Assignment 13 Transport Systems

1. Multiple-choice (1 point)
Based on what you have learned about conifers, why does the pine leaf (needle) in the micrograph have so few stomata?

The pine tree needs less carbon dioxide because it obtains carbon from the soil.
The pine tree is adapted to conserve oxygen.
The pine tree is adapted to conserve water.
The pine tree lives in areas that have more carbon dioxide in the atmosphere.
None of these.

2. Essay ( 3 points)
Count the number of whole stomata in the leaf peel (total number in the microscope's field of view, excluding those at the edges where only a part of the stoma is visible). Then calculate the density of stomata in the leaf, assuming that the field of view is 0.152 square mm.

To answer this question, indicate the number of stomata that you counted and show your calculation to give a value for stomata density. Be sure to indicate the units of your density measurement.

3. Essay (3 points)
The leaves of the holly tree were found to have different densities of stomata depending on whether they were located near the center of the tree or at the periphery (the ends of the branches). Write a short essay that explains why this difference would be advantageous for the tree.

4. Multiple-choice (1 point)
What process is the major driving force that moves water up a tree trunk?

water pressure from the roots
loss of oxygen from the leaves
loss of carbon dioxide from the leaves
evaporation of water from the leaves
movement of sugars into the xylem
5. Multiple-choice (1 point)
In the cross section of a plant stem below, which structures transport water to the leaves?

structure A
structure B
structure C
structure D
all of these transport water

6. Essay (4 points)
Answer the following questions about the potometer set up and experiment.
a) When setting up a potometer, why is it important to cut the tip of the plant stem underwater?
b) Based on your knowledge of transpiration, why does the plastic bag shown in the experiment increase humidity around the plant?

7. Essay (4 points)
a) Record the total leaf surface area of a plant in the transpiration experiment.

b) Results of the transpiration experiment

<table>
<thead>
<tr>
<th>Condition</th>
<th>Volume (ml/30 min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.7 ml/30 min</td>
</tr>
<tr>
<td>Humidity</td>
<td>0.3 ml/30 min</td>
</tr>
<tr>
<td>Wind</td>
<td>0.9 ml/30 min</td>
</tr>
<tr>
<td>Light</td>
<td>1.1 ml/30 min</td>
</tr>
</tbody>
</table>

Write a short essay that explains the effects (in any) of humidity, wind and bright light on transpiration rate.
8. Multiple-choice (1 point)

What type of circulatory system does the small annelid in the video appear to have, and why?

- It is an open circulatory system because the heart beats weakly.
- It is an open circulatory system because blood vessels are not present.
- It is a closed circulatory system because most blood is within a hemocoel.
- It is a closed circulatory system because blood moves slowly through the tentacles and is not coordinated with heartbeat (does not pulse).
- It is a closed circulatory system because blood moves through the tentacles in rhythm to the heartbeat (moves in pulses).

9. Multiple-choice (1 point)
In the circulatory pattern of mammals, blood leaving the heart by the pulmonary artery is

- fully oxygenated
- deoxygenated
- on its way to the lower body
- on its way to the brain
- none of these

10. Essay (2 points)
In the photograph of the dissected pig heart, the muscular walls of the four chambers differ in thickness. Write a short essay that explains 1) why chambers A and C have thinner walls than chambers B and D, and 2) why chamber B has thinner walls than chamber D. Base your answer on the function of these chambers (not just their names).

11. Multiple-choice (1 point)
Go to the Virtual lab website and perform blood pressure measures on men and women in age group 18-24 and in age group 45-54. In both cases, which of the following blood pressure measurements would be the clearest indication of high blood pressure?

- repeated measurements of 145/92
- repeated measurements of 120/78
- a single measurement of 160/85
- a single measurement of diastolic 80, systolic 140
- repeated measurements of diastolic 70, systolic 135

12. Essay (4 points)
Based on your examination of medical histories, write a short essay that discusses factors that contribute to high blood pressure.
13. Multiple-choice (1 point)

Based on the electrocardiograms of a person riding a bicycle, what was the major difference prior to exercise vs. during exercise?

- Ventricular depolarizations were more frequent during exercise.
- Ventricular depolarizations were more frequent prior to exercise.
- T waves were flatter during exercise.
- P waves were less frequent during exercise.
- There was no change during exercise.

14. Multiple-choice (1 point)

The EKG patterns in the previous question were due to

- decreased blood pressure
- decreased atrial contractions
- increased heart rate
- increased breathing rate
- none of these