

5 3 physics and the quantum mechanical model section review answer key

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5.3 Physics and the Quantum Mechanical Model

Section Review Answer Key

1. What is the quantum mechanical model?

The quantum mechanical model is a model of the atom that treats the atom as a wave function. This model explains the behavior of electrons and other subatomic particles in terms of quantum properties, such as energy levels and quantized angular momentum.

2. What are the key features of the quantum mechanical model?

The key features of the quantum mechanical model include:

- Electrons are described by wave functions that describe their probability of being at a particular location.
- The energy of electrons is quantized, meaning that electrons can only occupy certain energy levels.
- The angular momentum of electrons is quantized, meaning that electrons can only have certain angular momentum values.

3. How does the quantum mechanical model explain the arrangement of electrons in atoms?

The quantum mechanical model explains the arrangement of electrons in atoms by the Pauli exclusion principle, which states that no two electrons can have the same

set of four quantum numbers. This principle requires electrons to fill the available energy levels in an orderly manner, leading to the observed electronic configurations of atoms.

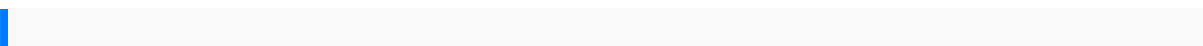
4. How does the quantum mechanical model predict the behavior of electrons in chemical reactions?

The quantum mechanical model predicts the behavior of electrons in chemical reactions by the concept of resonance, which allows electrons to delocalize across multiple atoms. This delocalization leads to the formation of hybrid orbitals and the stabilization of molecules.

5. What are the limitations of the quantum mechanical model?

The quantum mechanical model has some limitations, including:

- It cannot predict the exact location of an electron at a given time.
- It does not allow for the measurement of both the position and momentum of an electron with arbitrary precision.
- It does not apply to large, macroscopic objects.



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