

Name _____

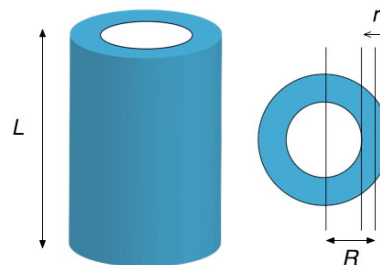
Physics 132
Spring 2017

Prof. Redish
6.II.17

Quiz #2
(10 points)

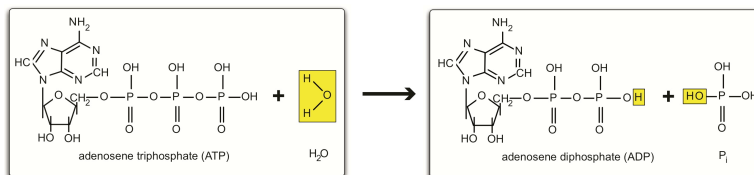
For each problem give all the correct answers for each in the space or box at the right. But be careful! You can lose partial credit on a problem if you include a wrong answer (but it will not affect any other problems). If none of the answers are correct, put N.

1. (2 points) We are considering buying a cylindrical pipe for our lab, but want a pipe that is not too heavy. We order the pipe by the length of the pipe, L , its average radius, R (measure from the central axis to the middle of the pipe), and the thickness of the pipe, r . (See the figure.) The only offering of one vendor is lead, but that's too heavy. We are interested in how much a different material would weigh. We know the density of various materials, so we just need to know the volume of the pipe. The internet gives a variety of formulas, but may use different definitions for the variables. Which one do you think is appropriate to use given the measurements we have?



- A. $V = 2\pi rRL$
- B. $V = 2\pi(R^2 - r^2)L$
- C. $V = 2\pi(R^2 + r^2)L$
- D. $V = 2\pi(R - r)^2 L$
- E. None of these work

2. (4 points) ATP hydrolysis, $\text{ATP} + \text{H}_2\text{O} \rightarrow \text{ADP} + \text{P}_i$, is the exothermic chemical reaction that provides the energy for many of the processes that take place in a cell. The reaction is described as arising from



“breaking a phosphate bond in ATP” that is often described as a “high energy bond.” The reaction also forms an OH-P bond to create P_i . Just consider this reaction in isolation. Which of the following statements would you therefore expect are true about the reaction?

- A. It takes a lot of energy to break the O-P bond in ATP.
- B. It only takes a little energy to break the O-P bond in ATP.
- C. The breaking of the O-P bond releases energy that is stored in the bond.
- D. The OH-P bond that is formed in the reaction is a weak bond.
- E. The OH-P bond that is formed in the reaction is a strong bond.
- F. The formation of the OH-P bond is the part of the reaction responsible for releasing energy.

3. (4 points) Consider a system consisting of a metal block. The block has been sitting on a table for a while and is then pushed, sliding on the table and slowing down. Fill in the spaces below to indicate whether the change in the kinetic energy of the system (ΔKE), internal energy of the system (ΔU_{int}), the heat absorbed by the system (Q), and the work done by the system (W) is positive (+), negative (-), or zero (0) in the time interval beginning when the block is first released and ending when it comes to a stop.

ΔKE	ΔU_{int}	Q	W