Physics 131-Physics for Biologists I



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Are you planning to take the makeup exam?

Disclaimer: The makeup exam is NOT easier. If you did not change the way HOW you prepared for the exam, you are likely not going to improve much or at all.

Disclaimer 2: Your possible gain on the exam gets smaller if your score is higher, and your possible loss of points gets larger.

1. Yes

Research Experience

Next semester we plan to offer the opportunity for some Physics 131 students to participate in interdisciplinary collaborative projects with biomedical researchers on campus and at the NIH. This would be a for-credit hands-on research activity, two afternoons a week.

- 1. I may be interested in this research experience in S 2014
- 2. I may be interested in this research experience later
- 3. I already do research in a lab/hospital
- 4. Other

System Schema and Fluid Flow

A ball floats in a beaker of water. The ball sinks in a beaker of mineral spirits. The mineral spirit will float above the water when poured slowly on top of water. If the ball is floating on the water 2/3 of the way under the water, what will happen to the ball when mineral spirit is slowly poured on top of the water?

Relative to the top of the liquid,

- 1. The ball will go down.
- 2. The ball will go up.
- 3. The ball will stay at the same level.





Fluid Flow Basics Pressure drop

- If we have a fluid moving at a constant rate and there is drag, N2 tells us there must be another force to balance the drag.
- The internal pressure in the fluid must drop in the direction of the flow to balance drag.



The Hagen-Poiseuille Law

 If the pressure drop balances the drag (and thereby maintains a constant flow) N2 tells us



$$\Delta P A = 8\pi\mu Lv$$

$$\Delta P A = 8\pi\mu L \left(\frac{Q}{A}\right)$$

$$\Delta P = \left(\frac{8\pi\mu L}{A^2}\right)Q = \left(\frac{8\mu L}{\pi R^4}\right)Q$$

$$\Delta P = ZQ$$



Is the pressure drop across the large vein smaller **1. Yes**

2. No

Smaller by a factor?5. 121. 26. 162. 47. 243. 68. 364. 88

