

大同大學九十五學年度研究所碩士班入學考試試題

考試科目：生物學

所別：生物工程研究所

註：本次考試 不可以 參考自己的書籍及筆記；不可以 使用字典；不可以 使用計算器。

I. Multiple Choice (Choose the best answer, 3 points each)

- The shoot of a vascular plant consists of
(a) stem and roots. (b) a stem. (c) stem and leaves. (d) the apical meristem.
- Parenchyma cells
(a) are alive at maturity. (b) have secondary cell wall. (c) do not contain living cytoplasm when mature. (d) are a type of dermal tissue in plants.
- Wood consists of accumulated
(a) primary xylem. (b) primary phloem. (c) secondary xylem. (d) secondary phloem.
- Which of the following is not a function of the plant hormone ethylene?
(a) Activates the plant's defence mechanisms against pest
(b) Inhibits the formation of lateral roots
(c) Controls leaf abscission.
(d) Promotes fruit ripening.
- Xylem
(a) is the principle water-conducting tissue of plants.
(b) conducts the products of photosynthesis.
(c) is made of sieve cells.
(d) is not found in roots.
- The lateral mobility (fluidity) of lipids and proteins in membranes is a consequence of
(a) lack of covalent bonds between the lipid and protein components of the membrane.
(b) weak hydrophobic interactions among the components in the interior of the membrane.
(c) the presence of liquid water in the interior of the membrane.
(d) a and b only
(e) a, b and c
- Why are cattle able to survive on a diet consisting almost entirely of plant material?
(a) They are autotrophic.
(b) Cattle, like the rabbit, reingests its feces.
(c) They manufacture all 15 amino acids out of sugars in the liver.
(d) Cattle saliva has enzymes capable of digesting cellulose.
(e) They have cellulose-digesting, symbiotic microorganisms in chambers of their stomachs.
- If the atrioventricular node could be surgically removed from the human heart without disrupting signal transmission to the Purkinje fibers, what would be the effect?
(a) No apparent effect on heart activity would be observed.
(b) The heart rate would be decreased.

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- (c) Only the ventricles would contract.
 - (d) Only the atria would contract.
 - (e) Atria and ventricles would contract at about the same time.
9. Which cells will respond whether you have a viral infection or a bacterial infection?
- (a) plasma cells
 - (b) helper T cells
 - (c) cytotoxic T cells
 - (d) only a and b
 - (e) a, b and c
10. Which of the following statements about endocrine glands is incorrect?
- (a) The parathyroids regulate metabolic rate.
 - (b) The thyroid participates in blood calcium regulation.
 - (c) The pituitary participates in the regulation of the gonads.
 - (d) The adrenal medulla produces "fight-or-flight" responses.
 - (e) The pancreas helps to regulate blood sugar concentration.

II. Problems:

1. Why was the development of seeds so important to the success of angiosperms? (10 points)
2. Compare and contrast the alternation of gametophyte and sporophyte generations in mosses, ferns, and flowering plants. Which plant groups are more advanced? Are there advantages to having the gametophyte or sporophyte generation dominate? (15 points)
3. Explain the photosystems. (10 points)
4. The osmolarity of human urine is four times that of human blood. How does the human kidney concentrate urine? (8 points)
5. FSH and LH are both found in males and females. How are their functions in males and females, respectively? (8 points)
6. What is the structure of antibody? How are the immense diversity of antibody generated? (8 points)
7. How do hormones function in maintenance of blood glucose homeostasis? (6 points)
8. Describe the process of blood clotting. (5 points)