

國立中央大學九十一年度碩士班研究生入學試題卷

所別: 生命科學系 不分組 科目: 生理學 共 2 頁 第 1 頁

Animal Physiology

- (15%) 1. List the hormones released by the anterior pituitary and by the posterior pituitary and explain how the hypothalamus controls the secretion of each.
- (15%) 2. What are Type I diabetes, Type II diabetes, and obesity? Explain how insulin and leptin are associated with these three types of disease.
- (10%) 3. Explain how the following chemical messengers produce their effects in the organs.
- amphetamines in the brain
 - norepinephrine in the heart.
 - acetylcholine in the cardiac muscle.
 - nitric oxide in the penis.
 - 2, 3-diphosphoglyceric acid in the affinity of hemoglobin for oxygen.
- (10%) 4. Define the terms depolarization and repolarization of the action potential. Why is saltatory conduction in myelinated fibers more rapid than conduction in unmyelinated fibers?

Plant Physiology

There are 20 multiple choice questions (單選題). Each question is worth 2.5 points (2.5%).

- 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.
- 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.
- 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.
- Which of the following may be employed by plant cells to cope with cold stress? (A) Converting saturated fatty acid into unsaturated fatty acid (B) Converting unsaturated fatty acid into saturated fatty acid (C) Converting saturated fatty acid into aldehyde (D) Converting unsaturated fatty acid into aldehyde.
- 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 (E) Covering leaves with waxy materials.
- During barley seed germination, which of the following plant hormones is moved from embryo to aleurone to induce the synthesis of α -amylase? (A) Auxin (B) Ethylene (C) Gibberellin (D) Abscisic acid (E) Cytokinin.

參考用

注意：背面有試題

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- 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.
- 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 plants by reflecting sunlight (D) both root hair and trichome are unicellular (E) Root hairs can penetrate water-containing capillary spaces between soil particles.
- 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.
- 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.
- PLASMOLYSIS happens when an onion cell is (A) bathed by a hypotonic solution (B) freezeed (C) placed at high altitude (D) treated with hormone auxin (E) stained with ethidium bromide.
- 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 method or freezing point depression (E) Girdling.
- Xylem sap exudation is considered to be the result of (A) root pressure (B) surface tension (C) transpiration (D) capillarity (E) evaporation.
- Which of the following ions is the most common osmotic regulator in plant cells? (A) K^+ (B) Ca_2^+ (C) Mg_2^+ (D) Al_3^+ (E) Mn_2^+
- The chromophore of plant phytochrome is a (A) carotenoid (B) chlorophyll (C) phycobilin (D) flavonoid (E) betacyanin
- Which of the following is not required during the initial incorporation of CO_2 in C_4 plant mesophyll cells? (A) Oxaloacetate (B) Phosphoenol pyruvate (C) Bicarbonate ion HCO_3^- (D) Ribulose -1,5-bisphosphate carboxylase-oxygenase (E) Phosphoenol pyruvate carboxylase.
- Apical dominance is caused by (A) gibberellin (B) auxin (C) cytokinin (D) auxin and ethylene (E) cytokinin and auxin.
- 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.
- Which of the following is not a light-regulated response in plants? (A) Phototropism (B) Nyctinasty (C) Photoperiodism (D) Etiolation (E) Thigmonastic curling.
- 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 trough animal gut.