

BIOLOGY 10 REVIEW FOR EXAM 2

Your text is an excellent source of practice questions, both within chapters and at the end of each chapter as well as on the website. Remember to focus on the topics that we covered in lecture. You should be able to answer all of the following questions for the next exam.

Cell Membranes: transport and signaling

- 1) Compare and contrast active and passive transport. Which direction does each move materials (with or against gradient)? Which requires energy?
- 2) Compare and contrast simple and facilitated diffusion.
- 3) Describe how the following molecules would move across the membrane if they were being moved **with** their concentration gradient: H⁺, triglyceride, water, carbon dioxide, oxygen gas, glucose, amino acid, protein. Now describe how they would be transported if they were moving **against** their concentration gradient.
- 4) Compare and contrast endo and exocytosis. Which is used by a white blood cell to consume a bacterium? What type of molecules move across the membrane this way?
- 5) Understand the general way that cell signaling works as in the figure from chapter 5. Which kind of molecules accept the initial signal in the plasma membrane? What would happen if this receptor molecule was not the correct shape?

Example Question:

1. There is more glucose inside a cell than outside, yet the cell keeps bringing in more glucose, this is an example of:
 - a. simple diffusion
 - b. magic
 - c. active transport
 - d. facilitated diffusion

Energy in Cells

- 1) How do enzymes work? Are enzymes reusable?
- 2) Compare and contrast competitive and non-competitive inhibition. Which one provides a negative feedback mechanism to prevent wasting resources? Give an example of a reversible inhibitor and an example of a non-reversible inhibitor.
- 3) Do enzymes make reactions happen that would not happen on their own?
- 4) Does each enzyme catalyze(speed up) one type of reaction, or many different types of reactions?
- 5) What does ATP stand for? When ATP is used to provide energy, what are the 2 products that result?
- 6) Since breaking apart ATP releases energy, regenerating ATP must _____ energy.

- 1) What is the main purpose of cell respiration?
- 2) Describe the process of cellular respiration including the overall summary equation, the names of the three stages and where they occur, what goes into (reactants) and what comes out of (products) all three major stages, and for the electron transport chain, describe how it works (as in the diagram in chapter 6 that we went over in class). For example: How many ATP are produced at each step? Where is carbon dioxide made and what process makes it, where is oxygen used and what is it used for?
- 3) Can other foods besides glucose be used for cell respiration?
- 4) What are the major differences between aerobic and anaerobic respiration? Which one is more efficient? Why is it more efficient?
- 5) Why do you die if you stop breathing? (note: “because you need air” is a terrible answer)
- 6) If an animal cell needs ATP to make a polymer, where does the ATP come from? If a plant cell needs ATP to make a polymer, where does the ATP come from?
- 7) You breathe out carbon dioxide as a waste product of cell respiration. What molecule did that carbon dioxide come from originally?
- 8) You make water as a byproduct of cell respiration. Where did the oxygen come from in that water molecule? Where did the hydrogen come from in that water molecule?
- 9) Be able to identify structures and molecules from cell respiration in a diagram (as in the activities quiz in mastering)

Photosynthesis

- 1) Why are most plant leaves green? Why are some other leaves not green (like a plum tree leaf)?
- 2) Why do leaves change color in the fall?
- 3) What is the main purpose of photosynthesis?
- 4) Describe the process of photosynthesis including what goes into (reactants), and what comes out of (products), both major stages. Where does each stage occur?
- 5) The light dependent reactions of photosynthesis make ATP, why doesn't the plant just use that ATP, why does it go on to the Calvin Cycle to make glucose?
- 6) Why do plants need water? Carbon dioxide? How do they make oxygen?
- 7) Do plants turn carbon dioxide into oxygen?
- 8) Be able to identify structures and molecules from photosynthesis in a diagram (as in the activities quiz in mastering)
- 9) How is the electron transport chain in the mitochondria similar to the one in the chloroplast? How are they different?

Example Question:

1. Why do plants need water?
 - a. they need it for a hydrogen source for making sugar
 - b. they need it to make oxygen
 - c. they need it to make carbon dioxide
 - d. they use it as a final electron acceptor

DNA and RNA Structure:

- 1) Define the following: nucleic acid, nucleotide, base, DNA, RNA
- 2) What are the three components of a nucleotide?
- 3) How are nucleotides linked together to form nucleic acids?
- 4) What are the 3 major differences between DNA and RNA?
- 5) Differentiate between Replication, Transcription and Translation.
- 6) Role of helicase and polymerase.
- 7) Why is DNA called a double helix?
- 8) What is a “sugar-phosphate backbone”? How many does DNA have? RNA?
- 9) What type of bond holds the two strands of DNA together?
- 10) What are the DNA base pairing rules?

Example Questions:

1. Nucleotides are linked together in a chain:
a. sugar to base b. sugar to sugar c. phosphate to base d. sugar to phosphate
2. If a sequence of DNA is: AATTTCTGGG Its complimentary DNA strand would be:
a. AATTTCTGGG
b. TTAAAGCCC
c. UAAAAGCCC
d. TTUUUGCCC
3. Both DNA and RNA
a. are single-stranded molecules b. contain the same four nucleotide bases
c. are polymers of amino acids d. are made of sugar, phosphate, and a base
4. The role of DNA Helicase is to:
a. Unwind DNA at the H-Bonds
b. Unwind DNA at the Covalent-Bonds
c. Add new nucleotides in DNA Replication
d. Add new nucleotides in Translation

The role of DNA polymerase is to:

- a. Unwind DNA at the H-Bonds
- b. Unwind DNA at the Covalent-Bonds
- c. Add new nucleotides in DNA Replication
- d. Add new nucleotides in Translation