A few words of advice:
A) Only attempt to answer these questions when you feel confident with the material. In other words, use them as a assessment of your readiness. Don’t have the answers nearby.
B) Don’t use these questions as an estimate of what will be on the exam... anything from lecture can be on the exam even if a question doesn’t appear on practice sets.
C) Give yourself a time limit. All of your exams (including the state-wide final exam) will average about 1 minute per question. Use these practice questions to prepare for that pace.
D) Answer questions as we’ve discussed them in lecture.
E) Answer the question as it is written... period. Don’t add words and don’t ignore words.
F) Above all, have fun!

1. Homeostatic mechanisms
   a. do not require the participation of the body's organ systems.
   b. operate only when the body is subjected to large changes.
   c. help to stabilize conditions within and around the body's cells.
   d. maintain the body's internal environment exactly at its set points.
   e. Two of the above are correct.

2. The role of ion transport from one side of the plasma membrane to the other is performed by
   a. integral membrane proteins.
   b. phospholipids.
   c. peripheral membrane proteins
   d. prestidigitation.
   e. Two of the above are correct.

3. Intracellular Ca^{2+} concentration is maintained at low levels in part by
   a. diffusion via ungated Ca^{2+} channels.
   b. Ca^{2+}-Na^{+} secondary active cotransport.
   c. Ca^{2+}-Na^{+} secondary active countertransport.
   d. Na^{+}-K^{+} primary active transport.
   e. Two of the above are correct.

4. If a large concentration of steroid hormone is secreted into the bloodstream by the adrenal gland, when it gets to a muscle cell, net flux will be
   a. into the cell by way of facilitated diffusion.
   b. into the cell by way of membrane channel.
   c. out of the cell by way of simple diffusion.
   d. into the cell by way of simple diffusion.
   e. None of the above are correct.

5. The total flux of O^{2} from air (alveoli) to blood in the lung will be directly reduced by
   a. breathing from a tank of 100% O^{2}
   b. decreased alveolar-capillary membrane area
   c. increased rate of breathing
   d. blocking Na^{+}-K^{+} pumps
   e. Two of the above are correct.
6. A net flux of glucose through a plasma membrane can be reduced by increasing the
   a. concentration difference of glucose between inside and outside.
   b. surface area of the plasma membrane by adding microvilli.
   c. number of glucose transporters in the plasma membrane.
   d. the thickness of the plasma membrane.
   e. Two of the above are correct.

7. In the figure below, the net flux of particles from ISF to ICF is represented by the large arrow.

Movement of this particle can be via
   a. primary active transport.
   b. facilitated diffusion.
   c. secondary active transport.
   d. osmosis.
   e. Two of the above are correct.

8. The fluid-mosaic model of the plasma membrane demonstrates
   a. its flexibility and movement of membrane proteins.
   b. that it is a rigid structure that undergoes very little change.
   c. that cells are very fragile and easily damaged.
   d. the tendency for cells to divide spontaneously.
   e. Two of the above are correct.

9. A high concentration of solute means there is
   a. a high concentration of water molecules.
   b. a strong osmotic gradient attracting water.
   c. a slow diffusion of solute molecules.
   d. a strong gradient attracting more solute molecules.
   e. Two of the above are correct.

10. The transport mechanism used by parietal cells to secrete hydrochloric acid into the stomach
    is an example of
       a. secondary active counter-transport.
       b. primary active transport.
       c. secondary active co-transport.
       d. facilitated diffusion.
       e. an ungated ion channel.

11. _______________ will have the slowest rate of simple diffusion across the plasma membrane.
    a. Water
    b. Fatty acids
    c. Oxygen
    d. Glucose
    e. Estrogen
12. Inhibition or blockade of the Na\(^+\)/K\(^+\) pump will most directly cause
   a. decreased Na\(^+\)-glucose cotransport into small intestine cells.
   b. decreased water movement through aquaporins.
   c. depletion of intracellular Ca\(^{2+}\).
   d. increased insulin-induced glucose movement into cells.
   e. Two of the above are correct.

