SBI4U Unit 4 Test: Homeostasis
(50 Marks Total)

Name:_____

Signature:_____

Marks obtained:

Category	Total Marks	Possible Marks
Knowledge/Understanding (K/U)		**10**
Thinking/Investigation (T/I)		**20**
Application (A)		**15**
Communication (C)		**5**
Total		**50**
Percentage		

SECTION 1: Knowledge/Understanding - Multiple Choice (Questions 1-10)

[K/U, 10: 1 each]

Write your section 1 answers here:

Question	1	2	3	4	5	6	7	8	9	10
Answer										

K/U	T/I	A	C
/10			

****NOTE: FOR SECTIONS 1 WRITE YOUR ANSWERS IN THE TABLES ON THE FIRST PAGE OF THIS TEST****

SECTION 1: Knowledge/Understanding - Multiple Choice (Questions 1-10)

[K/U, 10: 1 each]

1. Which of the following substances are not normally found in urine?

a) sodium
b) water
c) glucose
d) urea
e) uric acid

2. Which of the following structures is/are not part of the peripheral nervous system?

a) sensory receptors in skin
b) spinal cord
c) sensory neuron
d) motor neuron
e) hypothalamus

3. Which of the following structures, if any, could be considered part of both the peripheral and central nervous systems?

a) sensory receptors in skin
b) spinal cord
c) sensory neuron
d) motor neuron
e) hypothalamus

4. Which of the following organs secrete a pairs of hormones that have opposite effects?

a) pituitary
b) parathyroid gland
c) thyroid gland
d) hypothalamus
e) pancreas

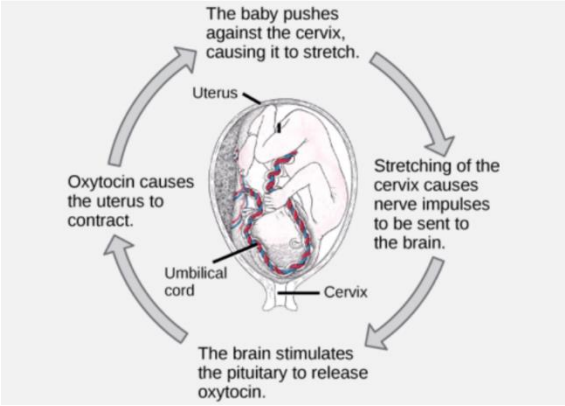
5. Which of the following substances is/are used by the body to make hormones?

a) proteins
b) polypeptides
c) glucose
d) vitamins
e) cholesterol

6. Neurons communicate with one another and with effectors by:

a) releasing chemical neurotransmitters
b) receptor binding at the cell membrane
c) interacting with a hormone and a receptor complex
d) releasing chemicals into the bloodstream
e) none of the above

7. What type of feedback loop is shown?



a) Positive feedback loop
b) Negative feedback loop
c) Both positive and negative feedback loop
d) No feedback loop
e) None of the above

8. The most notable effect of ADH produced in the posterior pituitary is to:

a) increase the amount of water lost at the kidneys
b) decrease the amount of water lost at the kidneys
c) increase or decrease calcium ion as a second messenger
d) lowers blood pressure
e) None of the above

9. Nitrogen wastes from the breakdown of proteins and amino acids are removed from the body by the:

a) conversion of ammonia to urea in the liver and filtration by the kidney
b) conversion of ammonia to urea in the kidney and filtration by the kidney
c) conversion of urea to ammonia in the liver and secretion by the kidney
d) conversion of urea to ammonia in the kidney and secretion by the kidney
e) conversion of nitrogen to ammonia in the liver and secretion by the kidney

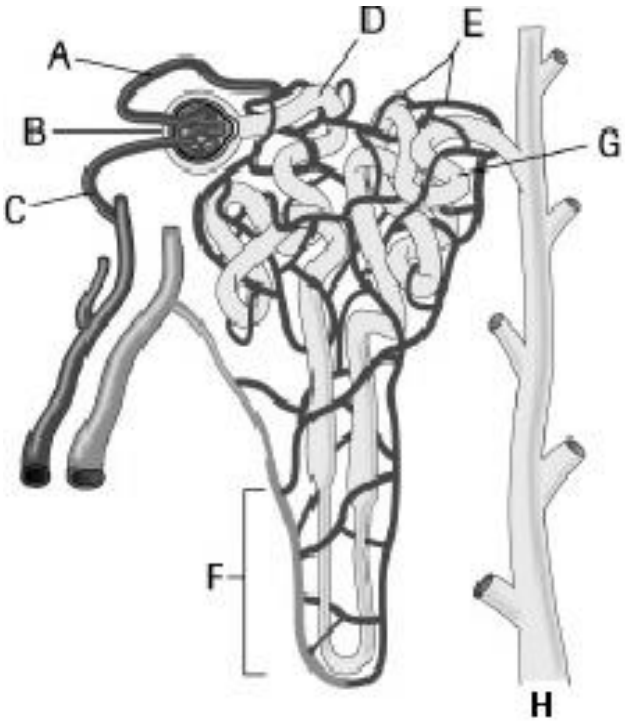
10. An increase in blood pressure in the glomerulus would cause:

a) an increase in filtration and increase in urine output;
b) a decrease in filtration and increase in urine output;
c) an increase in filtration and decrease in urine output;
d) a decrease in filtration and decrease in urine output;
e) no effect on urine output.

