Question 1

In the Bohr model, the energy levels can be labeled with an integer n. Visible light is emitted when the atom undergoes a transition from a level with $n > 2$ into one with $n = 2$.

$-0.85\,\text{eV}$ —— $n = 4$

$-1.51\,\text{eV}$ —— $n = 3$

$-3.40\,\text{eV}$ —— $n = 2$

$-13.6\,\text{eV}$ —— $n = 1$

The frequency of blue light is larger than the frequency of red light. Which of the following is true?

1. Blue light and red light are each produced from a transition involving the same energy level to the $n = 2$ level.
2. Blue light is produced from a transition from a level that is closer in energy (than for red light) to the $n = 2$ level.
3. Red light is produced from a transition from a level that is closer in energy (than for blue light) to the $n = 2$ level.

Question 2

The ground state energy of the Bohr model hydrogen atom is $-13.6\,\text{eV}$.

Which of the following best represents the energy of the $n = 3$ level?

1. $-1.51\,\text{eV}$
2. $+1.51\,\text{eV}$
3. $-4.53\,\text{eV}$
4. $+4.53\,\text{eV}$
5. $-10.6\,\text{eV}$

Warm Up Question 1

A hydrogen atom is known to have an energy somewhere in the range of $-1.00\,\text{eV}$ to $-4.00\,\text{eV}$. What are the possible energies that it could have in this range?

1. Only the $n = 1, 2, 3$ levels: $-13.6\,\text{eV}$, $-3.4\,\text{eV}$ and $-1.5\,\text{eV}$.
2. Only the $n = 1, 2, 3, 4$ levels: $-13.6\,\text{eV}$, $-3.4\,\text{eV}$, $-1.5\,\text{eV}$ and $-0.85\,\text{eV}$.
3. Only the $n = 2, 3$ levels: $-3.4\,\text{eV}$ and $-1.5\,\text{eV}$.
4. Many possibilities.

Warm Up Question 2

The Bohr model and quantum physics predict the possible energies for a hydrogen atom and these depend on an integer, n. Is the following statement true: "As n increases, the energy approaches infinity?" Explain your answer.

1. False. As n increases, energy approaches 0.
2. True. As n increases, energy approaches infinity.
3. False. As n increases, energy decreases.