

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Part I : 50%**一、選擇題: (15 分，每題 3 分)**

1. At chemical synapses, opening of ion channels permeable to the following ions can lead to excitatory postsynaptic potentials (EPSPs). (3%)
 - (a) Na^+
 - (b) Cl^-
 - (c) K^+
 - (d) Ca^{2+}

2. Ion balance is very important in maintaining a normal cardiac rhythm. Which of the following statements is **TRUE**? (3%)
 - (a) Blockade of Na^+ channels increases conduction velocity.
 - (b) Blockade of K^+ channels decreases the duration of the action potential.
 - (c) Blockade of Ca^{2+} channels has a positive inotropic effect.
 - (d) Blockage of Na^+/K^+ -ATPase increases contractility.

3. Which of the following is **not** present in smooth muscle? (3%)
 - (a) Actin
 - (b) Myosin
 - (c) Troponin
 - (d) Tropomyosin

4. The endocrine system of the body is responsible for: (3%)
 - (a) blood flow through the use of the heart muscle
 - (b) communication through the use of hormones
 - (c) metabolism through the use of enzymes
 - (d) defense through the use of antibodies

5. In the biosynthetic pathway of catecholamines, the enzyme phenylalanine N-methyltransferase (PNMT) catalyzes the following reaction: (3%)
 - (a) Phenylalanine \rightarrow Tyrosine
 - (b) Dopamine \rightarrow Norepinephrine
 - (c) Norepinephrine \rightarrow Epinephrine
 - (d) Dihydroxyphenylalanine (DOPA) \rightarrow Dopamine

二、簡答題: (35 分)

1. Please draw a graph of a nerve action potential and outline its physiological basis. (10%)
2. Please define MAC (minimal alveolar concentration), name the physical property of an inhalation anesthetic that correlates best with its MAC, and explain how the concept of MAC is used in anesthesiology. (10%)
3. Please describe the molecular, cellular, and biochemical sites where drugs can act to affect neuronal function. (15%)

Part II : 50%

1. Please describe the roles of parathyroid hormone, calcium, and vitamin D in bone homeostasis and remodeling? (10%)
2. Please give the name of the organs that make up the human oculomotor system, describe how they work together, and further describe the “goal-directed oculomotor” behavior in details. (10%)
3. Please describe the physiological process involving in blood pressure regulation in human body. (10%)
4. Please define the following terms:
 - a. Concentric muscle contractions (4%)
 - b. Eccentric muscle contractions (4%)
 - c. Isometric muscle contractions (4%)
 - d. Isotonic muscle contractions (4%)
 - e. Sliding fragment theory (4%)