

Homeostasis Remedial Test Opportunity 2022

- **Do not open this booklet until you are instructed to do so.**
- Print your name at the top of the BACK PAGE of this booklet.
- Indicate all of your answers to the questions on the separate Response Form. No credit will be given for anything written in this booklet, but you may use the booklet for notes or rough work. No additional time will be given after the exam to transfer your answers to the Response Form.
- After you have decided which of the suggested answers is best, fill in the corresponding answer on the Response Form. Give only one answer to each question. If you change an answer, be sure that the previous mark is erased completely. Print neatly using UPPER CASE letters, ambiguous answers will not be marked.
- Use your time effectively. Do not spend too much time on questions that are too difficult. Go on to other questions and come back to the difficult ones later if you have time. This is a timed test, you need to work efficiently.

1. Which statement about cell membrane proteins is CORRECT?
 - a. Peripheral proteins are tightly attached to both sides of the phospholipid bilayer.
 - b. Integral proteins integrate and insert glycoproteins into the phospholipid bilayer.
 - c. Membrane-spanning proteins interact only with the hydrophilic side of the phospholipid bilayer.
 - d. Anchoring proteins hold peripheral proteins to the surface of the phospholipid bilayer.
 - e. Glycoproteins are only found on the outer surface, and not on the cytoplasmic side, of the phospholipid bilayer.**

2. Which of the following statements about bulk membrane transport is **false**?
 - a. **The two types of endocytosis are phagocytosis and exocytosis.**
 - b. Pinocytosis is also called “cell drinking”.
 - c. Phagocytosis is also called “cell eating”.
 - d. Exocytosis increases the amount of cell membrane.
 - e. Pinocytosis and phagocytosis both form vesicles.

3. Which of the following statements about the cell membrane is **true**?
 - a. Both ends of the phospholipid are hydrophilic.
 - b Both ends of the phospholipid are hydrophobic.**
 - c. There is one type of protein embedded in the bilayer.
 - d. A variety of proteins are embedded in the bilayer.
 - e. None of these statements is correct.

4. The movement of materials across a cell membrane without the expenditure of cell energy is called
 - a. **passive transport.**
 - b. active transport.
 - c. Brownian motion.
 - d. diffusion.
 - e. endocytosis.

5. Some substances, such as glucose, diffuse into the cell faster than other materials. The most likely explanation for this involves
 - a. large holes in the cell membrane.
 - b. glucose having more energy than other materials.
 - c. phospholipid assistance.
 - d. protein carrier molecules.**
 - e. glycoproteins.

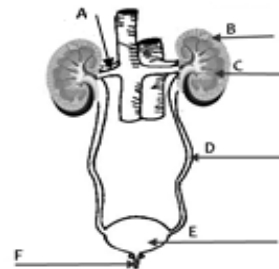
6. Carefully read these statements about cell membranes and identify true and false statements.
 - I. The membrane of the cell, the nucleus, ribosomes and vesicles has the same structure.
 - II. Our current understanding of cell membranes is summarized in the Fluid Mosaic Model.
 - III. **Plant and animal cells have one layer of phospholipids in the cell membrane.**
 - IV. **All molecules need carrier proteins to move across the cell membrane.**
 - V. The phospholipids are dynamic and cholesterol keeps the membrane fluid at low temperatures.

Which of the following sequences represents only the **false** statements?

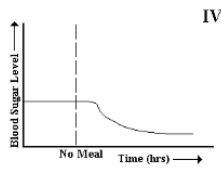
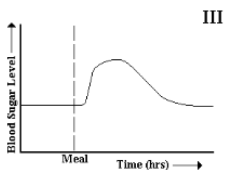
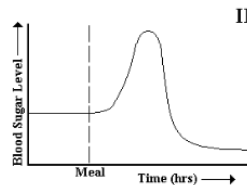
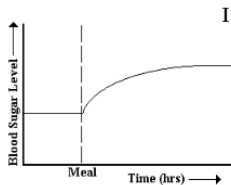
 - a. Only III **d III and IV**
 - b. III and V e. I, III and IV
 - c. III, IV and V

7. The movement of a molecule across a cell membrane **without** using any ATP cell energy is called
- the sodium/potassium pump.
 - active transport.
 - Brownian motion.
 - bulk membrane transport.
 - passive transport.**
8. Water moves out of a cell if the cell is placed in a solution that
- is hypertonic to the cell.**
 - is isotonic to the cell.
 - is hypotonic to the cell.
 - has a lower concentration of solutes than the inside of the cell.
 - A and D are both true
9. The term used to describe the ability of a living organism to adjust to changing environmental conditions by changing their internal processes is
- regulation
 - control.
 - inhibition.
 - homeostasis**
 - feedback.

