Final Exam – Take Home (100 points)

INSTRUCTIONS:
1. You are to do this exam on your own without consulting with other students, teachers, tutors, etc. I will only answer questions to clarify a particular question. You are on the honor system for this exam and if there is any question that collaborative work was done, the exam will not get a grade.
2. You may consult your lab book or any other text to help you answer the questions.
3. Write your answers right on these pages. There is not a separate answer sheet.
4. Use complete sentences where appropriate. You should not plagiarize portions from a text or the lab manual. Use your own words. Write neatly and legibly. If answers cannot be read, they will not be graded. You may type your answers for neatness if you want. Please attach the exam to your answer sheet if you type your answers.
5. For multiple choice questions, circle the correct answer on the exam.
6. Return the exam to my office at 8-232 or by e-mail, no later than Wednesday, May 12, 2004 at 5PM. If I am not in my office, please slide the exam under my office door.
6. If you have questions, email me at rwalter@monroecc.edu.

1. (2 pts.) What two pieces of equipment are used to measure blood pressure? (Give the technical names.)
________________________________________________________________

2. (1 pts.) What is the name of the instrument used to measure vital capacity and tidal volume?
________________________________________________________________

3. (1 pt.) A person has a blood pressure of 120 / 75. What does the 120 number represent?
   A. pulse pressure
   B. systolic pressure
   C. diastolic pressure
   D. vital capacity pressure

4. (2 pts.) If your pulse is 75, what units are this measured in and what does this number tell you?
________________________________________________________________

5. (1 pts.) What is the average "resting" heart rate for an adult?
   A. 16-18 beats per minute
   B. 30-40 beats per minute
   C. 70-80 beats per minute
   D. 110-120 beats per minute
   E. 150 beats per minute
In lab #10, we measured heart rate (HR), blood pressure (BP), respiratory rate (RR), tidal volume (TV) and vital capacity (VC). We calculated cardiac output (CO) (same as blood flow), pulse pressure (PP), and minute ventilation (respiratory flow).

In order to calculate cardiac output and minute ventilation, we used the following two equations:

Cardiac Output = heart rate x stroke volume
= heart rate x (pulse pressure x 1.7/1000)

minute ventilation = respiratory rate x tidal volume

Use the data set below to answer questions 6. – 8.

<table>
<thead>
<tr>
<th>Measurements during rest</th>
<th>Measurements during exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>H.R.</td>
</tr>
<tr>
<td>Kim</td>
<td>60</td>
</tr>
<tr>
<td>Claire</td>
<td>75</td>
</tr>
<tr>
<td>Mike</td>
<td>70</td>
</tr>
<tr>
<td>Jane</td>
<td>60</td>
</tr>
</tbody>
</table>

6. (6 pts) Calculate the C.O., P.P., and minute ventilation for all four subjects above during exercise. Put your answers (to the nearest tenth) in the table below.

<table>
<thead>
<tr>
<th>Resting</th>
<th>Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim</td>
<td>40</td>
</tr>
<tr>
<td>Claire</td>
<td>40</td>
</tr>
<tr>
<td>Mike</td>
<td>40</td>
</tr>
<tr>
<td>Jane</td>
<td>40</td>
</tr>
</tbody>
</table>

7. (3 pts) List below the units of measurement for the values calculated.

P.P. ________________

C.O. ________________

Minute ventilation ________________

8. (3 pts) Graph the relationship between heart rate and load for the four people only during exercise. (Hint: This is different than the graph we did in lab #10.) Draw the graph neatly on a separate piece of paper and attach it to the test. It does not have to be drawn on graph paper. Label the axes.

9. (1 pt) In your own words, describe what this graph shows.

10. (1 pt) Whose pulse pressure increased the most from rest to exercise?
11. (2 pts.) What is tidal volume?

12. (2 pts.) What is vital capacity?

13. - 18. During an experiment to investigate the chemical digestion of lipids (fats), three test tubes are set up as shown below:

<table>
<thead>
<tr>
<th>Test tube #1 contains:</th>
<th>Test tube #2 contains:</th>
<th>Test tube #3 contains:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreatic lipase</td>
<td>Pancreatic lipase</td>
<td>Pancreatic lipase</td>
</tr>
<tr>
<td>Bile</td>
<td>Bile</td>
<td>Bile</td>
</tr>
<tr>
<td>0.2% HCl</td>
<td>0.2% HCl</td>
<td>Vegetable oil</td>
</tr>
<tr>
<td>Albumin</td>
<td>Vegetable oil</td>
<td></td>
</tr>
</tbody>
</table>

Incubated at 37°C for 20 minutes
Incubated at room temperature for 20 minutes
Incubated at 37°C for 2 hours

For each of the “Why or why not? “ questions below, be sure you have looked at all of the factors in each test tube and have discussed those that are important.

13. (2 pts) Will chemical digestion of the substrate occur in test tube #1? Yes or no?

14. (4 pts) Why or why not?

15. (2 pts) Will chemical digestion of the substrate occur in test tube #2? Yes or no?

16. (4 pts) Why or why not?

17. (2 pts) Will chemical digestion of the substrate occur in test tube #3? Yes or no?

18. (4 pts) Why or why not?

19. (1 pts.) In Lab #11 on Digestion, why were some of the enzyme reactions incubated at 37°C?
   A. 37°C is the temperature at which Biuret Reagent works the best
   B. 37°C represents normal human body temperature
   C. at 37°C enzymes stop working, so no digestion takes place
   D. all reagents (Lugols, Biuret, Benedicts and phenol red) must be at 37°C to change color
20. Matching:(4 pts.) Match the color change / description with the correct experimental conditions.

___1. Biuret changes from light blue to purple        A. in the presence of starches
___2. Biuret changes from light blue to light pink   B. in the presence of proteins
___3. phenol red changes from red to yellow          C. in the presence of peptides
___4. Lugol's Iodine changes from                  D. in low pH conditions
         orange / rust to dark blue / black

21. (2 pts.) What is the word used to explain the mechanical action of bile on fats?

____________________________________________________________________________________

BONUS(1 1/2 pts.)

Matching: Match the substrate molecule with the correct enzyme (A - E) that the body uses to chemically "digest" that substrate.

___1. starch         A. phenol red
     B. pepsin
___2. protein        C. lipase
     D. amylase
___3. fat            E. albumin

BONUS:(1 pt.) Which of the following could be used as a substrate when testing for the digestion of protein to peptides?
A. starch solution   B. water   C. albumin   D. vegetable oil   E. lactose