1. What is a sigma bond?

Overlap of 2 atomic orbitals, along a line between the 2 nuclei in the covalent bond

2. What arrangement does an sp3 hybridised orbital take?

Trigonal planar

3. Describe the structure of a pi-bond

Region of electron density above and below the internuclei axis, but not along the axis
Unable to rotate
Sp2 hybridisation

4. Describe the bonding in ethyne

Triple covalent bond
2 pi bonds
1 sigma bond
Sp hybrid orbitals in a linear arrangement

5. Describe a non-polar covalent bond

Equal sharing of electrons
Identical electronegativities across the bond

6. Describe a polar covalent bond

Sharing of electrons with atom of different electronegativity

7. true/false: pi-bonds are stronger than sigma-bonds

false

8. Greater electron density results in stronger/weaker bonds

stronger

9. More S character in a bond results in

stronger , shorter bond
Larger bond angle

10. Define protein

Linear polymer of amino acids

11. What direction a polypeptides written in?

N terminus -> C terminus

12. Properties of peptide bonds:

Very stable
Partial double bond character
Planar
Cleaved by proteolytic enzymes

13. Which bonds in polypeptides can rotate?

N–C(alpha) (psi) and C(alpha) – C (phi)
Provides flexibility and allows the protein to fold

14. Why can’t some bond angles be formed in a protein?

Steric clashes
Side chain and sequence in polypeptide does not permit certain conformations
Torsion angles

15. What type of amino acids are present in natural proteins?

L– amino acids

16. Which amino acids are non-polar?

Glycine
Alanine
Proline
Valine

Leucine
Isoleucine
Methionine
Tryptophan
phenylalanine

17. Which amino acids are polar and uncharged?

Tyrosine
Serine
Asparagine
Threonine
Glutamine
cysteine

18. Which amino acids are polar and positively charged?

Lysine
Arginine
histidine

19. Which amino acids are polar and positively charged?

Aspartate
glutamate

20. Draw all 20 side chains

amino acid structures.pdf