

Quiz #6 Solutions: Pratt's lecture, April 5, 2002

Useful stuff: $\gamma = 1/\sqrt{1-(v/c)^2}$, $hc = 1.24 \times 10^{-6} \text{ (eV)} \cdot \text{m}$

1. A meter stick is parallel to the x axis and is observed to be moving along the x axis at velocity $v = 0.85 \cdot c$. How long is the meter stick observed to be?

- (a) 38 cm
- (b) 45 cm
- (c) **53 cm**
- (d) 62 cm
- (e) 100 cm

$$L = \frac{L_p}{\gamma} = 100 \text{ cm} \sqrt{1 - (v/c)^2} = 53 \text{ cm}$$

2. A photon has a wavelength of 580 nm. What is its energy?

- (a) 1.46 eV
- (b) 1.63 eV
- (c) 1.80 eV
- (d) 1.97 eV
- (e) **2.14 eV**

$$E_{\text{ph}} = \frac{hc}{\lambda} = \frac{1.24 \times 10^{-6} \text{ (eV)} \cdot \text{m}}{5.8 \times 10^{-7} \text{ m}} = 2.14 \text{ eV}$$