

1. Explain why depletion of intracellular ATP blocks the activity of the Na^+ - Ca^{2+} antiporter in the plasma membrane. (10%)
2. Describe the sequence of events between a motor neuron action potential and skeletal-muscle fiber contraction. (10%)
3. Explain how electrical stimulation in the periaqueductal gray area of the midbrain can suppress pain signals entering the dorsal horns of the spinal cord (15%).
4. Describe the endocrine and exocrine functions of the pancreas during eating a meal. (20%)
5. What forces govern renal glomerular filtration? How can the glomerular filtration rate be measured? (15%)
6. What are the factors that regulate systemic arterial blood pressure? List one type of drug and explain why it can be used in the treatment of hypertension. (15%)
7. Describe the positive and negative feedback effect of estrogen on the secretion of gonadotropin. (15%)