HOMEOSTASIS REVIEW ANSWERS

In no way do these questions represent all the topics. You must have a study sheet. About 60-65% of marks will be on the second half of the unit.

MODIFIED TRUE/FALSE- Correct any false statements to make them true

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1. Contractions that increase in strength during pregnancy are an example of a negative feedback mechanism. ___F this is positive_____
3. An increase in body temperature is detected by sensors in the brain. The brain sends a nerve message to the hypothalamus. ___F sensors are in the skin_____
4. Kidneys remove waste, balance blood pH, and maintain water balance. _T_____
5. Wastes are filtered from the blood by the kidneys and conducted to the urinary bladder by the urethra. __F by ureters_____

6. A cross section of the kidney shows an outer layer called the medulla, an inner layer called the cortex, and a hollow chamber called the renal pelvis. _____F outer layer is medula_____
7. When a person sweats and does not drink water, the pituitary gland releases ADH. _T_____

8.Adrenal gland/ releases the hormone aldosterone that increases water reabsorption. _____T_____

9.Insulin is produced in a healthy person when blood sugar is low. ___F when sugar is high_____

10.Information from your brain is moved to your leg muscles by motor neurons. _____T_____

11. Myelin sheath is very important for the transferring of information along the medulla. _____F - the axon_____

12. Electrochemical messages are carried by the movement of ions through the nerve membrane. _T_____

13. When the nerve cell is excited, it becomes more permeable to potassium ions than sodium ions. _____F more permeable to ___sodium ions. _____

14. There are more nerve networks leading to the legs and arms than to the thumb and fingers. _____T_____

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2. The areas between the myelin sheath on the axon that allow ions to pass are called the NODES OF RANVIER

3. When a nerve cell is excited, sodium ions rush into the cell, changing its charge. This is referred to as DEPOLARIZATION

4. THRESHOLD POTENTIAL is the intensity a stimulus must be to produce a response.

MULTIPLE CHOICE

Substance	In Bowman's Capsule	In Urine
X	0.1 g/L	0.1 g/L
Y	0.1 g/L	1.0 g/L
Z	0.1 g/L	0.0 g/L

4. The above table shows the results of an experiment on the functioning of a mammalian kidney. The following item is based on an analysis of the data. Substance X was likely
REMOVE THIS QUESTION – OPEN TO MISINTERPRETATION
   a. reabsorbed in the tubules
   b. not reabsorbed and not secreted by tubule cells
   c. reabsorbed in the tubules and secreted by tubule cells
   d. secreted by tubule cells and not filtered through the glomerulus
   e. reabsorbed in the tubules and not secreted by tubule cells

5. The above table shows the results of an experiment on the functioning of a mammalian kidney. The following item is based on an analysis of the data. Substance Y was likely
   a. reabsorbed in the tubules
   b. not reabsorbed, and secreted by tubule cells
   c. reabsorbed in the tubules and secreted by tubule cells
   d. secreted by tubule cells and not filtered through the glomerulus
   e. reabsorbed in the tubules, and not secreted by tubule cells

6. The above table shows the results of an experiment on the functioning of a mammalian kidney. The following item is based on an analysis of the data. Substance Z was likely
   a. reabsorbed in the tubules
   b. not reabsorbed and not secreted by tubule cells
   c. reabsorbed in the tubules and secreted by tubule cells
   d. secreted by tubule cells and not filtered through the glomerulus
   e. reabsorbed in the tubules and not secreted by tubule cells

13. When the ambient (room) temperature is very high (i.e., 105 degrees Fahrenheit), the body will lose heat by
   a. Radiation
   d. increased metabolism

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b. Conduction
c. Evaporation
e. none of the above

14. The term used to describe the ability of a living organism to adjust to changing environmental conditions by regulating their internal processes is
a. Regulation
b. Homeostasis
c. Inhibition
d. feedback
e. metabolism

21. Which of the following analogies would **best** fit the action of the kidney?
a. selecting those items not useful and excreting them
b. removing all the items and returning 10% of them
c. removing all the items and returning none of them
d. removing all the items and returning what is still useful

24. The main active transport mechanism in the kidney is the
a. sodium pump
b. filtration process
c. calcium pump
d. osmotic pressure

28. Choose the item below controlled by ADH:
a. the level of glucose in the blood
b. the amount of water re-absorbed in the nephron
c. the development of the lining of the uterus
d. the release of an ovum from the ovary
e. the uptake of calcium by the bones

30. Antidiuretic hormone is secreted by the
a. Thyroid
b. adrenal glands
c. pituitary gland
d. hypothalamus

MATCHING

Match each item with the correct statement below.
a. Ectotherm
b. positive feedback
c. Reabsorption
d. deamination
e. glomerulus

1. nutrients move from renal tubules to blood vessels C
2. increases in intensity of response to stimulus B
3. removal of amino group from amino acid D (FROM LAST UNIT, NOT ON TEST)

