Review for Chapter 22, Lipid Metabolism

From the syllabus: Three lecture exams and a final will cover material presented in class, text reading, homework, and quizzes. Each exam is in some ways cumulative because in order to understand the current material you must have an understanding of previous material, as information in this course builds on each other. Exams will concentrate on the current material, however, concepts from previous chapters may show up.

1. Read the book. (Quiz #3 will cover all of Chapter 21)
2. Know the notes.
3. Suggested Problems for Chapter 22: 3, 6, 7, 8, 11, 12, 17, 18
4. What are the primary uses of fatty acids?
5. Why does oxidation of fatty acids give more ATP/carbon atom than carbs?
6. How are fatty acids processed?
7. Where do the glycerol and fatty acids get transported to?
8. What are glycerol and fatty acids used for after mobilized?
9. How are the fatty acids transported into the mitochondrial matrix?
10. What are the products of each round of β-oxidation?
11. What is the energy yield of fatty acid oxidation compared to glucose oxidation?
12. What are the similarities/differences between fatty acid synthesis and degradation?
    a. Cofactors used?
    b. Cell location?
    c. 2-C unit used?
    d. Thiol bonded to as carrier?
    e. What end of the molecule starts process?
    f. Multienzyme complex or separate enzymes?
    g. Etc.
13. What are the products of degradation of odd-numbered fatty acids?
14. You don't need to know the enzyme names, but you should know what TYPE of enzyme catalyzes the steps of β-oxidation and synthesis (e.g., dehydratase, thioesterase, reductase, transferase, dehydrogenase, hydratase, thiolase)
15. What are the 4 steps of β-oxidation? What 4 steps in synthesis of fatty acids correspond to the reverse of these reactions?
16. What is the priming step of fatty acid synthesis? What catalyzes it? Is it energetically favorable?
17. What do lipases do? What type of reaction do they catalyze?
18. How are fatty acids with odd-numbered double bonds metabolized? (e.g., what extra enzymes needed?)
19. How are fatty acids with even-numbered double bonds metabolized? (e.g., what extra enzymes needed?)
20. How are fatty acids with an odd number of carbons metabolized?
21. What are ketone bodies?
22. What tissues can use them as fuel? What tissues prefer to use them as fuel?
23. Why can you smell acetone on a diabetics breath if their diabetes isn't well controlled? What causes ketosis? What is ketoacidosis? How does ketoacidosis become arise?

24. How is acetyl CoA transported outside of mitochondria? What CAC enzyme used for this?
25. What is biotin used for?
26. Why does fatty acid synthesis typically stop at 16C?
27. What is the priming step in fatty acid synthesis?
28. What purpose does the decarboxylation of malonyl-CoA serve?
29. What is a phosphopantetheine group?
30. What does the ER do in fatty acid synthesis?
31. How is acetyl CoA carboxylase regulated? (cell conditions, hormones, diet)
32. How are fatty acids with >16C synthesized?
33. What are essential fatty acids?
34. Know fatty acid nomenclature (e.g., Δ, ω)
35. How are double bonds added to fatty acids?
36. What are eicosanoids?
37. What is arachidonate?
38. What are leukotrienes?
39. What are prostaglandins?
40. What are thromboxanes?
41. What is serum albumin? What does it do?
42. What roles do 7TM receptors, G_s, & PKA play in activating fatty acid degradation?
43. What is metabolic water?
44. What are bile salts? What are they a derivative of?
45. What are chylomicrons? Lipoproteins?
46. What are phosphatases?
47. How does AMP-dependent kinase regulate metabolism?