

問答題 (每題 10 分，共 10 題)

1. If extracellular $[Na^+]$ is elevated (and you ignore any effects of a change in osmolarity), how would the resting potential and action potential of a neuron change? (10%)
2. Draw a flow chart to demonstrate the sequence of events that occurs between the entry of a sound wave into the external auditory and the firing of action potentials in the cochlear nerve. (10%)
3. Match the following states of consciousness with the electroencephalogram patterns described below. (Use each one.) (10%)
 - a. Relaxed, awake, eyes closed
 - b. Stage 4 nonrapid eye movement (NREM) sleep
 - c. Rapid eye movement (REM) sleep
 - d. Epileptic seizure
 - I. Very high-amplitude, recurrent waves, associated with sharp spikes
 - II. Low-amplitude, high-frequency waves, similar to the attentive awake state
 - III. Irregular, slow frequency, high-amplitude, "alpha" rhythm
 - IV. Regular, very slow frequency, very high-amplitude "delta" rhythm
4. In the laboratory, if an isolated skeletal muscle is placed in a solution that contains no calcium ions, will the muscle contract when it is stimulated (1) directly by depolarizing its membrane, or (2) by stimulating the nerve to the muscle? (10%)
5. If a blood clot blocked a cerebral blood vessel supplying a small region of the right cerebral cortex, just in front of the central sulcus in the deep groove between the hemispheres, what symptoms might result? (10%)
6. What pathway will activate when a person response to stress? (10%)
7. What are major risk factors for atherosclerosis? (10%)

(背面仍有題目,請繼續作答)

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8. Sleep apnea is characterized by periodic cessation of respiration during sleep. If you are a medical engineer, what kind of device will you design to help the treatment of sleep apnea. (10%)
9. What are the pathways by which sodium and water excretion decrease in response to severe sweating? (10%)
10. In the stomach, how is hydrochloric acid secreted into the lumen by parietal cells? (10%)