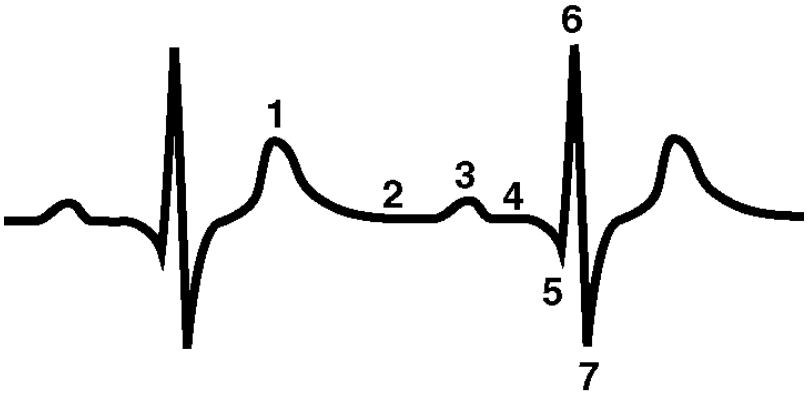
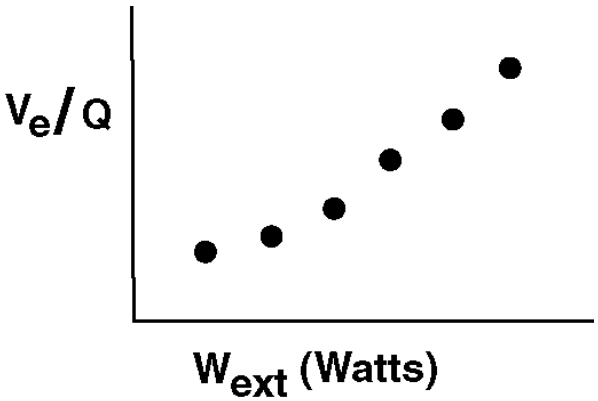
Lab Midterm 2 - Sample Questions – 4/9/04 **TA: Leif Saul**
Human Physiology – EPOB 3430

Please Note: These questions were written by me. Any resemblance to past, present or future exam questions is purely coincidental. I have not yet seen the exam. These questions are intended to give you some idea of the style of questions that I am guessing you might see on the exam. They do not by any means cover the range of possible questions on the exam. Also note that you are likely to encounter a limited number of "practical" style questions (hands-on with the computer, apparatus, photos, models, etc.) during the exam. If you find an error below, please e-mail me at leif.saul@colorado.edu.
Note: If you use this handout, please check <http://spot.colorado.edu/~saul/> prior to the exam in case there are corrections to any of the questions/answers below.

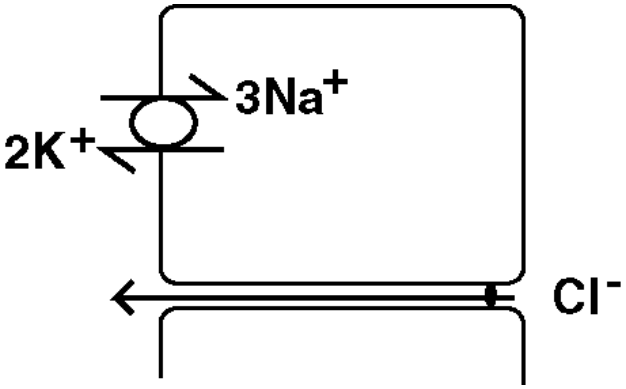


Questions 1-4 refer to the above figure which shows a typical (but smoothed out) EKG from the human cardiovascular lab.

1. Which part of the recording indicates the repolarization of the ventricles? _____
2. Which part of the recording indicates the depolarization of the atria? _____
3. If a drug is administered that slows down conduction through the AV node, which portion of the curve would be stretched out horizontally? _____
4. Which section is the P-R interval? _____



5. Based on the graph shown above, you can conclude that in this experiment
a) The ventilation/perfusion ratio was less than 1.
b) Tidal volume increased throughout the experiment.
c) Cardiac output did not increase as exercise intensity increased.
d) Ventilation increased faster than cardiac output as exercise intensity increased.
e) The measurements were taken from an untrained individual, because Ve/Q increased over time.



