

Name (Last, First): _____

Chem 355 Test 4, Professor David L. Huffman, Monday, 4/11/2003

**Questions for TEST FORM B. THIS EXAM WILL BE COLLECTED AT 12:50 PM.
PAGE 5 IS FOR SCRATCH WORK. DO NOT USE YOUR OWN PAPER. COMPLETE
THE SCANTRON PORTION OF THE TEST BEFORE PROCEEDING TO THE SHORT
ANSWER SECTION.**

Number 1 through 15 are worth 6 points each.

1. Lipids important for human development are
 - A. triacylglycerols
 - B. cholesterol
 - C. A and B above
 - D. None of the above above
2. Chylomicrons . . .
 - A. transport endogenous cholesterol
 - B. transport predominantly lipids made by the liver
 - C. A and B above
 - D. None of the above
3. Palmitate . . .
 - A. is composed of 18 carbon atoms
 - B. inhibits fatty acid synthase
 - C. is a volatile compound
 - D. A and B above
 - E. B and C above
4. Sphingosines . . .
 - A. are based on an 18 carbon amino alcohol backbone
 - B. are not found in lipid bilayers
 - C. can have complex oligosaccharides as a head group
 - D. A, B, and C above
 - E. A and C above
5. Cholesterol . . .
 - A. is made from squalene
 - B. synthesis is regulated by HMG CoA oxidase
 - C. is found in lipoprotein complexes such as VLDL
 - D. A and B above
 - E. A and C above
6. Glucagon
 - A. is released in response to low blood glucose concentrations
 - B. activates the production of cAMP (cyclic AMP)
 - C. A and B above
 - D. None of the above
7. The Na⁺-K⁺ ATPase pump . . .
 - A. is an example of a passive transporter
 - B. is an example of an active transporter
 - C. is a peripheral membrane protein
 - D. A and C above
 - E. B and C above
8. Fatty acid catabolism . . .
 - A. uses the enzyme Acetyl CoA Carboxylase
 - B. occurs only in the cytosol of the cell
 - C. depends upon the activity of Carnitine Acyltransferase I
 - D. A and B above
 - E. B and C above
9. Fatty acid synthesis
 - A. uses the cofactor ACP
 - B. is inhibited by the product propionyl CoA
 - C. is activated by citrate
 - D. A and C above
 - E. A and B above
10. LDL particles
 - A. are the major carriers of cholesterol in the blood
 - B. are formed from VLDL particles
 - C. contain a protein component
 - D. A and B above
 - E. A, B, and C above
11. The action of glutamate dehydrogenase . . .
 - A. produces glutamine
 - B. requires NADPH or NADP⁺
 - C. A and B above
 - D. None of the above
12. The urea cycle . . .
 - A. occurs only in the cytosol
 - B. requires the amino acid glutamate as one of its reactants
 - C. provides a way to detoxify ammonia
 - D. none of the above
13. The biosynthesis of heme . . .
 - A. requires the amino acid glycine
 - B. is not dependent upon citric acid cycle intermediates
 - C. requires an iron atom
 - D. A and B above
 - E. A and C above
14. Ribonucleotide reductase . . .
 - A. reduces the 3' hydroxyl group of DNA
 - B. reduces the 2' hydroxyl group of RNA
 - C. A and B above
 - D. None of the above
15. The following components are need for purine biosynthesis:
 - A. arginine
 - B. glycine
 - C. glutamine
 - D. B and C above
 - E. All of the above

SHORT ANSWER PORTION OF TEST. VARIABLE NUMBER OF POINTS. TELL ME WHAT YOU KNOW. DO NOT LEAVE ANSWERS BLANK. PLACE YOUR ANSWER WITHIN THE BOX TO RECEIVE CREDIT

16. Discuss the regulation of β oxidation and fatty acid synthesis in the 'fed' state. (15 points)

16.

17. Outline the degradative pathway of an amino acid. How can the products of degradation be further utilized? Be sure to mention the role of α -ketoglutarate or oxaloacetate in the process. (15 points)

17.

18. Answer **only one** of the following topics in detail. Don't give short 'yes' or 'no' answers. (15 points)
- What is the relationship between amino acid metabolism and urea production?
 - How are glycogen breakdown and triacylglycerol breakdown related?
 - Does cholesterol synthesis depend upon adequate glycogen stores?
 - How much energy is produced by the oxidation of palmitate?
 - Compare active and passive transport.
 - How does lipid composition affect membrane fluidity?

18.

19. Describe the metabolic cause of one of the following: gout or jaundice. (5 points)

19.

20. Draw the structure of cholesterol and circle the esterification site (5 points).

20.

21. Draw the structure of urea and its immediate biosynthetic precursor (5 points).

21.

22. Discuss a topic of your choice from metabolism that is unrelated to your previous answers from the material you studied for test 4. Give at least three main points (15 points)

22.

23. Discuss one of the following shuttle or transport mechanisms. (15 points)

- the glucose-alanine cycle
- the transport of acetyl CoA across the inner mitochondrial membrane
- the acquisition of dietary lipids
- the transport of cholesterol in the blood and its acquisition by cells

23.

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SCRATCH PAPER OR A PAGE TO PLACE ANSWERS THAT NEED EXTRA SPACE.

THIS FORM MUST BE RETURNED WITH YOUR EXAM. DO NOT DETACH