EP 1108 Assignment 3

Deadline **14** Feb 2022 before **17:00 hrs**

1. The threshold wavelength for photoelectric emission in tungsten is 2,300 Angstrom. What is the wavelength of light (in Angstrom) which must be used in order for electrons with a maximum energy of 1.5 eV to be ejected [2 pts]

2. Derive the inverse Lorentz transformation equation for x as a function of x' and t', from the Lorentz transformation equations for x' and t' as a function of x and t [3 pts]

3. A rocket ship is 100 m long on the ground. When it is in flight, its length is 99 m to an observer on the ground. What is its speed? [2 pts]

4. How much velocity must an electron have in order that its mass equal to the rest mass of a proton? (Mass of an electron is 0.5 MeV and rest mass of a proton is 1 GeV). [3 pts]

5. If the Kinetic energy of a particle is same as its rest energy, calculate its speed. [3 pts]

6. For the muon decay example shown in class, calculate the total distance travelled by a muon of energy 100 GeV (as seen from the Earth), if it its rest mass is equal to 100 MeV and lifetime 2μ s [2 pts]