6. There is a mistake in the diagram of frog skin shown above. Choose the **one** answer that will make the diagram correct.
a) Cl- should flow in the opposite direction.
b) It should be 3K+ and 2Na+, not 2K+ and 3Na+.
c) The directions of Na+ and K+ should be reversed.
d) The Na+/K+ pump should be moved from the left side to the right side of the cell.
e) The tight junction should be moved from the right side to the left side.

Questions 7 and 8 refer to the following data obtained from the Active Transport lab.

Treatment:	Zero potential (mV)	Total potential (mV)	Countercurrent (microAmps)
Ringer's / Ringer's	26	41	33
Cl-free Ringer's / Cl-free Ringer's	17	39	34

7. Concerning the **potentials** in the table above, your conclusion is that
a) The results agreed with the prediction, because skin potential is **greater** in the Chloride-free treatment compared with the control.
b) The results agreed with the prediction, because skin potential is **less** in the Chloride-free treatment compared with the control.

c) The results **disagreed** with the prediction, because skin potential is **greater** in the Chloride-free treatment compared with the control.
d) The results **disagreed** with the prediction, because skin potential is **less** in the Chloride-free treatment compared with the control.

8. Concerning the **countercurrents** in the table above, your conclusion is that
a) The results **agreed** with the prediction, because the countercurrents are about the same.
b) The results **disagreed** with the prediction, because the Chloride-free treatment should have had a much **greater** countercurrent than the control.
c) The results **disagreed** with the prediction, because the Chloride-free treatment should have had a much **lesser** countercurrent than the control, but greater than zero.
d) The results **disagreed** with the prediction, because the Chloride-free treatment should have had a countercurrent of **zero**.

9. Suppose you were able to selectively administer atropine to the ventricles of a rat's heart—with none of the drug contacting the atria. Based on the processes and structures emphasized in the Rat Heart lab, your prediction is that:
a) The rate and force of heart contraction will both increase.
b) The rate and force of heart contraction will both decrease.
c) The rate will increase, but the force will decrease.
d) The rate will decrease, but the force will increase.
e) There will be no noticeable change in the rate or force of contraction.

10. Explain why there is a "1/3" in the formula for mean blood pressure: *diastolic BP + (1/3) x (systolic BP – diastolic BP*).

11. The purpose of using hemostats in the Rat Heart lab was:
a) To reduce bleeding.
b) To soak up excess blood.
c) To enable the rat to breathe while under anesthesia.
d) To avoid depolarizing the vagus nerve.

12. Name one muscle, *other than* the diaphragm and heart, that was mentioned in the Rat Heart chapter of the lab manual.

13. Overinflation of the lungs is prevented by the _____ reflex.

14. In normal conditions, the amount of air we breathe is adjusted in response to pCO2 but not to pO2. Why is this?

a) Atmospheric levels of O_2 do not fluctuate as much as CO_2 on a daily basis.
b) CO_2, when dissolved in the blood, is converted to an acid.
c) There is a plateau in the oxyhemoglobin desaturation curve, so moderate changes in pO_2 have little effect.
d) B and C are both correct.
e) A, B and C are all correct.

15. If you breathe a hypercapnic gas mixture, it is predicted that your
a) Tidal volume will increase more than breathing rate.
b) Tidal volume will decrease more than breathing rate.
c) Breathing rate will increase more than tidal volume.
d) Breathing rate will decrease more than tidal volume.

ANSWERS:

1. 1
2. 3
3. 4
4. 4
5. d
6. c
7. a
8. a
9. e (Note: atropine is an antagonist to acetylcholine that we added to that lab)
10. Because the heart spends more time in diastole (about 2/3) of the time, the average has to be weighted to reflect this.
11. a
12. Sternomastoid, sternohyoid, or omohyoid.
13. Hering-Breuer.
14. d
15. a