

Question 1

Electrons are fired toward a crystal. Suppose that the crystal lattice can expand; this causes the spacing between atoms to increase.

As the lattice expands, what happens to the locations at which electrons are strongly scattered?

1. They don't change.
2. They spread out.
3. They move closer together.

Question 2

A hypothetical atom has the illustrated energy level structure.

$$E_4 = 8.0 \text{ eV} \text{ —————}$$

$$E_3 = 7.0 \text{ eV} \text{ —————}$$

$$E_2 = 4.0 \text{ eV} \text{ —————}$$

$$E_1 = 2.0 \text{ eV} \text{ —————}$$

How many distinct wavelengths of light would the emission spectrum of this atom contain?

1. Three
2. Four
3. Five
4. Six
5. More than six.

Question 3

A hypothetical atom has the illustrated energy level structure.

$$E_4 = 8.0 \text{ eV} \text{ —————}$$

$$E_3 = 7.0 \text{ eV} \text{ —————}$$

$$E_2 = 4.0 \text{ eV} \text{ —————}$$

$$E_1 = 2.0 \text{ eV} \text{ —————}$$

Which transition/jump results in emission of light with the largest wavelength (based only on the illustrated energy levels)?

1. $4 \rightarrow 3$
2. $3 \rightarrow 4$
3. $4 \rightarrow 1$
4. $1 \rightarrow 4$
5. $3 \rightarrow 2$
6. $2 \rightarrow 3$