A Level Basics of Proteins

Proteins are polymers - this means they are large, complex chains, made up of monomers which are small, basic units. Basically, monomers make up polymers; this can be remembered as 'mono' for one, while 'poly' stands for multiple.

The monomers for proteins are called amino acids - one monomer is one amino acid. There are multiple names for chains, depending on how many amino acids make up the chain.

a) A monomer is one amino acid.

b) A dipeptide is two amino acids joined together. This can be remembered as 'di' means two, and 'peptide' is the type of bond formed between two amino acids.

c) A polypeptide is three or more amino acids in a chain. This can be remembered as 'polypeptide' in this case means 'many bonds'.

d) A protein is multiple polypeptide chains bonded together.

The basic structure for an amino acid is harder to remember - is has one carbon in the centre. It has four bonds to a carboxyl group (COOH), to an amino group (H2N), a hydrogen and a variable group, which is the only bit that changes across all amino acids. This is often represented by an 'R'.

The most basic amino acid is glycine. The variable group of this is one hydrogen.

Amino acids are linked together by peptide bonds - this is through a reaction called 'condensation'. This is when the carboxyl group (COOH) forms a peptide bonds with the amino group (H2N); the OH from the carboxyl and an H from the amino group combine and are lost as water. This leaves a carbon and oxygen at the carboxyl group, which combine to the nitrogen.

This is shown in a diagram as a carbon bonded to a nitrogen, and the left over oxygen is doubled bonded to that carbon.

The reverse of this reaction is 'hydrolysis', which means to split with water. Essentially, you are giving back the two hydrogens and one oxygen you took away as water.