5. capillary bed, which filters the blood E

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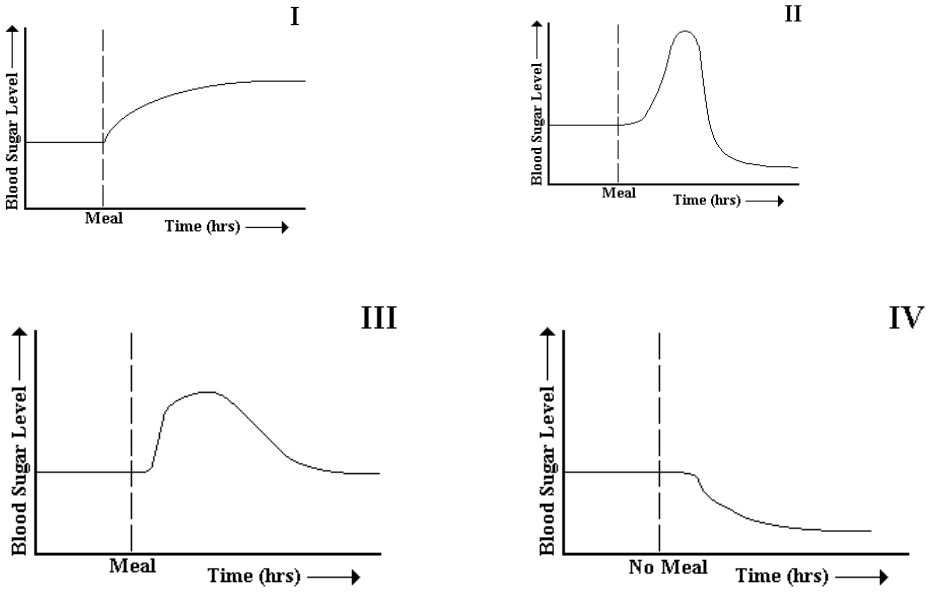
SHORT ANSWER

8. Describe how negative feedback is preferable to positive feedback in most situations.
NEGATIVE FEEDBACK RESTORES A FACTOR TO THE BEST HOMEOSTATIC LEVEL WHILE A POSITIVE FEEDBACK LOOP IS DESIGNED TO PUSHES A FACTOR FURTHER FROM EQUILIBRIUM.

10. You are playing an active game and you begin to sweat. Soon you feel cooler.
For the above homeostatic system, construct a labelled diagram to represent the feedback loop involved. On the diagram, indicate the receptor(s), the control centre(s), and the effector(s).
SEE TEXTBOOK!!
ALSO, WITH INCREASED BLOOD FLOW IN THE CAPILLARIES AT THE SURFACE OF THE SKIN, EVAPORATING SWEAT HELPS TO REMOVE THE HEAT FROM THE BLOOD.

15. Complete the following table, comparing the concentrations of the listed materials in three locations in the excretion of urine by the kidneys of a healthy person. Use the symbols, H = high, M = medium, and L = low for the concentrations. N - NONE

Materials	Blood of the Afferent Arteriole	Bowman's Capsule Filtrate	Urine
blood protein	HIGH	NONE	NONE
glucose	HIGH	HIGH	NONE
sodium ions	HIGH	HIGH	MEDIUM – LOW
urea	MEDIUM	MEDIUM	HIGH



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7. Which of the graphs above illustrate someone with diabetes?
   a. III
   b. I
   c. IV
   d. II and IV

8. Which graph illustrates a person who may secrete too little glucagon?
   a. III
   b. I
   c. IV
   d. II and IV

9. Which graph illustrates a person with a healthy pancreas?
   a. III
   b. I
   c. IV
   d. II and IV

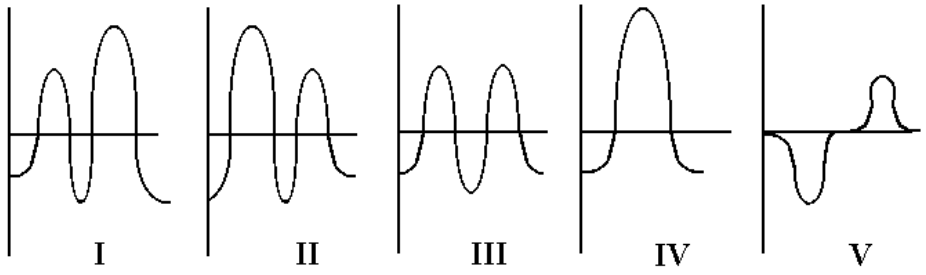
23. In an emergency situation
   a. digestions of sugars is accelerated
   b. glycogen is converted to glucose
   c. glucose is converted to glycogen
   d. endocrine suppression of glucose metabolism is experienced

