

Solutions

Each answer shows the steps, then the **result**.

2.1

- $E = hf = (6.63 \times 10^{-34})(6.0 \times 10^{14}) = 4.0 \times 10^{-19} \text{ J}$

2.2

- $\lambda = \frac{h}{p}$

2.3

- that light and matter each behave both as waves and as particles

3.1 A

3.2 B

3.3

(a)

- $f = \frac{c}{\lambda} = \frac{3.0 \times 10^8}{500 \times 10^{-9}} = 6.0 \times 10^{14} \text{ Hz}$

(b)

- $E = hf = (6.63 \times 10^{-34})(6.0 \times 10^{14}) = 4.0 \times 10^{-19} \text{ J}$