# Proteins and amino acids

## 1) Fill in the missing words:

amino acids

amino acids

Proteins are made up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or more precisely α-L-\_\_\_\_\_\_\_\_\_\_\_\_\_. There are 20 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ amino acids, for example\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (name at least 2). The two functional groups common for all amino acids are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

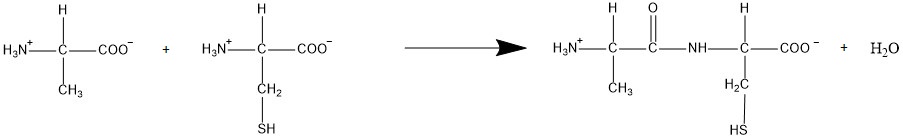
carboxyl (–COOH)

amine (–NH2)

alanine, cystein, glycine etc.

encoded/proteinogenic

## 2) Complete the reaction, name the amino acids and circle the peptide bond:



alanine

cysteine

## 3) Sort the given amino acids into correct groups (some can be placed into multiple squares):

Amino acids: alanine, glycine, serine, cysteine, aspartic acid, lysine, leucine, proline, phenylalanine, glutamine

**polar basic**

**polar acidic**

**polar neutral**

**apolar/nonpolar**

**nonessential**

**essential**

alanine

glycine

leucine

proline

phenylalanine

lysine

leucine

phenylalanine

proline

glutamine

alanine

glycine

serine

cystein

aspartic acid

lysine

aspartic acid

serine

cystein

glutamine

## 4) Based on the number of amino acids they are made up of, peptides can be sorted into 3 groups:

2 to 10 amino acids – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

polypeptides

oligopeptides

10 to 100 amino acids – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

proteins

more than 100 amino acids – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## 5) Name at least 3 functions of proteins in the human body:

Structural, transporting, storing, catalytic, immune, metabolic…

## 6) Based on their structure, we can characterize proteins as:

primary

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – denotes the order of individual amino acids

secondary

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – determines the geometrical structure of only a part of the chain; there are 2 types: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ both of which are reinforced by H-bonds

tertiary

β-pleated sheet

α-helix

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – conveys the geometrical arrangement of the whole chain without the prosthetic group; again there are 2 types: \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_

quaternary

fibrous

globular

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – relays the geometrical arrangement of the whole chain including the prosthetic group

**Sketch what the individual structures look like:**