MULTIPLE CHOICE

4. The coordination of motor activities in mammals is carried out by which of the following?
   a. pons
   b. cerebellum
   c. cerebrum
   d. medulla
   e. hypothalamus

5. Exocytosis is used by the synaptic vesicles to remove their contents at which of the following?
   a. dendrite
   b. axon hillock
   c. nodes of Ranvier
   d. postsynaptic membrane
   e. presynaptic membrane

2. To an isolated neuron, two stimuli, the first of one millivolt and the second of ten millivolts, were applied in quick succession. Action potentials of the neuron were recorded. Which of the below graphs has the correct pattern?



   a. I
   b. II
   d. IV
   e. V

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c. III

6. Given the steps shown below, which is the correct sequence for transmission at a chemical synapse? I DID NOT TEACH YOU ABOUT THE CA++ IONS BUT YOU CAN DEDUCE THIS ANSWER BASED ON THE OTHER 4 STEPS
   I. neurotransmitter binds with receptor
   II. calcium ions rush into neuron's cytoplasm presynaptic neuron
   III. action potential depolarizes the presynaptic membrane
   IV. ion gate opens to allow particular ion to enter cell post synaptic neuron
   V. synaptic vesicles release neurotransmitter into the synaptic cleft

   a. I, II, III, IV and V
   b. II, III, V, IV and I
   c. III, II, V, I and IV
   d. IV, III, I, II and V
   e. V, I, II, IV and III

11. The autonomic division of the nervous system
   a. is involved in conscious thought
   b. is involved in learning
   c. controls unconscious life-sustaining activities
   d. controls voluntary muscles
   e. all of the above

17. Parasympathetic stimulation would result in which of the following?
   a. decreased blood flow in skin
   b. pupil dilation
   c. increased heart rate
   d. decreased activity of digestive tract

25. Vision difficulties are associated with which lobe of the brain?
   a. frontal
   b. temporal
   c. parietal
   d. occipital

30. Which part of the neuron receives sensory information?
   a. dendrite
   b. sheath
   c. axon
   d. node of Ranvier

32. Which of the following is **not** an effector?
   a. muscles
   b. organs
   c. glands
   d. brain

MATCHING

Match each item with the correct statement below.

a. axon
b. dendrites
c. myelin sheath
d. schwann cells
e. synapses

1. special glial cells **D**

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2. receive information from sensory receptors or nerve cells **B**
3. extension of the cytoplasm of a nerve cell **A**
4. acts as an insulator for the neuron **C**
5. small spaces between neurons **E**

SHORT ANSWER

12. Name and describe three current technologies used to investigate the structure of the brain.
EXPLAIN CAT SCAN, EEG, PET * in textbook was homework, be sure you do it!!

NOT 2023

Compare the mechanism for action of a fat soluble hormone like testosterone and a water soluble hormone like insulin. Be sure to specify what is the same or different at the cell membrane receptors, ~~and the response of the cell to increased concentrations of the hormone in the blood.~~ (not done)

	Fat soluble hormone	**Water soluble hormone**
What happens at cell membrane? - different	Hormone enters cell	Hormone binds to receptor on outside of cell
Cell response - different	Hormone binds to DNA and increases the production of a protein	ATP is broken down to cAMP and this starts a biochemical pathway resulting in production of the desired molecule
Result - same	- a small concentration of hormone causes a large production of protein	- a small concentration of hormone causes a large production of protein

ASK YOURSELF – WHAT TOPICS ARE MISSING FROM THIS REVIEW??

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14.Refer to the graph below:

Referring to the graph BELOW, complete the following table below.

Section of Graph	Name the Step and Describe the Activity
a	- **RESTING POTENTIAL** OF -70Mv MAINTAINED BY Na/K PUMP AND HIGH [NEGATIVE PROTEINS INSIDE AXON]
b	- **THRESHOLD VALUE** POTENTIAL MUST BE OVERCOME WITH ENOUGH STIMULATION OF DENDRITES TO FORCE AN ACTION POTENTIAL TO BE GENERATED - I DID NOT NAME THIS BUT WE TALKED ABOUT IT
c	- **DEPOLARIZATION**, SODIUM GATES OPEN AND SODIUM IONS FLOW OUT THE SODIUM GATES CAUSING THE VOLTAGE TO GO TO -30Mv
d	- **REPOLARIZATION**, FIRST THE K+ GATES OPEN CAUSING K+ IONS TO FLOW INTO THE AXON THUS LOWERING THE MEMBRANE POTENTIAL - THEN THE NA/K PUMP WILL RE-ESTABLISH THE COMPLETE -70Mv OF THE MEMBRANE POTENTIAL
e	- **REFRACTORY PERIOD**, THE EXTRA NEGATIVE HELPS PREVENT THE ACTION POTENTIAL FROM PROPAGATING BACKWARDS AND THEN BACK TO THE REGULAR RESTING POTENTIAL.