

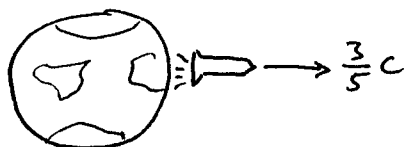
Physics 201, Fall 2007

Midterm Exam 1

October 19, 2007 10-10:50 am

Write your name on each page of paper submitted. You must show all work to receive credit, but only turn in work you would like graded. This exam is closed book. You may not use any electronic devices or written notes. Good luck!

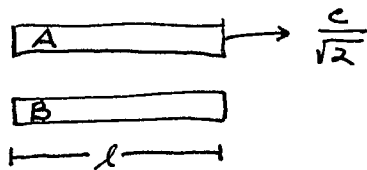
1. (25 points)



A super-rocket leaves Earth at 12am moving at speed $v = 3/5c$. Four minutes later as measured by the rocket's clock, the rocket emits a flash of light towards Earth.

At what time as measured by a clock on Earth does the light flash reach Earth? Assume the Earth is in an inertial frame, and ignore finite size effects.

2. (25 points)



Two rods are moving parallel to one another with relative speed $v = c/\sqrt{2}$ as shown. In rod B's rest frame, both rods are measured to have length l . What is the ratio of the length of rod A to the length of rod B as measured in rod A's rest frame?

3. (25 points)

A neutral pion with mass $140 \text{ MeV}/c^2$ decays into two massless photons, each with momentum $87.5 \text{ MeV}/c$. How fast was the pion moving when it decayed?

4. (25 points)

Describe two experimental conundrums of the 19th or early 20th century that seemed incompatible with classical physics.