

Past Paper

1. Which of the following is the approximate extracellular fluid volume of a normal individual? (male).

- A. 5% of body mass
- B. 60% of body mass
- C. 10% of body mass
- D. 20% of body mass
- E. 40% of body mass

ANSWER: D

2. Solution A contains 10 mmol/L glucose, and Solution B contains 1 mmol/L glucose. If the glucose concentration in both solutions is doubled, by how much will the flux (flow) of glucose between the two solutions change?

- A. remain unchanged
- B. double
- C. triple
- D. quadruple

ANSWER: B

3. A cell is equilibrated in an aqueous solution of 300 mosm/L sodium chloride. Which of the following best describes what will happen to cell volume when the cell is placed in an aqueous solution of 300 mOsm/L Calcium Chloride?

- A. No change
- B. Decrease and then increase
- C. Increase
- D. Decrease
- E. Increase and then decrease

ANSWER: A

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4. Solutions A and B are separated by a membrane that is permeable to urea. Solution A is 10 mM urea, and solution B is 5 mM urea. If the concentration of urea in solution A is doubled, the flux of urea across the membrane will:

- A. double
- B. triple
- C. be unchanged
- D. decrease to one-half

ANSWER: B

5. The osmolarity of a solution of 50 mmol/L CaCl_2 is closest to the osmolarity of which of the following:

- A. 50 mmol/L NaCl,
- B. 100 mmol/L urea,
- C. 150 mmol/L NaCl,
- D. 150 mmol/L urea

ANSWER: D

6. When the blood sugar regulating system is not functioning, the blood sugar rises from normal 100 to 180. When the blood sugar regulating system is normal it rises to 110, what's the gain?

- A. 8 negative feedback
- B. 7 negative feedback
- C. 8 positive feedback
- D. 7 positive feedback

ANSWER: B

7. In a hospital error, a 60-year-old woman is infused with large volumes of a solution that causes lysis of her red blood cells (RBCs). The solution was most likely:

- A. 150 mM NaCl
- B. 350 mM mannitol
- C. 100 mM NaCl
- D. 150 mM CaCl_2

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ANSWER:C

8.Omeprazole which is proton pump inhibitor is used to treat gastritis; it blocks H⁺ secretion in gastric parietal cells. Which of the following transport processes is being inhibited?

- A. Simple diffusion
- B. Facilitated diffusion
- C. Primary active transport
- D. Cotransport

ANSWER:C

9.Which one of the following is NOT consistent with secondary active transport:

- A. The movement of an ion down its concentration gradient is coupled to the movement of another molecule against its concentration gradient.
- B. In secondary active transport ATP is hydrolyzed.
- C. Cotransport and exchange are variations of secondary active transport.
- D. In secondary active transport, the ion that is moving down its concentration gradient is referred to as the driving ion.
- E. All of the above are true about secondary active transport.

ANSWER: B

10. Rapid growth during puberty causes your body to release more and more growth hormones. As you grow, more and more growth hormones are released until puberty is reached, and then the hormones stop. This represents a :

- A. Positive Feedback Response
- B. Negative Feedback Loop
- C. non of the above
- D. more than one of the above

ANSWER:A

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11. How does the intracellular Na^+ concentration change following inhibition of $\text{Na}^+ - \text{K}^+$ ATPase?

- A. Increase
- B. decrease
- C. Remains the same

ANSWER:A

12. Select the molecule that should have the greatest permeability through a cell membrane:

- A. ATP
- B. amino acid
- C. cholesterol
- D. glucose
- E. potassium

ANSWER:C

13. Aquaporins are _____ that permit the _____ transport of water:

- A. channels: active
- B. carriers: passive
- C. channels: passive
- D. carriers: active
- E. none of the above

ANSWER:C

14. Red blood cells are placed into an unknown solution. The cells swell and some burst. This indicates that the solution is _____ :

- A. isotonic
- B. hypotonic
- C. hypertonic
- D. cannot be determined

ANSWER:B

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15. An example of primary active transport is the:

- A. calcium pump
- B. glucose carrier
- C. sodium-linked glucose transport
- D. sodium-proton counter transport
- E. cholesterol through plasma membrane

ANSWER: A

16. Secondary active transport occurs when:

- A. an energy source directly transports a molecule across a membrane
- B. a concentration or electrochemical gradient is created by primary active transport
- C. a membrane potential moves ions up their concentration gradient
- D. a molecule passes through a second membrane after a first membrane

ANSWER: B

17. As osmolarity increases, water concentration _____ and osmotic pressure _____

- A. decreases: increases
- B. decreases: decreases
- C. increases: decreases
- D. increases: increases

ANSWER: A

18. Which of the following factors will increase the diffusive clearance of solutes across the semipermeable membrane?

- A. Area of the membrane increases
- B. Concentration gradient for the solutes decreases
- C. Lipid solubility of the solutes decreases
- D. Size of the solute molecules increases

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E. Thickness of the membrane increases

Answer:A

19.The operation of the sodium-potassium "pump" moves ____

- A. sodium and potassium ions into the cell .
- B. sodium and potassium ions out of the cell .
- C. sodium ions into the cell and potassium ions out of the cell .
- D. sodium ions out of the cell and potassium ions into the cell .
- E. sodium and potassium ions into the mitochondria.

Answer: D

20.What activates adenyl cyclase?

- A. epinephrine binding to it
- B. an activated G protein
- C. cAMP
- D. a protein kinase

Answer: B

21.Receptor molecules on the surface of a cell do what of the following:

- A. determine that cells response .
- B. may allow a particular ligand to bind .
- C. bind to all ligands .
- D. determine that cell's response and may allow a particular ligand to bind.
- E. determine that cell's response and bind to all ligands.

ANSWER:D

22.Receptor molecules are located :

- A. only in the outer cell membrane .
- B. only in the cytosol .

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- C. only in the nucleus .
- D. only on the cell surface .
- E. in all of these places.

ANSWER: E

23. In chemical communication between cells, a _____ cell secretes a chemical messenger that binds to _____ on the _____ cell .

- A. gap : connexons : secretory
- B. secretory : connexons : gap
- C. secretory : connexons : target
- D. target : receptors : secretory
- E. secretory : receptors : target

ANSWER: E

24. Adenylyl cyclase is used in a G-protein pathway to ;

- A. cause ATP to form cAMP
- B. add a phosphate to a kinase
- C. C.remove a phosphate from a kinase
- D. attract a ligand

ANSWER: A

25. Which of the following can activate a protein by transferring a phosphate group to it ?

- . A. cAMP
- B. G Protein
- C. protein kinase
- D. protein phosphatase

ANSWER: C

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