

系所組別： 生物醫學工程學系丙組

考試科目： 生理學

考試日期： 0219 · 節次： 3

※ 考生請注意：本試題 可 不可 使用計算機

1. Adult women after menopause lose bone mass rapidly and develop to severe osteoporosis. (20%)
  - a. Discuss the causes and treatment of osteoporosis
  - b. Name the factors affecting plasma  $\text{Ca}^{2+}$  concentration, and discuss the mechanism by which each exerts its effects.
  - c. List the physiological functions of calcium.
  
2. Conduction can occur in either direction along an axon but in only one direction at a chemical synaptic junction. (20%)
  - a. Why?
  - b. What types of chemicals are known to serve as synaptic transmitters?
  - c. Define synaptic plasticity, and discuss its relation to learning.
  
3. Heart failure is a collection of signs and symptoms that occur when the heart fails to pump an adequate cardiac output. (20%)
  - a. Discuss the causes and treatments of heart failure.
  - b. List the factors determining cardiac output.
  - c. How does heart failure lead to edema in the pulmonary and systemic vascular beds?
  
4. Explain in detail the following questions. (20%)
  - a. What are the Hering-Breuer reflexes?
  - b. What are the baroreceptor reflexes?
  - c. What are stretch reflexes?
  - d. What is the cross-bridge cycle (please include 4 stages).
  - e. What is diabetes insipidus?
  
5. Obesity is a major cause of metabolic disorders. (20%)
  - a. Describe the sources of plasma cholesterol gain and loss.
  - b. How does obesity contribute to type 2 diabetes mellitus?
  - c. What are the effects of saturated and unsaturated fatty acids on plasma cholesterol?
  - d. Describe how plasma glucose, insulin, glucagon, and epinephrine levels change during stress.