Valence Bond Theory

* Lewis diagrams can explain what occurs with the electrons in an atom but does not explain what occurs when covalent bonds are created to form molecules
* Linus Pauling determined that the orbitals of atoms overlap to form the covalent bond

Rules:

* Half-filled orbital of one atom overlaps with the half-filled orbital of the second atom forming a new bonding orbital
* The bonding orbital contains a pair of electrons of opposite spin
* Total number of electrons in the bonding orbital must be two
* The atoms will arrange themselves to achieve the maximum overlap of orbitals. This produces a bonding orbital of lowest energy

Hybrid Orbitals

* Carbon atom has a combining capacity of 4
* The energy of the 4 bonds are equal
* This would require the 4 carbon electrons to be in a hybrid orbital sp3
* Only occurs when carbon is in a molecule

Answer p232 #4

P235 #8-14