

※ 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。

一、問答題 (每題十分) (共九十分) (請將答案寫在答案紙上)

- (1) Please describe the activation of the pituitary-adrenal axis by nonspecific stress. What is the negative feedback control of the adrenal cortex. How will a patient with Addison's disease be changed for negative feedback control?
- (2) Please describe or illustrate the relationship of sensory neuron, association neuron (interneuron) and somatic motor neuron at the spinal cord level.
- (3) Please describe the structure and function of the Golgi apparatus, one of the important organelles inside the cell.
- (4) Please describe or illustrate the relationship of vascular and cardiac function curves. How does sympathetic activation influence these two curves?
- (5) Please describe or illustrate the oxyhemoglobin dissociation curve. What does the value of P50 mean?
- (6) Please describe how adenosine exerts effect on GIRK, namely G protein(s)-coupled inwardly rectifying  $K^+$  channels, existing sinoatrial and atrioventricular nodal cells.
- (7) Please describe on what kind of functions of smooth endoplasmic reticulum existing in different types of cells such as smooth muscle cells and steroid-producing cells) could exert.
- (8) Please describe how the autoregulation in cerebral blood flow takes place.
- (9) Please describe or illustrate how primary and secondary active transports in intestinal epithelial cells interact to influence the absorption of glucose or amino acids.

二、選擇題: (每題一分，共十分) (答案請務必寫在答案紙上)

- (1) Most of the water in the human body is present in  
a. the intracellular fluid compartment.

(背面仍有題目，請繼續作答)

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- b. the plasma compartment.
- c. the total extracellular fluid compartment.
- d. the interstitial fluid compartment.

(2) In considering diffusion of ions through an ion channel, which driving force(s) must be considered?

- a. the electrical gradient
- b. the ion concentration gradient
- c. facilitated diffusion
- d. both a and b

(3) Muscarinic receptors for acetylcholine are located

- a. at neuromuscular junctions of the skeletal muscle.
- b. on smooth muscle.
- c. on postganglionic neurons in the autonomic ganglia.
- d. on chromaffin cells existing in adrenal medulla.

(4) Where is the primary motor cortex found?

- a. in the ventral horn of the spinal cord.
- b. in the occipital lobe of the cerebrum.
- c. between the somatosensory cortex and the premotor area of the cerebrum.
- d. just posterior to the parietal lobe association cortex.

(5) Which of the following is NOT consistent with primary hyperparathyroidism? (Note that parathyroid hormone secreted from parathyroid glands can regulate the level of plasma calcium.)

- a. hypercalcemia (elevated plasma calcium level)
- b. a decrease in calcium resorption from bone
- c. phosphaturia (increased loss of phosphate from the urine)
- d. elevated plasma 1,25-dihydroxyvitamin D<sub>3</sub>

(6) An increase in renin can be caused by

- a. a decrease in sodium intake.
- b. a decrease in renal sympathetic nerve activity.
- c. an aldosterone-secreting adrenal tumor (e.g., Conn's disease)
- d. an increase in blood pressure in the renal artery.

(7) Which of the following statements is NOT correct regarding energy and

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metabolism?

- a. Fatty acid can be converted into glucose in the liver.
- b. Glucose can be converted into fatty acids in adipose cells.
- c. Triglycerides are absorbed from the digestive tracts in the form of chylomicrons.
- d. Certain amino acids can be converted into glucose by the liver.

(8) Menopause is characterized predominantly by

- a. loss of estrogen secretion from the ovary due to a decrease in LH (luteinizing hormone).
- b. loss of estrogen secretion from the ovary due to a decrease in FSH (follicle-stimulating hormone).
- c. a decrease in FSH and LH due to a decrease in GnRH (gonadotropin releasing hormone) pulses.
- d. primary ovarian failure.

(9) Which of the following statements is NOT correct regarding diffusion through the cell membrane?

- a. Lipid-soluble solutes diffuse more readily through the phospholipid bilayer of a plasma membrane than do water-soluble ones.
- b. A single ion, such as  $K^+$ , can diffuse through more than one type of the channel.
- c. Diffusion of a solute through a membrane is considerably quicker than diffusion of the same solute through a water layer of equal thickness.
- d. The rate of facilitated diffusion of a solute is limited primarily by the number of transporters in the membrane at any given time.

(10) Secretin is recognized to be a hormone which can

- a. stimulate bicarbonate secretion to the small intestine.
- b. stimulate proton secretion in the gastric wall.
- c. constrict the sphincter of Oddi located at the second portion of the duodenum.
- d. decrease the enterohepatic circulation.