Line Spectrs

Activity 1 – Pargraph Completion
Question Group 1
Question 1

There is only one question in this Activity - a paragraph completion question with seven blanks to fill in. The paragraph is ...

> Electrons in atoms have _____ energy levels. An electron's energy level can change when _____. When an atom _____ energy, the electron will jump to a higher energy level. This higher energy level is known as _____. Electrons won't maintain this high energy forever, but will transition to lower energy levels. These transitions result in _____ as the electron changes from the high energy state to the lower energy state. The difference in energy between the two energy states is equal to the _____. When viewed through a spectroscope, electron transitions are seen as _____.

Options for blanks include:

1. a continuous range of , only certain quantized
2. heat or electricity is applied, the object is touched or rubbed, a proton or neutron is added
3. releases , absorbs
4. a resting state, a ground state, an excited state, a united state
5. a phase change, a chemical reaction, the release of a photon
6. energy of the photon, enthalpy change of the reaction, heat of vaporization or fusion
7. a continuous rainbow of color, lines of a specific color, a magnificent fireworks display

Activity 2: Match That Color
Question Group 2
Question 2
Consider three colored lines on a line spectra - red, orange, and violet. Wavelengths associated with the lines are shown below. Match the wavelengths to the color of the lines.

Wavelength 610 nm	Wavelength 420 nm	Wavelength 685 nm

Question 3
Consider three colored lines on a line spectra - blue, green, and violet. Wavelengths associated with the lines are shown below. Match the wavelengths to the color of the lines.

Wavelength 425 nm	Wavelength 550 nm	Wavelength 468 nm

Question 4
Consider three colored lines on a line spectra - red, yellow, and green. Wavelengths associated with the lines are shown below. Match the wavelengths to the color of the lines.

Wavelength 675 nm	Wavelength 535 nm	Wavelength 585 nm

Question Group 3
Question 5
Consider three colored lines on a line spectra - violet, red, and green. Frequencies associated with the lines are shown below. Match the frequencies to the color of the lines.

Frequency (Hz) 5.8×10^{14}	Frequency (Hz) 7.2×10^{14}	Frequency (Hz) 4.5×10^{14}

Question 6
Consider three colored lines on a line spectra - blue, green, and violet. Frequencies associated with the lines are shown below. Match the frequencies to the color of the lines.

Frequency (Hz) 7.1×10^{14}	Frequency (Hz) 6.6×10^{14}	Frequency (Hz) 5.6×10^{14}

Question 7
Consider three colored lines on a line spectra - red, orange, and green. Frequencies associated with the lines are shown below. Match the frequencies to the color of the lines.

Frequency (Hz) 4.3×10^{14}	Frequency (Hz) 5.7×10^{14}	Frequency (Hz) 4.9×10^{14}

Question Group 4

Question 8

Consider three colored lines on a line spectra - blue, green, and red. Photon energy values associated with the lines are shown below. Match the energy values to the color of the lines.

Energy (J) 2.9×10^{-19}	Energy (J) 4.2×10^{-19}	Energy (J) 3.7×10^{-19}

Question 9

Consider three colored lines on a line spectra - violet, yellow, and orange. Photon energy values associated with the lines are shown below. Match the energy values to the color of the lines.

Energy (J) 3.4×10^{-19}	Energy (J) 3.3×10^{-19}	Energy (J) 4.8×10^{-19}

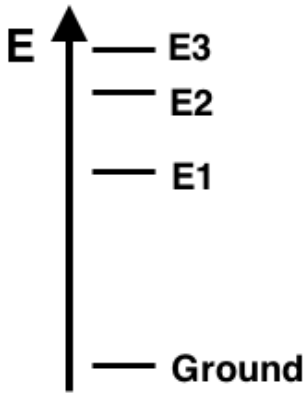
Question 10

Consider three colored lines on a line spectra - red, orange, and yellow. Photon energy values associated with the lines are shown below. Match the energy values to the color of the lines.

Energy (J) 3.3×10^{-19}	Energy (J) 3.4×10^{-19}	Energy (J) 2.9×10^{-19}

Activity 3: Match That Color
Question Group 5
Question 11

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E1: _____

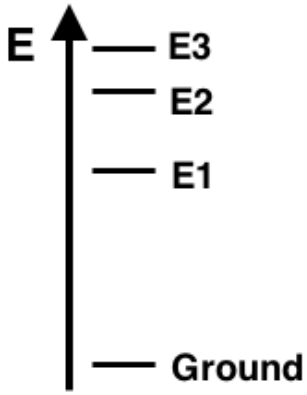
e^- Transition from E2 to E1: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E3 to Ground state would not be visible since it would correspond to the emission of ...

Question 12

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E3: _____

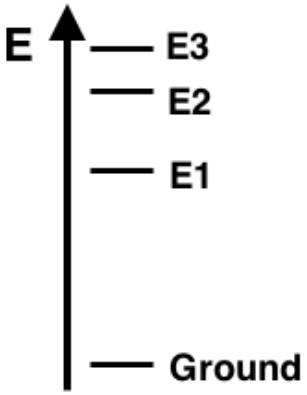
e^- Transition from E3 to E1: _____

e^- Transition from E2 to E1: _____

Finally, the transition from E1 to Ground state would not be visible since it would correspond to the emission of ...

Question 13

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and orange. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E1: _____

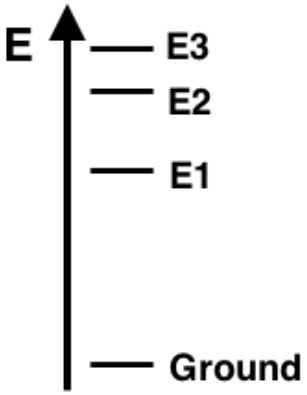
e^- Transition from E2 to E1: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E3 to E2 would not be visible since it would correspond to the emission of ...

