

Homework #1

Physics, summer 2020/21

- 1) **(5pkt)** From the top of a building of height $h = 200\text{m}$ men throw a ball up with velocity 10m/s .
 - a) What is the maximum height it reaches?
 - b) What is its potential energy at maximum height? Assume that its mass $m = 2\text{g}$.
 - c) How many minutes does it take for the ball to reach maximum height?

- 2) **(5pkt)** A particle is traveling through the Earth's atmosphere at a speed of $0.99c$. To an Earth-bound observer, the distance it travels is 5 km . The muon then travels at constant velocity and lives $2\mu\text{s}$ as measured in the muon's frame of reference.
 - a) How far does the particle travel in the particle's frame of reference?
 - b) How long does the particle live as measured by an Earth-bound observer?
 - c) What is the momentum of traveling particle with mass equal $9.11 \times 10^{-31}\text{kg}$?

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