

系所組別：生理學研究所甲組

考試科目：生理學

考試日期：0308，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

Answer all questions.

1. (a) How does the stomach adapt to the wide range of volumes it handles with only small increases in intragastric pressure? (5%)  
(b) What is the functional importance of the bicarbonate ion of pancreatic juice? (5%)
2. (a) Why is the urea clearance not a suitable measure of glomerular filtration rate? (5%)  
(b) Sodium reabsorption is the main energy consuming process in the kidneys. Explain. (5%)
3. (a) Why does pulmonary vascular resistance increase at high lung volumes? (5%)  
(b) As in patients with asthma, what change would be expected in the ratio of inspiratory to expiratory time? (5%)
4. Cardiac transplants are becoming increasingly more common. One apparent dilemma that presents itself in this situation is that the transplanted heart has no nervous innervation. Are these hearts able to respond appropriately to exercise? Explain. (10%)
5. (a) If all plasma membrane calcium channels in contractile cardiac muscle cells were blocked with a drug, what would happen to the muscle's action potentials and contraction? (5%)  
(b) A person is accumulating edema throughout the body. Average capillary pressure is 25 mmHg, and lymphatic function is normal. What is the most likely cause of the edema? (5%)
6. (a) If the transverse tubules of a skeletal muscle are disconnected from the plasma membrane, will action potentials trigger a contraction? Give reasons. (5%)  
(b) What is the role of myosin light-chain kinase in smooth muscle? (5%)

(背面仍有題目,請繼續作答)

系所組別：生理學研究所甲組

考試科目：生理學

考試日期：0308，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

7. (a) A child shows the following symptoms: deficient growth; failure to show sexual development; decreased ability to respond to stress. What is the most likely cause of all these symptoms? (5%)
- (b) During pregnancy there is an increase in the liver's production and, hence, the plasma concentration of the major plasma binding protein for the thyroid hormones (TH). This causes a sequence of events involving feedback that results in an increase in the plasma concentration of TH, but no evidence of hyperthyroidism. Describe the sequence of events. (10%)
8. "The [contraceptive] pill tricks the brain into thinking you're pregnant." Interpret this popularized explanation in terms of physiological mechanisms. (5%)
9. A person has received a severe blow to the head but appears to be all right. Over the next weeks, however, he develops loss of appetite, thirst, and sexual capacity, but no loss in sensory or motor function. What part of the brain do you think may have been damaged? (10%)
10. A standing subject looking over the left shoulder suddenly rotates his head to look over the right shoulder. How does the vestibular system detect this motion? (10%)