

請標明題號，於非選擇題作答區內作答

I. 選出一個最恰當的答案選項，並說明你選擇的理由。(每題 4 分；共 28 分)

1. A boy has had a serious hemorrhage accidentally. He receives a large transfusion of distilled water directly into a major vein. You would expect this mistake to:
 - A) have no harmful effect as long as the distilled water is free of bacteria.
 - B) have destructive effects because the red blood cells could shrink.
 - C) have serious, perhaps fatal effects because the red blood cells could swell and burst.
 - D) have no serious effect because the kidney could quickly excrete excess water.
2. The initial membrane potential of a neuron is -75 mV. An increase in the extracellular potassium ions concentration of that neuron would result in
 - A) depolarization of the neuron.
 - B) hyperpolarization of the neuron.
 - C) the rise of the rate in the replacement of potassium ions with sodium ions.
 - D) no change in the membrane potential
3. Which of the following would be most likely to happen during exercise?
 - A) Slower firing rate of the sinoatrial nodal pacemaker cells
 - B) Increased blood flow to the skin
 - C) Decreased rate of respiration
 - D) Reduced blood flow to muscles
4. The function of calcium ions in skeletal muscle contraction is to
 - A) provide the energy necessary for the movement of the cross-bridge.
 - B) cause an allosteric change in myosin so it detaches from actin.
 - C) expose the myosin-binding sites on the thin filament
 - D) produce action potential to cause the sliding of thick and thin filaments.
5. If an eukaryotic cell has a nuclear envelope that allows tRNA molecules, but not mRNA molecules, to leave the nucleus. Which of the following processes will not be able to take place in this cell?
 - A) DNA replication
 - B) tRNAs binding to codons
 - C) RNA being made from DNA
 - D) tRNAs binding to amino acids
6. Sensory receptor cells that fire both graded potentials and action potentials are found in _____.
 - A) audition
 - B) taste
 - C) smell
 - D) vision
7. Which of the following is the major stimulus to prompt a newborn baby to start breathing?
 - A) A decrease in the partial pressure of oxygen in the baby's blood
 - B) An increase in the partial pressure of carbon dioxide in the baby's blood
 - C) A change in the temperature on the surface of the skin
 - D) An increase in the pH of the baby's blood

見背面

II. 簡答題 (共 32 分)

1. Describe the roles that proteins play in organism. (12 分)
2. What do all of the following have in common: alveolus, villus, nephron? (5 分)
3. What are the mechanisms that sexual reproduction could increase the genetic diversity of offspring? (10 分)
4. Researchers have found a gene in *Drosophila* that produces more than 17,500 proteins. How is it possible? (5 分)

III 解釋名詞 (每題 4 分 ; 共 40 分)

1. RNA interference
2. clonal selection (of lymphocytes)
3. cDNA gene
4. allopatric speciation
5. motor unit (in muscle contraction)
6. imprinting
7. sensory transduction
8. survivorship curves
9. dendritic cell
10. leptin

試題隨卷繳回