10. Which of the following sequences correctly represents the renal medulla, renal arteries, bladder and ureter as shown on the diagram?
- B, A, E, F
 - C, A, E, D**
 - B, A, C, D
 - B, A, E, D
 - C, A, E, F



11. Which statement about urine formation is **false**?
- Blood cells in nephric filtrate are secreted back into blood.**
 - Of the 180 L of plasma filtered every day by the kidneys only 1.5 L of urine is formed.
 - Tubular secretion is active transport of substances from the blood to urine.
 - The process starts with pressure filtration of blood in the glomerulus.
 - The kidney removes the wastes urea, uric acid and creatine from blood.



12. Which graph(s) above are for a person who secretes **too little glucagon**?
- III
 - I
 - IV
 - II and IV**
 - none of the above
13. Identify the sequence of neural components in the reflex arc.

- a. sensory neuron, receptor, effector, motor neuron
b. effector, motor neuron, sensory neuron, receptor
c. receptor, sensory neuron, motor neuron, effector
- d. motor neuron, effector, receptor, sensory neuron
e. receptor, effector, sensory neuron, motor neuron
14. Parasympathetic stimulation would result in which of the following?
a. increased release of sugar from liver to blood
b. pupil dilation
c. increased heart rate
d. **increased activity of digestive tract**
e. all of the above
15. 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
16. Which of the following statements about human feedback systems is **false**?
a. **The release of oxytocin during childbirth to increase contractions is an example of negative feedback.**
b. Negative feedback loops maintain equilibrium in response to external stimuli.
c. Human blood sugar levels are maintained by a negative feedback system using glucagon and insulin.
d. A negative feedback system requires a receptor to sense stimuli.
e. A negative feedback response to increased body temperature is sweating.
17. The nitrogen that must be excreted comes from
a. the metabolic breakdown of carbohydrates
b. the nitric buffer system
c. **the deamination of proteins**
d. the atmosphere
18. 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**
19. The main active transport mechanism in the kidney is the
a. **sodium (potassium) pump**
b. filtration process
c. calcium pump
d. osmotic pressure
20. 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
21. 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

22. Which of the following is **not** an effector?
- a. muscle c. gland
 - s s
 - b. organs d. **brain**

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

23. The 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
24. 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
25. Parasympathetic stimulation would result in which of the following?
- a. decreased blood flow in skin c. increased heart rate
 - b. **pupil dilation** d. decreased activity of digestive tract
26. Integration of simple responses to certain stimuli, such as the knee jerk response, is accomplished by which of the following?
- a. **Interneurons** d. Afferent nerves
 - b. Motor neurons e. Somatic nerves
 - c. Efferent nerves
27. Exocytosis is used by the synaptic vesicles to remove their contents at which of the following?
- a. dendrite d. postsynaptic membrane
 - b. axon hillock e. **presynaptic membrane**
 - c. nodes of Ranvier

28. Which of the following correctly matches the function of dendrites, cell bodies, and neuron axons?

- i. Passes electrical signals by action potentials
- ii. Collects electrical signals
- iii. Integrates incoming signals and generates outgoing signals

- a. Dendrites – i; cell bodies – ii; axons – iii
- b. Dendrites – i; cell bodies – iii; axons – ii

- c. **Dendrites – ii; cell bodies – iii; axons – i**
- d. Dendrites – iii; cell bodies – ii; axons – i
- e. Dendrites – iii; cell bodies – i; axons – ii

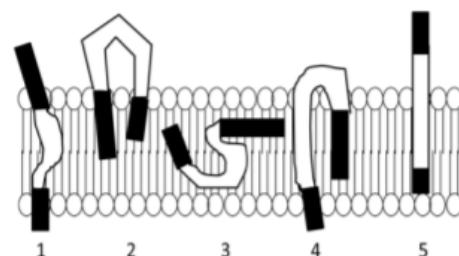
29. A small uncharged molecule moves across a membrane down an electrochemical gradient. What transport process is most likely involved in the movement of this molecule?