13. Passive membrane transport processes require ___________ to achieve a measurable rate of net flux.
   a. non-polar molecules
   b. a concentration gradient
   c. an integral membrane protein
   d. kinetic energy
   e. Two of the above are correct.

14. If a 400 mOsm solution of sodium ions are on the left side of a membrane permeable to only water and a 200 mOsm solution of sodium ions are on the right side, given an ample amount of time, the final concentrations of the solutions will be
   a. unchanged.
   b. 300 mOsm on both sides.
   c. 350 mOsm on the left and 250 mOsm on the right.
   d. 250 mOsm on the left and 350 mOsm on the right.
   e. 500 mOsm on the left and 100 mOsm on the right.

15. Aquaporins can accurately be described as
   a. ion channels.
   b. active transporters.
   c. mechanisms of facilitated diffusion.
   d. ungated channels.
   e. Two of the above are correct.

16. _________________ will cause red blood cell volume to decrease.
   a. excessive renal Na\(^+\) and Cl\(^-\) loss.
   b. intravenous infusion of isotonic salt solution.
   c. sweating.
   d. excessive H\(_2\)O intake (polydipsia).
   e. Two of the above are correct.

17. A _________________ will lead to a faster nerve conduction velocity.
   a. myelin sheath on the axon
   b. larger than normal action potential
   c. smaller axon diameter
   d. suprathreshold stimulus
   e. Two of the above are correct.

18. Membrane depolarizations on the dendrites of a neuron
   a. usually occur when closed K\(^+\) channels begin to open.
   b. are much stronger than depolarizations of the cell body.
   c. must travel to the axon hillock and summate with other depolarizations to reach threshold.
   d. can be shared with another neuron through an electrical synapse.
   e. Two of the above are correct.
19. During the rising part of an action potential
   a. a neuron is in the midst of its relative refractory period.
   b. the membrane is equally permeable to sodium and potassium.
   c. the membrane is more permeable to Na\(^+\) than K\(^+\).
   d. Na\(^+\)/K\(^+\) pumps depolarize the membrane potential.
   e. Two of the above are correct.

20. Which of the following is an example that could produce temporal summation on a post-
synaptic neuron?
   a. Neuron A creates two graded potentials very quickly.
   c. Neuron A and Neuron B create graded potentials at very different times.
   d. Neuron A creates two graded potentials at very different times.
   e. Two of the above are correct.

21. The resting membrane potential of a neuron is -70 mV. This means that
   a. the inside of the cell is 70 mV more negative than the outside of the cell.
   b. the negative charges are all inside the cells and the positive charges are all outside.
   c. the inside of the cell is 70 mV more positive than the outside of the cell.
   d. the chemical driving forces for all ions have reached equilibrium.
   e. Two of the above are correct.

22. In a neuron, the final decision to generate an action potential is made by
   a. the cell body.
   b. the dendrites.
   c. the axon hillock.
   d. the axon.
   e. the axon terminals.

23. Two factors, the concentration gradient and the resting membrane potential of neurons, favor diffusion of ____________ into nerve cells.
   a. potassium ions
   b. sodium ions
   c. chloride ions
   d. water
   e. Two of the above are correct.

24. Normally, action potentials
   a. can be hyperpolarizing or inhibitory.
   b. are unaffected by the distance they need to travel.
   c. can travel in either direction along an axon.
   d. have variable amplitudes within a neuron.
   e. Two of the above are correct.

25. The opening of voltage-sensitive Na\(^+\) channels:
   a. occurs relatively slowly compared to other voltage-gated channels.
   b. occurs after the opening of voltage-sensitive K\(^+\) channels during action potentials.
   c. decreases the permeability of the plasma membrane for potassium ions.
   d. dramatically increases when the threshold membrane potential is reached.
   e. None of the above are correct.