簡答題 (76%; 請於非選擇題作答區內依序作答,並標明題號)

1. 簡述鈣離子(Ca^{++})對心室肌肉細胞(ventricular muscle cell)的影響或重要性，至少包括動作電位(3%)、不反應期(3%)和肌肉收縮(4%) 三部分。

2. 有一 70 公斤重之健康成年人因意外事故突然失血 1000 mL，請問其身體為了維持體內環境的恆定(homeostasis)，會啟動哪些生理調節機制，因而導致下列情況發生？請簡單用流程圖說明
   (a). sodium retention (4%)
   (b). a decreased capillary hydrostatic pressure (3%)
   (c). a decreased concentration of plasma proteins (3%)

3. 有關 Na^+-K^+ pump, 請回答以下問題
   (a) 解釋何為 Na^+-K^+ pump, 並描述其功能 (3%)
   (b) 請解釋 Na^+-K^+ pump 功能受阻斷後,其對神經細胞膜電位的影響 (5%)
   (c) 為什麼 Na^+-K^+ pump 又稱為 electrogenic pump? 此特性對膜電位的貢獻是 depolarization 或 hyperpolarization, 為什麼? (5%)

4. Physostigmine 是一種神經毒氣, 主要可以阻斷 acytylcholinesterase (AChE)此一酵素的功能進而造成個體死亡, 請解釋何為 AChE? 其致死機制為何? (12%)

5. 有關肌肉細胞吸收葡萄糖
   (a) 請簡單描述葡萄糖運輸穿越細胞膜機制(4%)
   (b) Insulin 能加速葡萄糖吸收, 請問其機制為何? (4%) (ps: 延伸問題 "a"作答才可能得滿分)
   (c) 延續問題 "a", 請列舉 2 種可能參與上述過程的胞器, 並簡訴理由? (4%)
   (d) 請以 Insulin 為例, 描述該類型 hormone 作用機制(4%)

6. 請解釋下列名詞, 後並將它們連成一段完整文字, 如以下框格所示 (15%)

   Mitochondria　**Uncoupling protein**　**Brown fat**　**Thermogenesis**　**Hiberators**

Neuron　***Dendrite***　***Axon***

神經細胞 (Neuron) 是神經系統的主要功能細胞,具有複雜細胞的突起,包括:樹突(dendrites) 與軸突 (Axon). 其中樹突部份是一個神經細胞接受其他細胞訊息傳入部份, 而軸突 (Axon)部份是神經細胞發出並傳遞神經衝動-動作電位的部份.

接背面

單選題 (Select the one that is best in each case)(24%; 請於選擇題作答區內作答)

1. Minimum aortic pressure during the cardiac cycle is attained

A. immediately after closure of the aortic semilunar valve

B. immediately before opening of the aortic semilunar valve

C. immediately before opening of the atrioventricular valves

D. in mid-diastole

2. Transport of oxygen and nutrients across most capillary walls occurs primarily by

A. active transport C. bulk flow E. filtration

B. vesicle transport D. diffusion

3. Which of the following statements is correct?

A. Baroreceptors are stretch receptors.

B. The Frank-Starling mechanism of the heart states that an increased venous return will normally result in a higher heart rate.

C. The P wave corresponds to contraction of atria.

D. Pulmonary edema is the result of right heart failure.

4. In which of the following conditions is the arterial partial pressure of oxygen reduced?

A. anemia C. CO poisoning

B. pulmonary hypoventilation D. moderate exercise

5. Which of the following statements about respiration is correct?

A. Lung compliance is reduced in emphysema.

B. Obstructive lung diseases have decreased airway resistance.

C. During inspiration, intrapleural pressure becomes more negative.

D. Contraction of the diaphragm increases the rate of air flow during forced expiration.

6. In human, hemoglobin is nearly _____ saturated at the normal resting oxygen partial pressure of mixed venous blood.

A. 5% B. 25% C. 50% D. 75% E. 100%

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7. Which of the following statements about respiration is False?

A. During heavy exercise, arterial partial pressure of CO_2 decreases.

B. An increase in arterial H^+ concentration is detected by the central chemoreceptors.

C. Hemoglobin has a lower affinity for oxygen during exercise due to increased temperature and decreased pH

D. The neurons responsible for the cyclic nature of respiratory-muscle function are located in the brainstem.

8. Which of the following statements is False?

A. Increasing the GFR will increase the excretion rate of sodium.

B. Potassium secretion is stimulated by aldosterone.

C. An increase in the reabsorption of solutes will decrease water reabsorption in the proximal renal tubule.

D. The loss of 0.5 L sweat would stimulate a greater increase in ADH secretion than the loss of an equal amount of blood plasma over the same period of time.

9. Hypoventilation is a cause of

A. metabolic acidosis

B. respiratory acidosis

C. metabolic alkalosis

D. respiratory alkalosis

10. The following results are obtained in a renal functional test: U/P inulin = 200, U/P sodium = 2.0, U/P osmol = 4 (U/P = urine/plasma concentration ratio).

How would you define this functional state?

A. Osmotic diuresis B. Water diuresis C. Antidiuresis D. Renal failure

11. With regard to gastric secretion,

A. the total amount of H^+, K^+-ATPase present in an unstimulated parietal cells is low.

B. H^+ is secreted across the basolateral membrane of parietal cell the by the H^+, K^+-ATPase

C. HCO_3^- leaves the parietal cells at the basolateral membrane, and its down hill efflux powers the uphill entry of Cl^- into parietal cells

D. Cl^- is secreted into secretory canaliculus via Cl^- active transport protein.

12. The enteric nervous system is found in what layer of the gastrointestinal tract?

A. Serosa

B. Submucosa

C. Muscularis

D. Mucosa

試題隨卷繳回