

## LATEX PRACTICE

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(27)

$$\lambda = 589 \times 10^{-9} \text{ m}$$

$$t = 1.60 \times 10^{-8} \text{ s}$$

$$m = 9.11 \times 10^{-31} \text{ kg}$$

a. Find the  $\Delta E$

$$\Delta E \Delta t \geq \frac{\hbar}{2} ; \frac{h}{4\pi}$$

$$\Delta E \geq \frac{h}{4\pi \Delta t} ; \frac{6.626 \times 10^{-34} \text{ J s}}{4\pi \times 1.60 \times 10^{-8} \text{ s}} = 3.296 \times 10^{-27} \text{ J} \left( \frac{1 \text{ eV}}{1.602 \times 10^{-19} \text{ J}} \right)$$

$$\Delta E \geq 2.057 \times 10^{-8} \text{ eV}$$

b. Find  $f$

$$f = \frac{v}{\lambda} = \frac{3.00 \times 10^8 \frac{\text{m}}{\text{s}}}{589 \times 10^{-9} \text{ m}} = 5.093 \times 10^{14} \text{ Hz}$$

c. Find  $\Delta f$

$$\Delta E = h \Delta f ; \Delta f = \frac{\Delta E}{h} = \frac{3.296 \times 10^{-27} \text{ J}}{6.626 \times 10^{-34} \text{ J s}} = 4.974 \times 10^6 \text{ Hz}$$

$$\% = \frac{4.974 \times 10^6 \text{ Hz}}{5.093 \times 10^{14} \text{ Hz}} \times 100 = 9.766 \times 10^{-7} \%$$

Math problems from AoPS: Intro to Algebra

**4.29** Factor the following:

(a)  $7x - 35y^2$   
 $7(x - 5y^2)$

(b)  $21ab^2 - 24a$   
 $3a(7b^2 - 8)$

(c)  $-20x^3 - 13x^2yz$   
 $-x^2(20x + 13yz)$

(d)  $12rst^2 + 24r^2st - 18rs^2t$   
 $6rst(2t + 4r - 3s)$   
 $6rst(4r - 3s + 2t)$