一、單選題(30%)

1) The most immediate potential benefits of introducing genetically modified crops include:

I) creating crops that can grow on land previously unsuitable for agriculture

II)creating crops with better potential for biofuel production

III) creating crops with better nutritional attributes

IV) increasing crop yield

V)decreasing the mutation rate of certain genes

A) only I, II, III, and IV B) only II, III, and IV

C) only III, IV, and V D) I, II, III, IV, and V

2) Micronutrients are needed in very small amounts because

A) most of them are mobile in the plant.

B) most are supplied in large enough quantities in seeds.

C) most serve mainly as cofactors of enzymes.

D) they play only a minor role in the growth and health of the plant.

3) Mycorrhizae enhance plant nutrition mainly by

A) enabling the roots to parasitize neighboring plants.

B) converting atmospheric nitrogen to ammonia.

C) providing sugar to root cells, which have no chloroplasts.

D) absorbing water and minerals through the fungal hyphae.

4) If you were shipping green bananas to a supermarket thousands of miles away, which of the following chemicals would you want to eliminate from the plants' environment?

A) auxin B) carbon dioxide C) ethylene D) cytokinins

5) In the fall, the leaves of some trees change color. This happens because chlorophyll breaks down and the accessory pigments become visible. What hormone is responsible for this?

A) abscisic acid B) ethylene C) cutokinin D) phototropin

6) In autumn, chlorophyll is degraded in the leaves of deciduous trees. Why do the leaves change color to shades of yellow, orange, or red?

A) Sugars from sap fill the leaves prior to winter.

B) Other pigments such as carotenoids are still present in the leaves.

C) Degraded chlorophyll changes into many other colors.

D) In the absence of photosynthesis, the leaves produce energy exclusively by aerobic cellular respiration.

7) Compared to C_3 plants, C_4 plants _____.

A) have higher rates of photorespiration

B) do not use rubisco for carbon fixation

C) can continue to fix CO_2 even at lower CO_2 concentrations and higher oxygen concentrations

D) make a four-carbon compound, oxaloacetate, which is then delivered to the citric acid cycle in mitochondria

8) Which of the following would tend to increase transpiration?

A) sunken stomata B) spiny leaves

C) higher stomatal density D) a thicker cuticle

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9) Plant meristematic cells _____.

A) are undifferentiated cells that produce new cells

B) increase the surface area of dermal tissue by developing root hairs

C) subdivide into three distinct cell types named parenchyma, ground meristem, and procambium

D) are distributed evenly in all tissues throughout the plant

10) Suppose a flower had normal expression of genes *A* and *C* and expression of gene *B* in all four whorls. Based on the ABC hypothesis, what would be the structure of that flower, starting at the outermost whorl?

A) sepal-carpel-carpel-sepal B) carpel-petal-petal-carpel

C) sepal-sepal-carpel-carpel D) petal-petal-stamen-stamen

二、名詞解釋(20%):簡單對比解釋各組兩名詞之差別 (* 僅翻譯成中文不算解釋)

1. Hypersensitive Response 與 Systemic Acquired Resistance
2. Bryophyte 與 Monilophyte (ferns)
3. Fertilization 與 Pollination
4. Bilateral symmetry 與 Radial symmetry
5. Circadian clock 與 Molecular clock

三、簡答題(50%)—作答請統整思緒，每題答案請勿超過 70 字。

1. 試比較植物適應野生環境的繁殖策略，如採用有性生殖、抑或無性生殖，其各自的優、缺點(8%)。
2. 定義什麼是 phytochrome、phototropin 及 photoperiod(6%)? 並簡述其對植物生長的生理功能為何(6%) (Note:翻譯成中文不算定義解釋)
3. 如果你從原住民部落拿到一種你不認識的蔬菜，你不清楚其可食的部分是儲藏根(如胡蘿蔔)還是儲藏莖(如馬鈴薯)，請回答如何活用你所學，分別從外表特徵、及組織簡單橫切特徵，判定是根或莖(8%)。
4. 若你對植物施肥過度，雖然澆水勤快，你會發現土壤是濕的，但葉片卻枯萎，請由水分生理觀念解釋為何會如此(6%)。
5. 當我們將綠豆種子泡水，遮光半悶放在暗處的容器內，讓它長出豆芽菜，試判斷這個過程有哪些植物荷爾蒙參與(4%)，又各荷爾蒙分別對生長過程的作用為何(4%)?
6. 植物與授粉者專一共演化，如可可豆的花就有一種蠓蠅訪花採蜜為其授粉，試比較單一授粉者對植物生殖成功，分別有何優點、及潛在的缺點(8%)?

試題隨卷繳回