

**Spring 2008 Biology 111 In-Class Exam #3 – BioEnergetics**

There is no time limit on this test, though I have tried to design one that you should be able to complete within 30 minutes. You are not allowed to use your notes, any electronic sources, nor are you allowed to look at someone else's test or discuss the test with anyone until all exams are turned in at 1:20 pm on Wednesday April 16. You will need at least 4 colors of ink/pencil. If you do not write your answers in the appropriate location, I may not find them.

**-3 pts if you do not follow this direction.**

**Please do not write or type your name on any page other than this cover page.**

Staple all your pages (INCLUDING THE TEST PAGES) together when finished with the exam.

Name (please print):

**ANSWER KEY**

Write out the full pledge and sign:

**On my honor I have neither given nor received unauthorized information regarding this work, I have followed and will continue to observe all regulations regarding it, and I am unaware of any violation of the Honor Code by others.**

How long did this exam take you to complete (excluding typing)?

Lab Question:

**4 pts.**

1) How does *Chlamydomonas* get energy to regrow its flagella even when it is kept in the dark? Support your explanation with data you (should have) observed in lab.

It uses the stored glucose in the form of starch which we could see as a dark circle when stained with Lugol's stain.

Lecture Questions:

**4 pts.**

2) Draw a spectrum of visible light using 4 colors (label the colors if you don't have them) with the highest energy of light being on the far right side of your spectrum.



**3 pts.**

3) Tell me whether these reactions demonstrate oxidation or reduction

$FAD^+ \rightarrow FADH_2$  this reaction is Reduced

$CO_2 \rightarrow$  glucose this reaction is Reduced

$H_2O \rightarrow O_2$  this reaction is Oxidized

**6 pts.**

4) Give 3 reasons why an all meat diet is a dumb way to lose weight.

1. Environmental: energy is lost along each link in food web; or waste methane gas
2. Fat: meat has more fat so you actually eat more calories with meat; or too much fat is bad.
3. Kidneys: too much protein stresses kidneys due to nitrogenous waste

**3 pts.**

5) In the presence of oxygen, eukaryotic yeast cells always ferment glucose into ethanol which they later metabolize aerobically to CO<sub>2</sub>. Do these unicellular organisms extract more or less energy than bacterial cells do that only catabolize glucose via cellular respiration? Explain your answer in two sentences or less.

Bacteria always extract more E than eukaryotes due to the importation of NADH and pyruvate that bacteria don't have to face.

**7 pts.**

6) Draw a picture that tracks the movement of energy through the light reaction. Label all the important components.

Needed to include cyclic and non-cyclic electron flow

**7 pts.**

7) Diagram the citric acid cycle starting with pyruvate. Draw boxes around all forms of energy produced. Include all the carbon and oxygen in your diagram.

Needed to have 4 NADH, 1 ATP, 1 FADH<sub>2</sub>, 3 CO<sub>2</sub> and track the carbons at each step. The carbon and oxygen was in the form of CO<sub>2</sub>.