Valence Bond Theory Summary

Here are 20 fill-in-the-blank questions on **Valence Bond Theory**:

Fill in the Blanks:

1. Valence bond theory explains the formation of covalent bonds by the _____ of atomic orbitals.
2. The overlap of atomic orbitals results in increased electron _____ in the region between the nuclei.
3. The strength of a covalent bond is proportional to the extent of _____ between the atomic orbitals.
4. A bond formed by the head-to-head overlap of orbitals is called a _____ bond.
5. Pi (π) bonds are formed by the _____ overlap of atomic orbitals.
6. In valence bond theory, hybridization involves the combination of atomic _____ to form new hybrid orbitals.
7. The hybridization of an atom with a linear geometry is _____.
8. In a molecule with trigonal planar geometry, the hybridization of the central atom is _____.
9. The hybridization of carbon in methane (CH_4) is _____.
10. Sigma (σ) bonds are _____ than pi (π) bonds due to greater orbital overlap.
11. The bond angle in an sp^3 hybridized atom is approximately _____ degrees.
12. In a double bond, one bond is a sigma bond and the other is a _____ bond.
13. In valence bond theory, electrons in bonding orbitals are localized between the _____.
14. A covalent bond forms when the energy of the system _____ due to the interaction of atomic orbitals.
15. According to valence bond theory, the number of bonds an atom forms is equal to the number of _____ orbitals it can hybridize.
16. Hybrid orbitals are always of _____ energy compared to the atomic orbitals that combine to form them.
17. Valence bond theory is not as effective as _____ theory in explaining the magnetic properties of molecules.
18. The overlap of an s orbital and a p orbital forms a _____ bond.
19. A bond formed by the side-to-side overlap of two p orbitals is called a _____ bond.
20. In the molecule ethene (C_2H_4), each carbon atom is _____ hybridized.

Answer Key:

1. **overlap**
2. **density**
3. **overlap**
4. **sigma (σ)**
5. **side-to-side**
6. **orbitals**
7. **sp**
8. **sp^2**
9. **sp^3**

10. **stronger**
11. **109.5**
12. **pi (π)**
13. **nuclei**
14. **lowers**
15. **available**
16. **equal**
17. **molecular orbital**
18. **sigma (σ)**
19. **pi (π)**
20. **sp^2**