

1) Describe experimental evidence that supports that electrons can exhibit properties of waves.
Electrons diffract when shone on a crystal and exhibit interference patterns when sent through a double slit.

2) Which statement below best describes Heisenberg’s Uncertainty Principle?

(A) There must always be some uncertainty in energy (wavelength).

(B) There must always be some uncertainty in location (position).

(C) There must always be some uncertainty in energy or in location at any one time.

3) In the chart below, circle the correct amount of uncertainty in location and uncertainty in energy for a particle. Then, do the same for a wave and for a wavepacket.

Particle	location: circle one →	No uncertainty	Some Uncertainty	Max Uncertainty
	energy: circle one →	No uncertainty	Some Uncertainty	Max Uncertainty
Wave	location: circle one →	No uncertainty	Some Uncertainty	Max Uncertainty
	energy: circle one →	No uncertainty	Some Uncertainty	Max Uncertainty
Wavepacket	location: circle one →	No uncertainty	Some Uncertainty	Max Uncertainty
	energy: circle one →	No uncertainty	Some Uncertainty	Max Uncertainty

4) Circle the two statements below that correctly describe aspects of Bohr’s Model of the atom.

(A) Electron paths are controlled by probability.

(B) Electrons travel in circular paths called orbits.

(C) Electrons can have any energy.

(D) Electron energies are quantized.

5) Which of the two statements that you circled (in previous question) is now known to be false? B
Rewrite that statement so that it is true.

Electrons are described by a probability function showing the probability of existing in a region of space.

6) What is a wavefunction? What is the significance of the square of the wavefunction?

A wavefunction is a description of the distribution and energy of the electron. The square of the wavefunction is the probability of finding the electron within a region of space.

7) Explain how our concept of an electron orbital satisfies Heisenberg’s uncertainty principle.

In the orbital, the energy of the electron is well defined but its location is uncertain.