

本試卷含單選和複選題。

1. In the skeletal muscles of mammals, the rank order of the glycolytic enzyme activity in the fatigable fast twitch (FF), fatigue-resistant fast twitch (FR) and slow twitch (S) muscles are: (a) $FF > FR > S$, (b) $S > FR > FF$, (c) $FF > S > FR$ or (d) $S > FF > FR$. (3%)
2. When 50 mM of sodium ions of a physiological saline solution is replaced by 50 mM of potassium ions, the resting membrane potential of a neuron is (a) more depolarized than, (b) more hyperpolarized than, or (c) the same as the resting membrane potential of the neuron in the original physiological saline solution. (3%)
3. Which of the following mechanisms increase the conduction velocity of action potentials along an axon: (a) increasing the diameter of the axon, (b) adding myelin sheath to the axon, (c) increasing the conductance of potassium and chloride channels along the axon, (d) decreasing the conductance of potassium and chloride channels along the axon. (3%)
4. Which are the principal excitatory and inhibitory neurotransmitters, respectively, in our brain? (a) acetylcholine and GABA (γ -aminobutyric acid), (b) glutamate and glycine, (c) acetylcholine and glycine, or (d) glutamate and GABA. (3%)
5. In a skeletal muscle, the Golgi tendon organ associated to the muscle discharges more rapidly when (a) the muscle is passively stretched, (b) the muscle is stimulated to contract by activating the α -motor neurons in the spinal cord, or (c) the intrafusal muscle fibers are stimulated to contract. (3%)
6. Which of the following receptors are not mechanoreceptors: (a) Pacinian corpuscles of the skin, (b) hair cells of the cochlea, (c) taste cells of the tongue, (d) photoreceptor cells of the retina, (e) olfactory receptor cells of the olfactory epithelium, (f) hair cells of the vestibular system. (3%)
7. The glomerular filtration rate of a mammalian kidney can be evaluated by using (a) inulin, (b) phenol red, (c) para-aminohippuric acid, (d) insulin, or (e) glucose. (3%)
8. When the Na,K-ATPase activity on the plasma membrane of a neuron is inhibited, the resting membrane potential of this neuron will become (a) hyperpolarized, (b) depolarized, or (c) unaffected. (3%)
9. The concentrations of free intracellular calcium ions and extracellular calcium ions of a neuron in the mammalian CNS are approximately (a) ~ 0.01 mM and ~ 2 mM, (b) ~ 0.1 μ M and ~ 2 mM, (c) ~ 0.1 μ M and ~ 20 μ M, (d) ~ 1 mM and ~ 2 mM, respectively. (3%)

八十八學年度 生命科學系 生物技術所 0703 系(所) 甲 組碩士班研究生招生考試
 科目 生理學 科號 1003 共 2 頁第 2 頁 *請在試卷【答案卷】內作答

10. Please list the events occurring at a neuromuscular junction that lead to an action potential in the muscle fiber plasma membrane. (6%)
11. Describe the functions and the clinical effects of deficits of the following vitamins (10%)
 - a. Vitamin A
 - b. Vitamin K
 - c. Vitamin D
 - d. Thiamine
 - e. Folic acid
12. Please describe mechanisms of long-term and short-term regulation of food intake. Why is it important to have both mechanisms? (10%)
13. Explain how each of the following factors contributes to heat loss from the body. (8%)
 - a. Radiation
 - b. Conduction
 - c. Convection
 - d. Evaporation
14. Beyond certain limits of depth underneath the surface of sea, high pressure can cause tremendous alterations in body physiology. (6%)
 - a. Please explain the phenomenon of "oxygen toxicity" and "nitrogen necrosis".
 - b. What are the cause and effects of "decompression sickness" (diver's disease).
15. 某人深信喝自己排出之尿液有益身體健康，故每天飲用兩大杯，若尿液中之成份多被吸收，請問其腎臟及相關內分泌系統如何因應？(10%)
16. 一位百米賽跑選手在比賽前做熱身運動，較之另一沒做之選手在正式比賽時肺呼吸量(ventilation)上可能有何好處？為什麼？(10%)
17. 某病人其血管 total peripheral resistance 比正常人高出 60%，另一病人其 total peripheral resistance 比正常人低 60% 但兩人之動脈壓卻都正常，請問其身體有那些機制來使其動脈壓正常？(13%)