

Biochemistry
Hour Exam III

Name: _____

1. (15 points) Two vitamins that we have seen used repeatedly in the past few weeks of metabolism are FAD/FADH₂ and NAD⁺/NADH. Describe these two vitamins in as much detail as possible and compare and contrast their activity and use in the cell.

2. (15 points) What metabolic advantage(s) does a eukaryotic organism with organelles and enzymes organized within membranes have over a prokaryotic cell with no organelles?

Thought question - not for credit- Can you think of any disadvantages?

3. (15 points) In the past few weeks you have seen the structure of glucose presented in several different ways. (See A-C below). What is the correct structure for glucose in aqueous solution and why are there so many different ways for writing the structure of one chemical ?

4. (15 points) On the next page is an outline of the Glycolytic pathway.
- A. Indicate on the pathway the reaction where ATP is either used or made
 - B. The structures of Fructose-6-P, Glycerate-3-P and pyruvate are missing, please fill them in
 - C. The names of 9 compounds are missing, please fill them in.

D. The names of 3 enzymes are missing, please fill them in.

5. (15 points) On the next page is an outline of the TCA cycle.

A. In this cycle mark the places these high energy intermediates are formed or used: NADH, FADH₂, GTP or ATP

B. On the cycle show where substances other than CH₃CO-CoA can either be fed into the cycle or siphoned out of the cycle.

6. (10 points) Suppose I could set up a system where all the reactions in the TCA cycle would only work 1 time, so when I fed in Acetyl-CoA the TCA cycle would only turn once. If I used radioactive carbon in my Acetyl-CoA, where would the radioactivity be at the end of a single turn of the TCA cycle?