1. Base your answer to the following question on the diagram below which represents the fluid-mosaic model of a cell membrane.

The arrow points to a component of the membrane that is best described as a
1) sugar floating in lipids
2) **protein floating in lipids**
3) lipid floating in proteins
4) lipid floating in sugars

2. Which diagram best represents the fluid-mosaic model of a cell membrane?

1) outside surface

2) inside surface

3) **outside surface**

4) inside surface

3. The diagram below represents a section of a plasma membrane.

What does structure X represent?
1) a protein
2) glucose
3) **a lipid**
4) glycogen

4. Which set of functions is directly controlled by the cell membrane?

1) protein synthesis, respiration, digestion of food molecules
2) **active transport, recognition of chemical messages, protection**
3) enzyme production, elimination of large molecules, duplication of DNA codes
4) release of ATP molecules, regulation of cell reproduction, food production

5. The ameba represented in the diagram below is a single-celled organism.

Which two processes are most closely associated with structure A?
1) insertion and deletion
2) nervous regulation and circulation
3) **active transport and diffusion**
4) replication and photosynthesis
Unit 4: Cellular Processes Practice Questions

6. Which statement regarding the functioning of the cell membrane of all organisms is not correct?

1) The cell membrane forms a boundary that separates the cellular contents from the outside environment.
2) The cell membrane is capable of receiving and recognizing chemical signals.
3) The cell membrane forms a barrier that keeps all substances that might harm the cell from entering the cell.
4) The cell membrane controls the movement of molecules into and out of the cell.

7. Molecules A and B come in contact with the cell membrane of the same cell. Molecule A passes through the membrane readily, but molecule B does not. Which statement could describe molecules A and B?

1) Molecule A is a protein, and molecule B is a fat.
2) Molecule A is a starch, and molecule B is a simple sugar.
3) Molecule A is an amino acid, and molecule B is a simple sugar.
4) Molecule A is a simple sugar, and molecule B is a starch.

8. Which substances may pass through a cell membrane by simple diffusion?

1) starch and protein
2) protein and fat
3) carbon dioxide and water
4) carbon dioxide and starch

9. In a cell, the selective permeability of the cell membrane is most closely associated with the maintenance of

1) homoeostasis
2) hydrolysis
3) phagocytosis
4) pinocytosis

10. Which activity can occur without the use of energy?

1) contraction of muscle tissue
2) protein synthesis in a cell
3) active transport of minerals
4) movement of water across a membrane

11. When most proteins, fats, and carbohydrates are digested completely, they are converted to end products that

1) are soluble and can easily pass through cell membranes
2) contain long chains of amino acids and fat acids
3) contain atoms of carbon, hydrogen, oxygen, and nitrogen
4) are a direct result of dehydration synthesis

12. The diagram below represents two processes that occur in organisms. A characteristic represented by X is common to both of these processes.

![Diagram of Diffusion and Active Transport]

A characteristic that the two processes have in common is that each process

1) uses ATP
2) requires enzymes
3) uses oxygen
4) moves molecules

13. If the concentration of sodium is greater outside a cell than inside the cell, which process could move sodium out of the cell?

1) salt from the red blood cell into the water
2) water into the red blood cell
3) water from the blood cell into its environment
4) salt from the water into the red blood cell

14. A red blood cell placed in distilled water will swell and burst due to the diffusion of

1) salt from the red blood cell into the water
2) water into the red blood cell
3) water from the blood cell into its environment
4) salt from the water into the red blood cell
15. The diagram below represents a specialized cell located in the root of a plant. The arrows in the diagram indicate the movement of molecules of oxygen and water into the cell.

Which row in the chart below correctly identifies the process responsible for the movement of each type of molecule represented in the diagram?

<table>
<thead>
<tr>
<th>Row</th>
<th>Water</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>diffusion</td>
<td>active transport</td>
</tr>
<tr>
<td>(2)</td>
<td>diffusion</td>
<td>diffusion</td>
</tr>
<tr>
<td>(3)</td>
<td>active transport</td>
<td>diffusion</td>
</tr>
<tr>
<td>(4)</td>
<td>active transport</td>
<td>active transport</td>
</tr>
</tbody>
</table>

1) 1   2) 2   3) 3   4) 4

16. In the diagram below, the dark dots indicate small molecules. These molecules are moving out of the cells, as indicated by the arrows. The number of dots inside and outside of the two cells represents the relative concentrations of the molecules inside and outside of the cells.

ATP is being used to move the molecules out of the cell by

1) cell A, only
2) cell B, only
3) both cell A and cell B
4) neither cell A nor cell B
17. The diagram below represents a cell and several molecules. The number of molecules shown represents the relative concentration of the molecules inside and outside of the cell.

Molecule \( B \) could enter the cell as a direct result of
1) digestion
2) diffusion
3) active transport
4) enzyme production

18. The diagram below represents a plant cell in tap water as seen with a compound light microscope.

Which diagram best represents the appearance of the cell after it has been placed in a 15% salt solution for two minutes?

1)  
2)  
3)  
4)
19. An investigation was set up to study the movement of water through a membrane. The results are shown in the diagram below.

Based on these results, which statement correctly predicts what will happen to red blood cells when they are placed in a beaker containing a water solution in which the salt concentration is much higher than the salt concentration in the red blood cells?

1) The red blood cells will absorb water and increase in size.
2) The red blood cells will lose water and decrease in size.
3) The red blood cells will first absorb water, then lose water and maintain their normal size.
4) The red blood cells will first lose water, then absorb water, and finally double in size.

20. The diagram below represents a cell in water. Formulas of molecules that can move freely across the cell membrane are shown. Some molecules are located inside the cell and others are in the water outside the cell.

Based on the distribution of these molecules, what would most likely happen after a period of time?

1) The concentration of O\textsubscript{2} will increase inside the cell.
2) The concentration of CO\textsubscript{2} will remain the same inside the cell.
3) The concentration of O\textsubscript{2} will remain the same outside the cell.
4) The concentration of CO\textsubscript{2} will decrease outside the cell.
Answer Key

Cell Transport

1. 2
2. 4
3. 3
4. 2
5. 3
6. 3
7. 4
8. 3
9. 1
10. 4
11. 1
12. 4
13. 3
14. 2
15. 2
16. 1
17. 3
18. 3
19. 2
20. 1