem?
a. passive transport by the endodermis; b. the evaporation of water from the leaves; c. active transport by tracheid and vessel elements; d. active transport by sieve-tube elements
 10. Mycorrhizae enhance plant nutrition mainly by
a. absorbing water and minerals through the fungal hyphae; b. providing sugar to root cells, which have no chloroplasts; c. converting atmospheric nitrogen to ammonia; d. stimulating the development of root hairs.

見背面

II. 解釋名詞與比較：(30 分，每題 5 分)

1. Chemiosmosis vs. linear electron flow
2. Hypersensitive response vs. systematic acquired resistance
3. Circadian rhythms vs. photoperiods
4. Photorespiration vs. transpiration
5. Collenchyma vs. sclerenchyma
6. Symplast vs. apoplast

III. 簡答題：(40 分)

1. 現代植物學家試圖瞭解光合作用、固氮作用機制及製造生質能源，這些研究到底對人類存活有什麼重大影響(5 分)? 列舉及簡介至少兩種當代植物轉殖基因技術(genetic engineering) (5 分)。
2. 光合作用分光反應 (light reaction) 及暗反應 (dark reaction) 兩部分。這兩個反應各自在葉綠體內之那個部位作用 (請以英文回答，如 stroma, thylakoid space or thylakoid membrane) (4 分)? 那個反應吸收空氣中二氧化碳(2 分)? C3 植物暗反應在白天還是晚上進行(2 分)? 光反應中哪兩種化合物吸收光能，成為提供暗反應所需之化學能(4 分)?
3. 為何開花植物能在世界上種化出超過三十萬種之多樣性(3 分)? 列舉及簡介至少三個花用來吸引傳粉者之花部特徵 (pollination syndrome) (3 分)? 列舉你所知道的哪些生理及環境因素能誘導開花(4 分)?
4. 為何單子葉植物 (譬如大王椰子) 的莖無法年年加粗?(4 分)。如果十年前你在椰子樹離地 1.5 公尺處做了記號，十年後的現在這個記號會向上、向下還是留在原處，為什麼?(4 分) (請用植物學原理來解釋此題兩部份的答案，例如哪種分生組織及其生長位置等)。

試題隨卷繳回