Sample Homeostatsis Test

Short Answer

1. John is a stock broker and works very long hours. Recently he has been under constant stress by the fluctuating stock market. At John's annual physical his doctor notices that his blood sugar, blood pressure and heart rate are elevated.

   a. What division of the nervous system is activated? [1 A]

   b. What hormone is responsible for these symptoms? [1 A]

   c. What are the long term effects associated with these symptoms? [4 A]

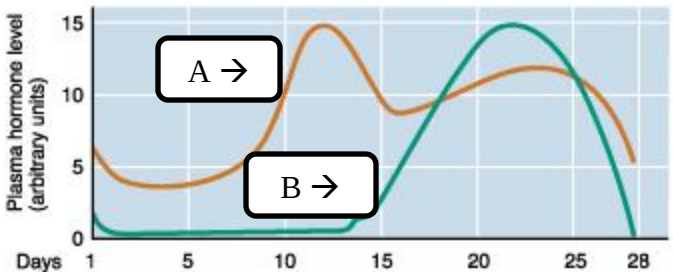
2. Neuron A and B release excitatory neurotransmitters, and when stimulated together, result in an action potential in neuron D. If neuron A, B and C are stimulated there is no resulting action potential in D.

   a. What is the name of this phenomenon? [1 A]

   b. What effect do the neurotransmitters released by C have on neuron D? Explain and be specific. [3 A]

3. Months after a severe car accident, Tony the Tiger continues to lack proper balance and struggles to move his legs in one fluid motion when walking (or running). What part(s) of the brain is/are affected? [2 A]

4. Use the diagram of the female reproductive cycle below to answer the following questions.



   a. Name hormone "a" and explain your choice. [2 I]

   b. Name hormone "b" and explain the significance in the dramatic increase after day 14. [3 I]

5. a. Explain how a hyperpolarized neuronal membrane becomes polarized at the resting state. [2 I]

   b. Explain why an action potential always moves in one-direction. [2 I]

c. Complete the table below with respect to nerve impulse generation. [6 I]

	Opened Voltage-Gated Channels	Closed Voltage-Gated Channels	Direction that Each Specific Ion Flows
Depolarization			
Repolarization			

6. Refer to the tables provided to answer the following questions.

a. Based on the table below, are the quantities of each solute expected for a normal individual? Explain your reasoning. If these results are not characteristic of a healthy individual, provide a possible explanation for the data. Be thorough. [4 I]

	Quantity (g/100 mL)		
Location	**Protein**	**Urea**	**Glucose**
Glomerulus	1.01	0.07	0.4
Bowman's Capsule	1.01	0.07	0.4
Loop of Henle	1.10	1.01	0
Collecting Duct	1.90	1.99	0

b. Based on the table below, are the quantities of each solute expected for a normal individual? Explain your reasoning. If these results are not characteristic of a healthy individual, provide a possible explanation for the data. Be thorough. [4 I]

	Quantity (g/100 mL)		
Location	**Protein**	**Urea**	**Glucose**
Glomerulus	0.6	0.09	0.90
Bowman's Capsule	0	0.09	0.90
Loop of Henle	0	0.12	0.75
Collecting Duct	0	0.31	0.60