Movement across membranes

Read Chapter 3.6

Fill in the blanks

1. Membranes are considered _____-_____ because they only let certain molecules in and out of the cell.
2. Molecules that can easily cross the membrane without needing a membrane protein include small nonpolar (lipid-soluble) molecules such as oxygen, _____, _____, _____ and water. Water can cross the membrane even though it is polar because the water molecule is very small and _____ _____ is a strong force that regulates water balance inside cells.
3. Water can also move through membrane proteins called _____.
4. _____ refers to the spontaneous movement of any molecule from an area of high concentration to an area of low concentration.
5. Once _____ is reached, molecules still move in and out but there is no *net* movement in one direction or the other.
6. For the following statements, state whether an increase or a decrease in each factor causes an increase in the rate of diffusion.
    a. A(n) _____ in concentration gradient will increase the rate of diffusion.
    b. A(n) _____ in temperature will increase the rate of diffusion.
    c. A(n) _____ in surface area will increase the rate of diffusion.
    d. A(n) _____ in diffusion distance will increase the rate of diffusion.
    e. A(n) _____ in molecule size will increase the rate of diffusion.
7. Osmosis is the movement of _____ across a cell membrane.
8. The direction of the movement of water depends on the concentration of _____ inside and outside of the cell.
9. Charged and _____ molecules attract water molecules.
10. If you compare the solute concentration inside of a cell to the interstitial fluid surrounding the cell, the difference in solute concentration creates a concentration gradient. For the following types of solutions, state whether the solute concentration is higher or lower or the same in the *solution* compared to the cell.
    a. Isotonic solution _____
    b. Hypertonic solution _____

c. Hypotonic solution_____

11. The normal osmotic pressure in a cell is _____ mOsm.
12. The normal concentration of NaCl in human body fluids is _____%
13. If a cell is placed in a solution that is 450 mOSM, that solution is _____ and water will move _____, causing the cell to _____.
14. Facilitated diffusion is the movement of molecules across a cell membrane, down a concentration gradient, through a membrane _____.
15. Facilitated Membrane proteins can be a _____ or a _____.
16. For the following ions, state whether that ion is found in higher concentration inside or outside of the cell.
    a. Sodium _____
    b. Potassium _____
    c. Calcium _____
    d. Chloride _____
17. Carrier proteins change shape when a substrate binds, such as glucose, causing the substrate to move into or out of the cell. Carrier proteins can only bind one molecule at a time and therefore, eventually an increase in substrate concentration does not increase the rate of _____ and reaches _____.
18. Active transport refers to the movement of molecules across a cell membrane against the concentration gradient, using a membrane _____ and using energy in the form of _____.
19. The sodium-potassium pump moves ____# of sodium ions _____ of the cell and _____# of potassium ions _____ the cell.
20. The 2 main reasons why every cell needs to have sodium-potassium pumps is to
    a. create a _____ gradient, where sodium is in higher concentration outside the cell
    b. create an _____ gradient, where the inside of the cell is more _____ charged
21. The charge inside resting cells is approximately _____ mV
22. The amount of energy required to fuel sodium-potassium pumps in our body each day is approximately _____ Calories.
23. A H+ ion is also called a _____.

24. Proton pumps move protons _____ the concentration gradient and are another example of active transport.
25. Proton pumps are used in the _____, which is an organelle that produces ATP.
26. The process of producing ATP molecules using a proton gradient is called _____.
27. _____ transport is when 2 substances move across the membrane at the same time.
28. _____ is when 2 molecules move in the same direction.
29. _____ is when 2 molecules move in opposite directions.
30. _____ is the movement of large molecules out of the cell.
31. _____ is the general term for moving substances into the cell.
32. _____ is the movement of fluid into a cell.
33. _____ is the movement of large particles into a cell.