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<https://studentlife.oregonstate.edu/studentconduct/academicmisconduct>

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Physics 201

Weekly Quiz 1 | Corvallis Campus

9/30/2020

Collaboration is strictly prohibited. You will have 25 minutes to download, solve, take pictures, AND upload the exam to Gradescope.

- (a) The dimensions of kinetic energy are equal to those of a force multiplied by a distance. The dimensions of a force are equal to those of an acceleration multiplied by a mass. The dimensions of acceleration are equal to those of a speed divided by time. The dimensions of speed are equal to those of a distance divided by time. Find the dimensions of energy in terms of the fundamental dimensions of mass [M], length [L], and time [T]. Show all work using only the information provided in this problem statement, i.e. don't start with the dimensions to acceleration used in class.

(b) The change in kinetic energy of a system is equal to $\frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2$, where \mathbf{m} represents mass, v_f represents final speed, and v_i represents initial speed. If the change in kinetic energy is equal to a force (\mathbf{F}) multiplied by a displacement ($\Delta\mathbf{r}$), algebraically find the final speed in terms of the variables, \mathbf{m} , v_i , \mathbf{F} , and $\Delta\mathbf{r}$. Show all your work, do not skip algebraic steps. Note: part (a) is a dimensional analysis while part (b) is working with the physical quantities involved with energy.