Question 14

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - blue, yellow, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E1: _____

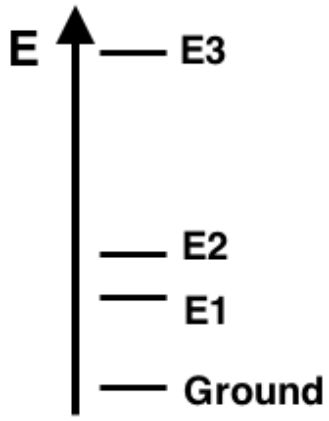
e^- Transition from E2 to E1: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E3 to E2 would not be visible since it would correspond to the emission of ...

Question Group 6
Question 15

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

e^- Transition from E2 to Ground: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E3 to Ground state would not be visible since it would correspond to the emission of ...

Question 16

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, blue, and orange. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.

e^- Transition from E3 to E2: _____

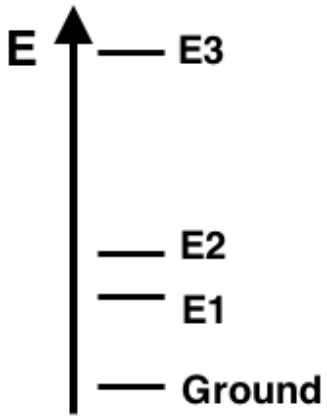
e^- Transition from E2 to Ground: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E2 to E1 would not be visible since it would correspond to the emission of ...

Question 17

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

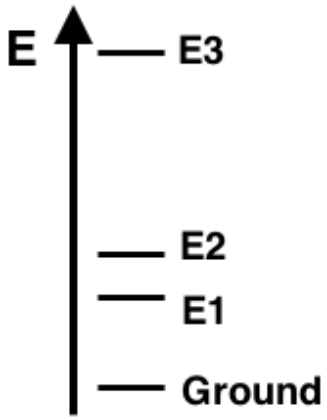
e^- Transition from E2 to E1: _____

e^- Transition from E2 to Ground: _____

Finally, the transition from E3 to Ground state would not be visible since it would correspond to the emission of ...

Question 18

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - blue, yellow, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

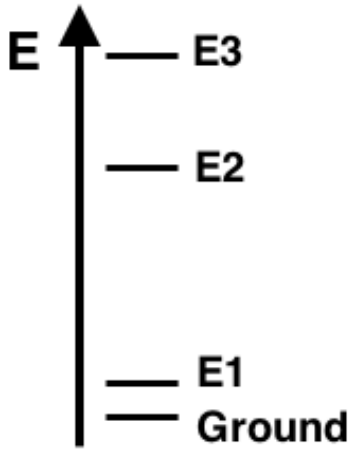
e^- Transition from E2 to E1: _____

e^- Transition from E2 to Ground: _____

Finally, the transition from E2 to E1 would not be visible since it would correspond to the emission of ...

Question Group 7
Question 19

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

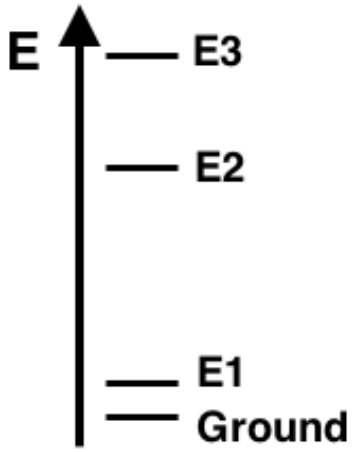
e^- Transition from E2 to E1: _____

e^- Transition from E2 to Ground: _____

Finally, the transition from E3 to Ground state would not be visible since it would correspond to the emission of ...

Question 20

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, blue, and orange. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

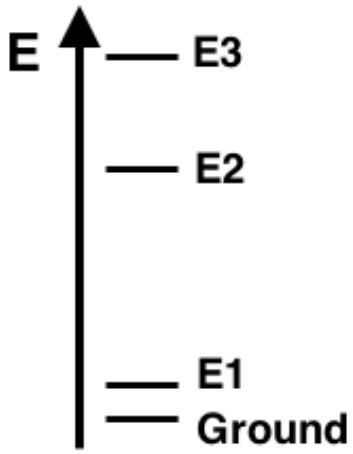
e^- Transition from E2 to E1: _____

e^- Transition from E2 to Ground: _____

Finally, the transition from E1 to Ground state would not be visible since it would correspond to the emission of ...

Question 21

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, green, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

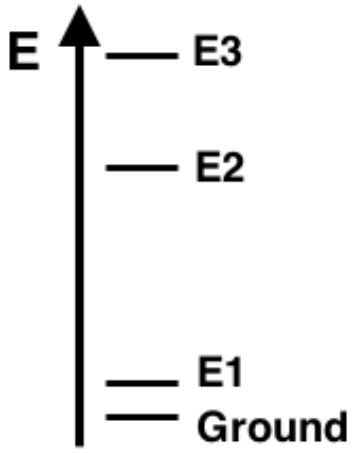
e^- Transition from E2 to E1: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E3 to Ground state would not be visible since it would correspond to the emission of ...

Question 22

The energy level diagram for Element X shows the ground state and excited states **E1**, **E2**, and **E3**. The line spectra for this element displays three visible emission lines - violet, blue, and red. The lines correspond to the electron transitions indicated below. Based on the properly-scaled energy levels shown in the diagram, match the three colors to the corresponding transitions.



e^- Transition from E3 to E2: _____

e^- Transition from E2 to E1: _____

e^- Transition from E1 to Ground: _____

Finally, the transition from E2 to Ground state would not be visible since it would correspond to the emission of ...