

Things to Know for Quiz 9

Chem 30B, Spring 2019

Chapter 20 (Carbohydrates)

1. Draw the ring structure for fructose. Draw either the alpha or beta anomer.
2. What is a reducing sugar? How can you tell if a sugar is a reducing sugar? [Ch. 20 #44, 45]
3. What happens when sugars react with Benedict's reagent? [Ch. 20 #54]
4. Why are ketose monosaccharides also reducing sugars? (Ketones normally cannot be oxidized.)
5. What is a glycosidic bond?
6. Be able to draw the structures of the disaccharides maltose, lactose, and sucrose. Identify the type of glycosidic bond in each.
7. Given a di- or trisaccharide, identify the type(s) of glycosidic bond(s) present. Decide whether it is a reducing sugar or not.
8. Draw the following types of glycosidic bonds between ring forms of sugars: α -1,4-, β -1,4-, and α -1,6-.
9. What happens when disaccharides or starches are hydrolyzed? [Ch. 20 # 66, 68]
10. Explain the similarities and differences between any of the 4 types of polysaccharides/starches: cellulose, amylose, amylopectin, and glycogen. [Ch. 20 # 63, 64, 70]
11. What happens when you react starch with I_2 ?

Chapter 21 (The Generation of Biochemical Energy)

1. Why do living things need energy? Where do they get energy?
2. What is "free energy"?
3. Draw an energy diagram for an exergonic reaction or an endergonic reaction. What is more stable for each, reactants or products? What types of reactions are spontaneous?
4. What is a mitochondrion? What happens inside of mitochondria?
5. Sketch a mitochondrion, labeling the matrix, the intermembrane space, the inner membrane, and the outer membrane.
6. What are catabolic reactions? Anabolic reactions?
7. What is ATP? What are the qualities of ATP that make it a good energy storage molecule?
8. Add two related reactions, cancel things that are the same on both sides, and add the ΔG values. Are the coupled reactions spontaneous or nonspontaneous overall? (How can you tell?) [Ch. 21 # 31, 32, 46]
9. Redox reactions often involve NAD^+ or FAD or NADH or $FADH_2$. Which ones are the oxidized coenzymes? Which are the reduced coenzymes? [Ch. 21 #49, 50]

10. Identify whether or not something is being oxidized or reduced. (Oxidation: addition of O and/or removal of H. Reduction: addition of H and/or removal of O.)
11. What is acetyl CoA?
12. Citric acid cycle: other names for it? Where does it happen? [Ch. 21 #51, 52]
13. The Citric Acid Cycle handout will be given for the test and the quiz.
14. By careful examination each step on the citric acid cycle handout, describe what is happening to the structure of the substrate in each step and what type of reaction it is. [Ch. 21 #25, 55]
15. Which steps involve NAD⁺? FAD? ATP? CO₂? [Ch. 21 #55-58]
16. What happens to the carbons from acetyl CoA in the citric acid cycle? [Ch. 21 # 54]
17. What is the purpose of the electron transport chain? [Ch. 21 # 59, 60]
18. Where does the electron-transport chain happen?
19. Explain in general terms how the electron transport chain works. What are the general steps?
20. How is ATP produced in the electron transport chain?
21. What is ATP Synthase?
22. What is "oxidative phosphorylation"? [Ch. 21 #69]
23. What is a "proton gradient" and how is it formed? How is it then used?
24. How many ATP can be made for each NADH? For each FADH₂?
25. What are the final products of the electron transport chain? [Ch. 21 #62]