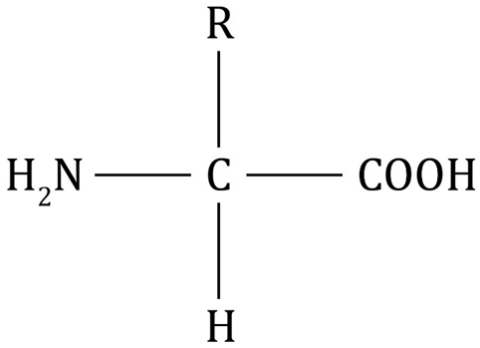
Amino acids: knowledge check

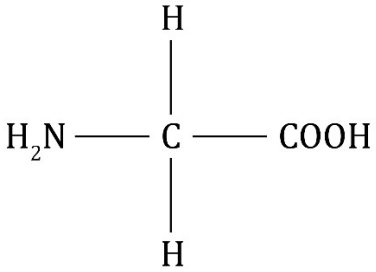
1.1 Amino acids contain two different functional groups. The image shows the general structural formula of an amino acid.



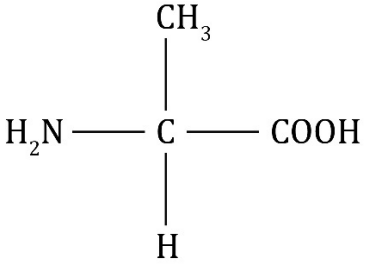
Circle the two functional groups and select words from those provided to name them.

hydroxyl group **carboxylic acid group** **amine group** **alkene group**

1.2 The images show the structure of two amino acids – glycine and alanine.



glycine



alanine

Use these images, along with the image shown in **question 1.1**, to circle the correct ending of each sentence from the options provided in the brackets.

(a) The 'R' in the general structure represents a [**functional/side**] group.

(b) All amino acids have the same general structure but different [**functional/side**] groups.

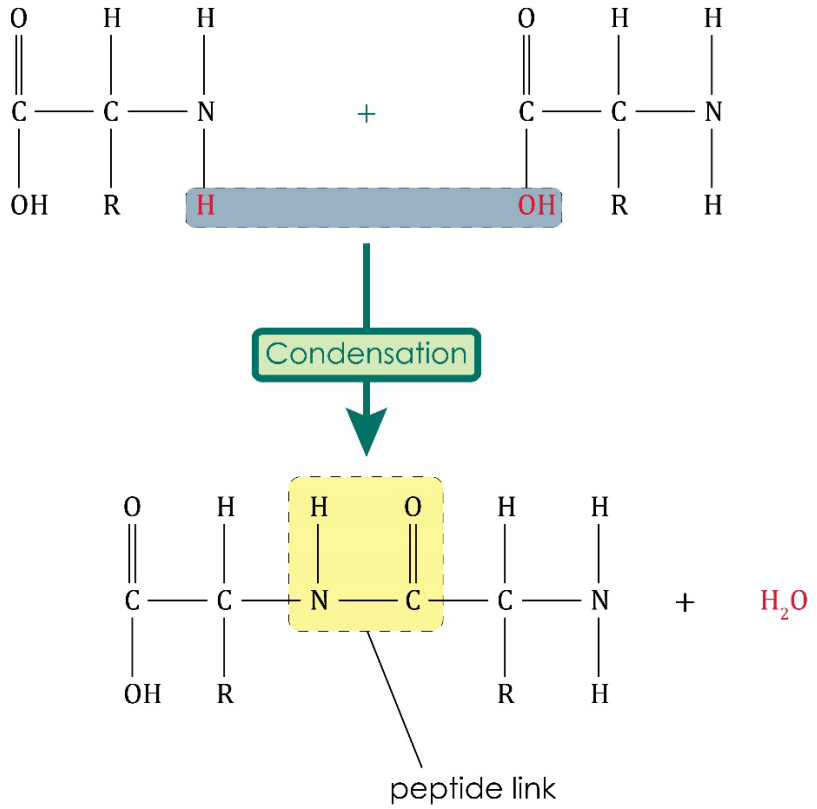
(c) The acidic functional group of the amino acid is the [**CH_3/COOH**] group.

(d) The NH_2 group of the amino acid is [**acidic/basic**].

(e) The 'R' in glycine represents the [**H atom/ CH_3 group**].

(f) The 'R' in alanine represents the [**H atom/ CH_3 group**].

1.3 The diagram shows the polymerisation reaction that occurs when two amino acids join together.



Using the diagram, choose the correct word from those provided to complete the sentences describing this reaction.

proteins **peptide** **nitrogen** **carboxylic acid**

condensation **monomers** **water** **polymers**

Proteins, or polypeptides, are biological _____ produced when many amino acid _____ join together in a _____ polymerisation reaction.

A molecule of _____ is also produced in the reaction.

Different amino acids make different _____ .

The link between two amino acid monomers is a _____ link where the carbon atom of the _____ group joins with the _____ atom of the amine group.

Amino acids: test myself

2.1 Which statement is correct? Circle the correct answer.

A Amino acid have only acidic properties.

B Amino acid have only basic properties.

C Amino acids have both acidic and basic properties.

D Amino acids do not have acidic or basic properties.

2.2 Which statement is correct? Circle the correct answer.

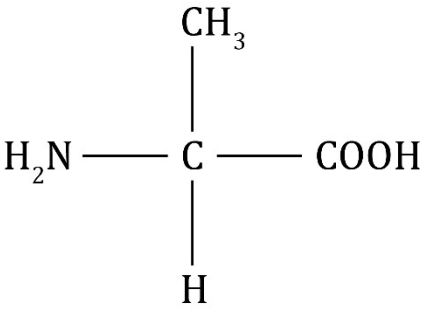
A All proteins have COOH groups.

