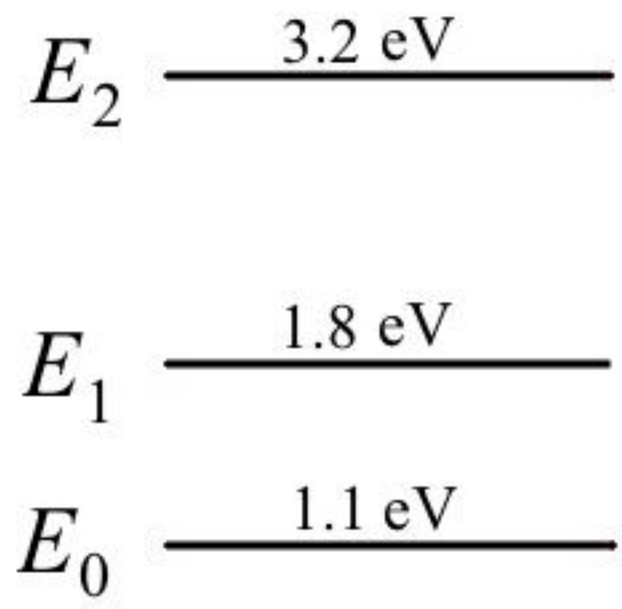
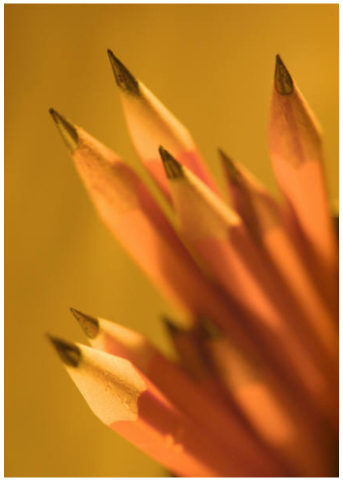
A molecule has the energy levels shown in the diagram at the right. We begin with a large number of these molecules in their ground states. We want to raise a lot of these molecules to the state labeled E_2 by shining light on it. What energy photon should we use?

1. 0.7 eV
2. 1.1 eV
3. 1.4 eV
4. 1.8 eV
5. 2.1 eV
6. 3.2 eV
7. Something else





What is the wavelength of the light?

$$E = hf$$

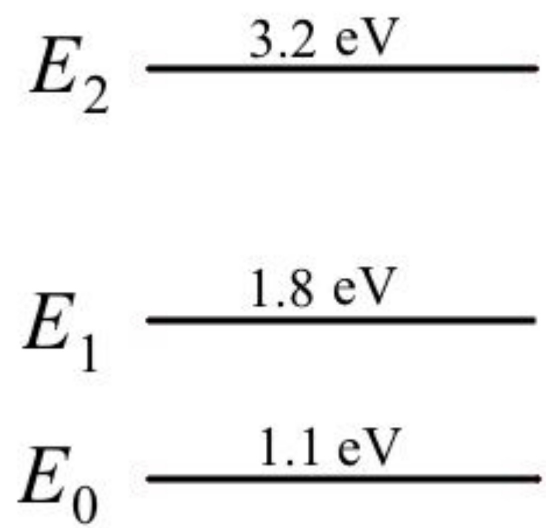
$$f\lambda = c$$

$$hc = 1234 \text{ eV-nm}$$

$$c = 3 \times 10^8 \text{ m/s}$$

A molecule has the energy levels shown in the diagram at the right. We have a large number of these molecules in the state E_2. The state decays by emitting photons. What might we expect about the wavelength of the emitted photons?

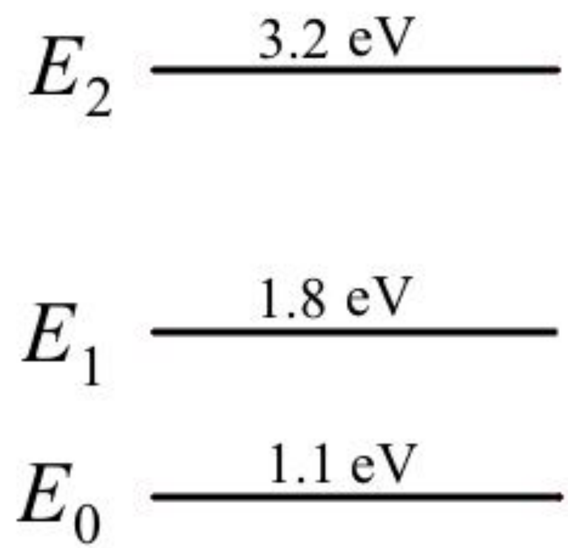
1. They will be the same as the wavelength of the photons that were used to pump the molecules up to state E_2.
2. Some might be the same wavelength, but some might be shorter.
3. Some might be the same wavelength, but some might be longer.
4. You only expect to see shorter wavelengths
5. You only expect to see longer wavelengths.
6. You will see longer, shorter, and the same wavelengths.



A molecule has the energy levels shown in the diagram at the right. We have a large number of these molecules in the state E_2. The state decays by emitting photons. What energy photons might we expect to see?

A. 0.7 eV
B. 1.1 eV
C. 1.4 eV
D. 1.8 eV
E. 2.1 eV
F. 3.2 eV

1. B D F
2. B D
3. C
4. C E
5. A C E
6. Some other set



In the transitions you found in the last slide, which corresponds to the longest wavelength? (and what is it)

1. 0.7 eV
2. 1.4 eV
3. 2.1 eV

$$E = hf$$

$$f\lambda = c$$

$$hc = 1234 \text{ eV-nm}$$

$$c = 3 \times 10^8 \text{ m/s}$$