SECTION 2: Application - Labeling (Questions 11-12)

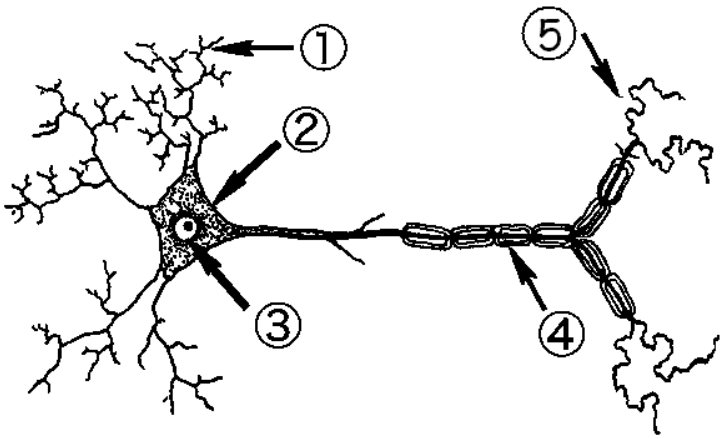
[A, 13: 1 each]

11. Label these parts of a nephron by writing the word letter to the letter in the space provided.
Word list: collecting duct, pyramid, afferent arteriole, efferent arteriole, peritubular capillaries, loop of Henle, glomerulus, ureter, proximal convoluted tubule, distal convoluted tubule, cortex, synapse *[A, 8]*



Label (letter)	Term
(a)	
(b)	
(c)	
(d)	
(e)	
(f)	
(g)	
(h)	

12. Label these parts of a neuron by writing the corresponding word to the number in the space provided. **Word list:** dendrites, node of ranvier, axon terminal, synapse, nucleus, exon, cell body, Myelin sheath, hippocampus *[A, 5]*



Label (letter)	Term
(1)	
(2)	
(3)	
(4)	
(5)	

K/U	T/I	A	C
		/13	

SECTION 3: Thinking/Inquiry & Application – Short Answer (Questions 13-17)

[T/I, 20; A, 2]

13. Describe how the nervous system and the endocrine system work together in the fight-flight response. *[T/I, 5]*

14. A new toxin is discovered (hypothetically) that has entered into the environment. Scientists are very concerned because it blocks Na+ channels. Explain why they should take this seriously and what this would mean to an organism? *[T/I, 3]*

K/U	T/I	A	C
	/8		

15. You work at a pharmaceutical company and you're tasked with developing a new contraceptive that will affect hormones in male or female to prevent pregnancy.

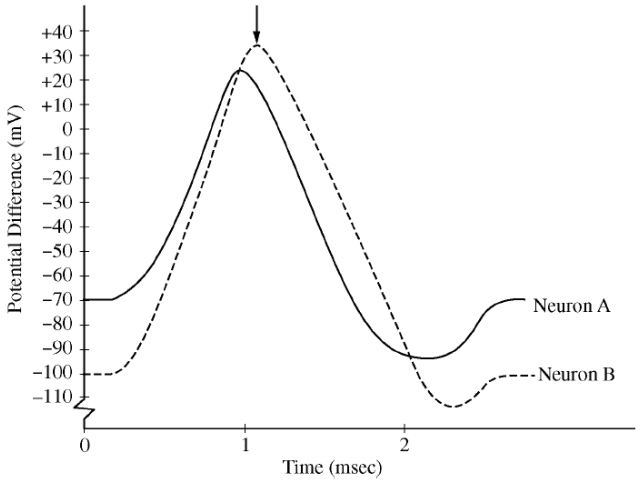
a) Would your drug be a protein hormone or a steroid hormone? Explain your choice. *[T/I, 2]*

b) Discuss any feedback mechanisms, effector cells, and/or endocrine organs you will target with your drug design. *[T/I, 3]*

16. How can studying individuals with damage to a particular brain region provide insight into the normal function of that region? Use an example of a region of the brain as an example. *[T/I, 5]*

K/U	T/I	A	C
	/10		

17. Two action potentials are represented below. The solid line is an intracellular recording from a motor neuron (neuron A) in the spinal cord of a frog. The broken line is a recording from a sensory neuron (neuron B) in the same animal.



Answer the following questions with reference to the graph above:

a) What type of polarization is occurring at time = 0 for neuron B, relative to neuron A? *[A, 1]*

b) At time = 0, which ion(s) has/have the most influence on membrane potential and what is happening with these ions? *[A, 1]*

c) What is causing the change in polarization of neuron B between time = 0 and time = 1? *[T/I, 1]*

d) Compare the inward and outward current of sodium and potassium at the peak for neuron B *[T/I, 1]*

K/U	T/I	A	C
	/2	/2	

SECTION 4: Communication – Short Answer (Question 18)

[C, 5]

18. During a physical examination, a doctor will usually hit a patient's knee on one side with a small hammer. Instantly the leg jerks upward. Explain what the doctor is testing and indicate the components involved in this process. You must explain in a short paragraph and a diagram.

K/U	T/I	A	C
			/5