

BIO 131 PAL
Week 8 - PROBLEM SET 1

Cardiovascular Physiology

1. A) REVIEW: Follow a single drop of blood through the heart and all the way back to the starting point, beginning with the right atrium (don't forget to include the valves!).

B) Why does blood flow this direction?

C) For each situation:

1. indicate the status of both the AV valves and semilunar valves (open/closed)
2. compare the pressures in the atria, the ventricles, and the arteries leading away from the heart

*Period of ventricular contraction and blood ejection

*Passive ventricular filling

*Isovolumetric ventricular contraction

*Isovolumetric ventricular relaxation

2. A) REVIEW: Show where on the heart we find pacemaker cells and where we find the contractile myocytes.

B) The SA node is the primary pacemaker of the heart. Explain why it is able to "run the show", when there are other cells (i.e. AV nodal cells) that also exhibit pacemaker potentials.

C) Indicate where in the heart we see innervation.

- D) If all of the nerves innervating the heart are cut (like during a heart transplant surgery), the heart will:
- A. stop beating
 - B. continue beating at the same rate
 - C. continue beating, but at a different rate
 - D. allow only the atria to continue beating; ventricular contractions will cease

Defend your answer choice.

E) Clearly explain what the “diving reflex” is. Why is the “diving reflex” beneficial to diving mammals like seals?

4. You are a doctor and are examining a patient. You notice a murmur toward the tip of the heart and decide to perform a catheterization. Below are the obtained catheterization records:

Right atrium: 10/1

Left Atrium: 40/10

Right ventricle: 30/1

Left Ventricle: 200/20

Pulmonary artery: 30/5

Aorta: 90/80

Normal Values:

Right atrium: 5/0

Left Atrium: 10/0

Right ventricle: 25/0

Left Ventricle: 120/0

Pulmonary artery: 25/5

Aorta: 120/80

- A) Which of the heart valves might be “stenotic”? How do you know?
- B) Why might the patient experience “dyspnea” (shortness of breath), especially at night?
- C) Why might the patient feel light headed/dizzy?