B All proteins have $\mathrm{NH_2}$ groups.

C All proteins have OH groups.

D All proteins have peptide links.

2.3 The image shows the amino acid alanine.



What is the correct structural formula for alanine? Circle the correct answer.

A $\mathrm{H_2NCH(CH_3)COOH}$

B $\mathrm{H_2NCH_2COOH}$

C $\mathrm{H_2NCH(CH_3)COOH}$

D $\mathrm{H_2NCHCOOH}$

2.4 What is produced when amino acids polymerise? Circle the correct answer.

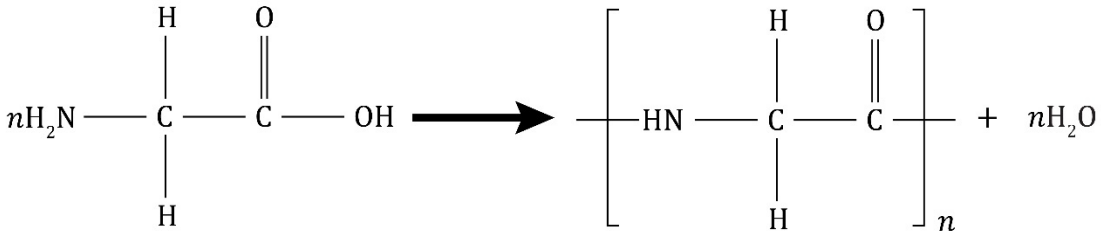
a carbohydrate **a polypeptide** **a hydrocarbon** **a monomer**

2.5 Why is the polymerisation of amino acids described as a condensation reaction? Circle the correct answer.

water is a product **water is a reactant**

water is a catalyst **water is not required**

2.6 The equation represents the polymerisation of an amino acid.

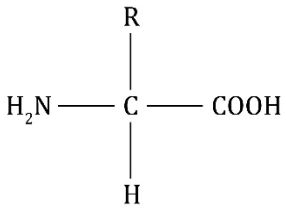


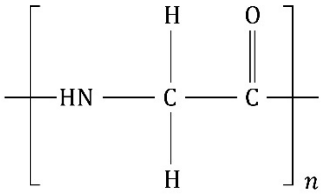
glycine polypeptide water

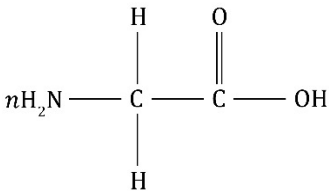
What does the '*n*' represent? Circle the correct answer.

a large number **a small number** **nitrogen** **nickel**

2.7 What is the repeating unit in **question 2.6**? Circle the correct answer.

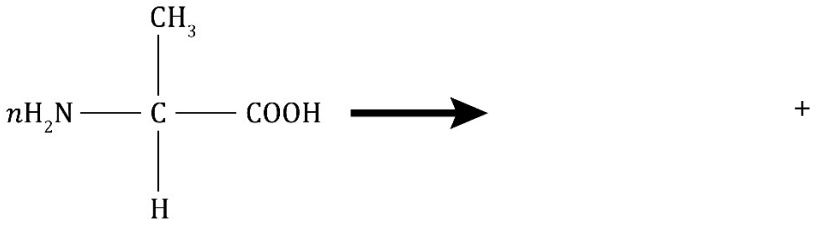






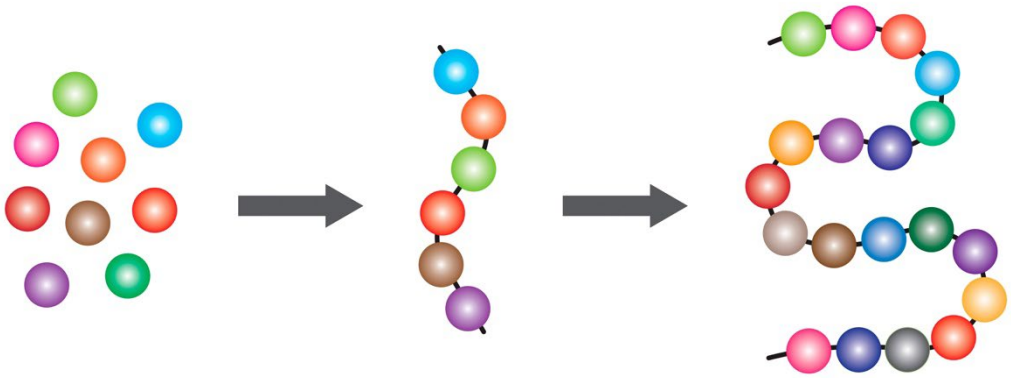
Amino acids: feeling confident?

3.1 (a) Complete the equation to represent the polymerisation of alanine.



(b) Label the monomer and the repeating unit.

3.2 The image represents the polymerisation of amino acids to form a protein.



Use the words provided to complete the table describing the image.

a protein **peptide links** **amino acids** **a polypeptide**

different amino acids

Part of image	What does it represent?
individual spheres	
different shaded spheres	
the chain of six spheres	
the twisted chain of spheres	
the lines connecting the spheres	

Amino acids: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

Mini-topic	I understand this well	I think I understand this	I need more help
I can describe the general structure of amino acids.			
I can interpret the structure of glycine and alanine.			
I can describe the polymerisation of amino acids to form polypeptides and proteins.			
I can use equations to represent the polymerisation of amino acids.			
Feeling confident? topics	**I understand this well**	**I think I understand this**	**I need more help**
I can complete equations to represent the polymerisation of amino acids.			
I can understand diagrams that explain protein formation.			