- a. **Diffusion**
- b. Osmosis
- c. Facilitated diffusion

- d. Active transport
- e. Receptor mediated transport

30. The diagram at right illustrates five possible arrangements (numbered 1 to 5) of a protein that could associate with a phospholipid bilayer. The black regions of the protein are composed of polar and charged amino acids, and the white region of the protein is composed of nonpolar amino acids. Which arrangement is most likely to occur?

- a. **1**
- b. 2
- c. 3
- d. 4
- e. 5

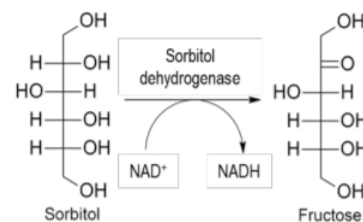


31. How does myelination increase the speed that action potentials can travel along an axon?

- a. **Myelin insulates the axon from the leakage of ions across the membrane, which allows the action potential to “hop” to the next region of high ion channel density.**
- b. Myelin conducts the action potentials down the axon by increasing ion channel density.
- c. Myelin decreases intracellular resistance, which causes the action potentials to decay at a slower rate.
- d. Myelin decreases intracellular resistance, which causes the action potentials to decay at a faster rate.
- e. Myelin increases the membrane resistance and decreases the intracellular resistance, which causes the action potentials to decay at a slower rate.

32. In some cases of diabetes in humans, glucose is metabolized to sorbitol. The enzyme sorbitol dehydrogenase then converts sorbitol into fructose by the reaction shown here. What type of reaction is this?

- a. Hydration
- b. Hydrogenation
- c. **Oxidation/reduction**
- d. Condensation
- e. Hydrolysis



33. Diuretics, which increase the amount of urine produced by the kidney, can act as effective treatments for hypertension (high blood pressure) by doing what?

a. Decreasing blood volume in the circulatory system.

b. Increasing blood volume in the circulatory system.

c. Slowing the heart rate.

d. Increasing the diameter of blood vessels.

e. Decreasing the stroke volume of the heart.

34. What would be the effect of preventing the flow of potassium ions in a neuron?

a. Action potentials would be stronger than usual.

b. Depolarization would occur more rapidly during an action potential.

c. The threshold potential of the neuron would become more negative.

d. The resting potential of the neuron would become more negative.

e. There would be no repolarization (or slower repolarization) during an action potential.

35. Which statement about action potentials is CORRECT?

a. During an action potential Na^+ ions rush out of the neuron.

b. Action potentials are generated in dendrites.

c. Ca^{2+} ions are involved in repolarization of the membrane.

d. If the membrane becomes hyperpolarized compared to the resting membrane potential, an action potential will occur.

e. The degeneration of myelination along an axon reduces the speed at which action potentials are transmitted.

36. Which of the following is an example of positive feedback?

a. At high temperatures blood vessels dilate → blood flow increases → heat-loss from the skin increases → body temperature decreases.

b. Glucose levels are high → the pancreas secretes insulin → cells in the liver synthesize glycogen → glucose levels fall.

c. The head of a fetus pushes on the cervix → the pituitary gland secretes oxytocin → oxytocin stimulates uterine contractions → the fetus is pushed towards the cervix.

d. The blood contains excess H^+ → carbonic acid is formed and breaks down to form water and carbon dioxide → breathing rate increases → blood pH is increased.

e. Calcium levels are low → the parathyroid gland releases parathyroid hormone → Ca^{2+} is released from bones and Ca^{2+} uptake in the intestines increases → calcium levels rise.

37. Which statement about the kidney's loop of Henle is CORRECT?

a. Pre-urine exits the proximal tubule and enters the ascending loop.

b. Water is actively pumped out of the descending limb.

c. Sodium and calcium ions are actively moved out of the ascending limb.

d. Solute loss from the ascending limb creates an osmotic gradient.

e. Urea moves out of the collecting duct into the cortex, thus increasing the osmotic gradient.

Homeostasis Remedial Test Opportunity

Name: _____

All multiple choice answers must be recorded in this table. When you are finished answering all the multiple choice questions transfer your answers to this table. Print neatly using UPPER CASE letters, ambiguous answers will not be marked.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
					26				
31	32	33	34	35	36	37			