

請清楚標示題號並依序作答於試卷上

一、配合題：請由右欄框 A-U 選項中選出最適合的答案。(10%)  
(注意：選項可能不只使用一次)

1. Region that set the heart rate in mammals
2. Vessels that blood moves most slowly
3. Location of cardiovascular control centers
4. Vessels that pressure and speed drop the most
5. Close during systole
6. Location of the thermostat in vertebrates
7. Sorting incoming information into categories before relaying it to the cerebral cortex
8. Hyperventilating
9. Formation of long-term (fact) memory
10. Location of the pacemaker for breathing

- |                    |                     |
|--------------------|---------------------|
| A. aorta           | N. hypothalamus     |
| B. arteries        | O. cerebral cortex  |
| C. arterioles      | P. hippocampus      |
| D. capillaries     | Q. aortic valves    |
| E. venules         | R. AV valves        |
| F. vena cava       | S. valves in veins  |
| G. SA node         | T. ↑ breathing rate |
| H. AV node         | U. ↓ breathing rate |
| I. node of Ranvier |                     |
| J. pons            |                     |
| K. medulla         |                     |
| L. cerebellum      |                     |
| M. thalamus        |                     |

二、選出最適合的答案選項，並說明你選擇的理由。(12%)

1. Humans can produce urine that is correctly described as being which of the following?
  - I. hypertonic to body fluids
  - II. isotonic to body fluids
  - III. hypotonic to body fluids

(A) I only    (B) II only    (C) III only    (D) I and II only    (E) I, II, and III
2. We can perceive the world around us because the presence of sensory receptors and specific neural pathways to communicate information to the cerebral cortex. Sensory systems must code for different qualities and intensities of the stimulus. Stimulus intensity is not coded by
 

(A) the size of the receptor potential.                      (B) the size of the action potential.

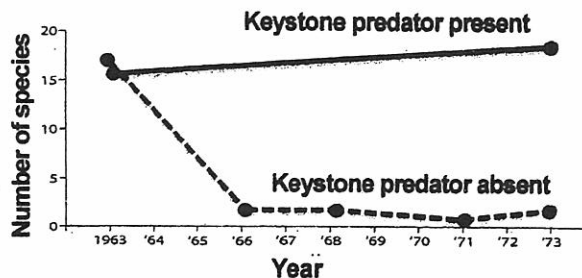
(C) the frequency of the action potentials              (D) the number of activated receptors.
3. What does the graph in the figure below tell you about the definition of a keystone species?
 

(A) A keystone species has little interaction with other species in an environment.

(B) Removing a keystone species from the community drastically reduces diversity.

(C) Adding a keystone species to the community will make it more diverse.

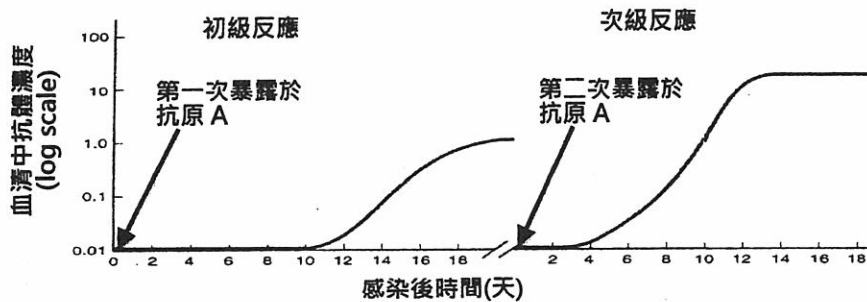
(D) Removing a keystone species from the community will eventually allow for the invasion of a new species



見背面

三、問答題

1. 「大面積燒傷」造成皮膚(skin)嚴重損傷，為何如此危險，甚至致命？(7%)
2. 在一個結構複雜的實驗環境中，兩種原生物種能與一種他們的共同掠食者(predator)共存。將物種 X 移除，會造成物種 Y 滅絕。將三物種移至另一結構簡單的實驗環境中，導致物種 Y 和物種 Z 滅絕，物種 X 隨後也滅絕。請問：(7%)
  - (a)物種 X、Y、Z 中，哪一物種最可能為掠食者？
  - (b)為何移除物種 X，會造成物種 Y 滅絕？
  - (c)為何將三物種移至結構簡單的棲地，會造成三物種先後滅絕？



3. 上圖顯示人體受病原菌感染後的初級和次級免疫反應，請問根據上圖中初級反應和次級反應曲線的差別，能得出哪 3 項重要結論？(6%)
4. 真核細胞中如何調控基因的表現？試由轉譯與轉譯後的兩個層級討論可能的調控機制。(6%)
5. 何謂花器官發育的 ABC model？(6%)
6. 請說明 RNA world 的理論，並解釋支持此理論的證據。(6%)

四、解釋名詞 (40%；每題 4 分)

1. Ground tissue system
2. Guttation
3. Metastasis
4. Endomembrane system
5. Pinocytosis
6. Crossing-over
7. Restriction enzyme
8. Calvin cycle
9. Postsynaptic potential
10. Ovarian cycle (human)