

CHEM 160A Exam 3
November 19, 2004

Name _____

- 1) (12 points) On a single graph, draw the oxygen binding curves for myoglobin and hemoglobin. Use this graph to describe how hemoglobin delivers O_2 from the lungs to myoglobin in the muscle.

2) (6 points) Explain why myoglobin does not show positive cooperativity upon binding oxygen, while hemoglobin does show positive cooperativity.

3) (10 points) In order to stay underwater for long periods of time, crocodiles can utilize virtually 100% of the O_2 in its hemoglobin. Humans, however, can use only about 65% of the O_2 in their hemoglobin. Crocodile deoxyhemoglobin preferentially binds HCO_3^- . How does this help the crocodile use more O_2 ?

4) Draw each of the following molecules:

a) (6 points) D-glucose

b) (12 points) sucrose (α -D-glucopyranose-(1-2)- β -D-fructofuranose)

c) (4 points) β -D-mannopyranose
(mannose is an epimer of glucose at carbon 2.)

5) (14 points) Compare and contrast amylose and cellulose in terms of structure, function, and source organism.

6) (10 points) Structurally and functionally, how does amylopectin differ from amylose? How does the structure of each determine its function?

- 7) (4 points) Structurally and functionally, chitin is most similar to which one of the following polysaccharides?
- a) amylose
 - b) cellulose
 - c) amylopectin
 - d) glycogen
- 8) (6 points) Why can't triacylglycerols be used in biological membranes?
- 9) (4 points) Salts of fatty acids, in aqueous solutions, form...
- a) Triacylglycerols
 - b) Diacylglycerols
 - c) Micelles
 - d) Lipid bilayers
- 10) (6 points) Discuss the functional similarities and differences between steroid hormones and eicosanoids.

11) (6 points) When bacteria growing at 20°C are warmed to 30°C, are they more likely to synthesize membrane lipids with saturated or unsaturated fatty acids? Explain your reasoning.