

國 立 清 華 大 學 命 題 紙

九十三學年度 生 命 科 學 系 (所) 甲 組碩士班入學考試

科目 生理學 科號 0803 共 1 頁第 1 頁 *請在試卷【答案卷】內作答

1. Electrical shocks delivered to the nerve attaching to a muscle could induce the contraction of this muscle, please describe the molecular events (in the nerve, neuromuscular junction and muscle) leading to muscle contraction. (10%)
2. Please explain why a heart dissected from an animal could keep beating for a while if there is an adequate energy supply. Please design the ways to increase and decrease the output of a dissected heart kept in physiological saline solution. (10%)
3. Please explain how a small number of molecules of a particular hormone can elicit cell responses involving millions of times as many molecules and how these cell responses could be modulated by stimuli elicited by other hormones impinging on the same cells. (10%)
4. Please describe how a hair cell in the lateral line organs of fish could function as a receptor for detecting water movement. (10%)
5. The oxygen consumption of a subject doing knee bends without making any pause is less than that of a subject doing the same knee bends with making a short pause in the squatting position. Please explain. (10%)
6. Describe the formation, composition, and function of pulmonary surfactant. What happens when surfactant is absent? How is this condition treated? (15%)
7. What happens to urinary bicarbonate excretion when a person hyperventilates? How might this response be useful? (15%)
8. Describe how pancreatic enzymes become activated in the lumen of the intestine. Why are these mechanisms needed? (10%)
9. Describe the steps of oogenesis when fertilization occurs and when it does not occur. (10%)