

Target grade:

Mark: / 21

Actual grade:

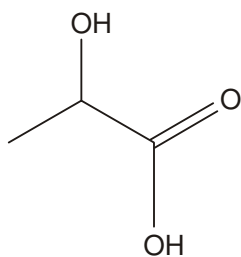
Percentage:

### Homework 6 - Isomers and amino acids

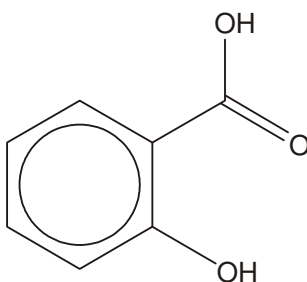
1. But-2-ene has *E/Z* isomers. Draw diagrams of the two isomers and label them as either ***E*** or ***Z***.

[Total 2 marks]

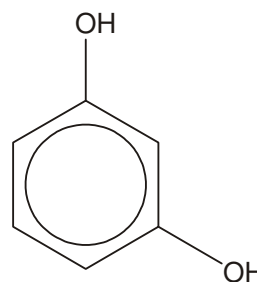
2. A chemical peel is a solution used to improve and smooth the texture of facial skin by removing its damaged outer layers. Jessener's Peel contains compounds **A**, **B** and **C**, whose structures are shown below.



**A**



**B**



**C**

- (a) Give the systematic name of compound **A**.

.....

[2]

- (b) Compound **A** exists as two enantiomers.

- (i) Explain the term *enantiomers*.

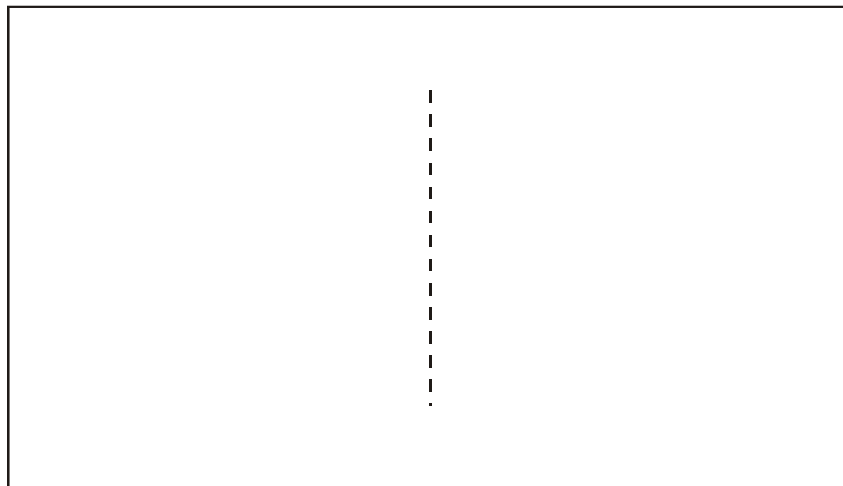
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[2]

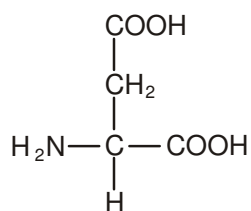
- (ii) In the box below, draw 3-dimensional structures to represent these enantiomers of compound **A**.



[2]

[Total 6 marks]

3. Dentine is the part of a tooth between the enamel crown and the soft pulp-like interior. It is hard and contains about 20% organic materials, such as proteins and amino acids. One of the amino acids present is aspartic acid.



**aspartic acid**

Aspartic acid has two isomers, D-aspartic acid and L-aspartic acid.

- (i) What type of isomerism is shown by aspartic acid?

.....

[1]

- (ii) Explain why aspartic acid can exist as two isomers and draw structures to show how the two isomers are related.



explanation .....

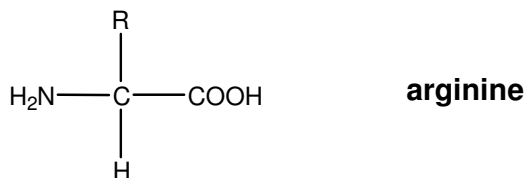
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[3]

[Total 4 marks]

4. A Japanese firm has marketed a range of clothes called 'amino jeans'. The garments are impregnated with arginine. The arginine softens and moisturises the wearer's legs. A simplified structure of arginine is shown below. R represents a carbon chain containing functional groups.



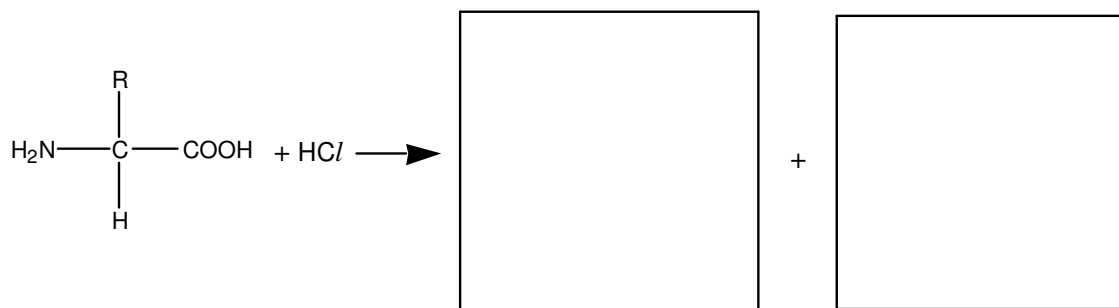
- (a) What is the name for the group of compounds to which arginine belongs?

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[1]

(b) Arginine is often used as a salt made by reacting arginine with hydrochloric acid.

Complete the equation below to show the **ions** formed.



[3]

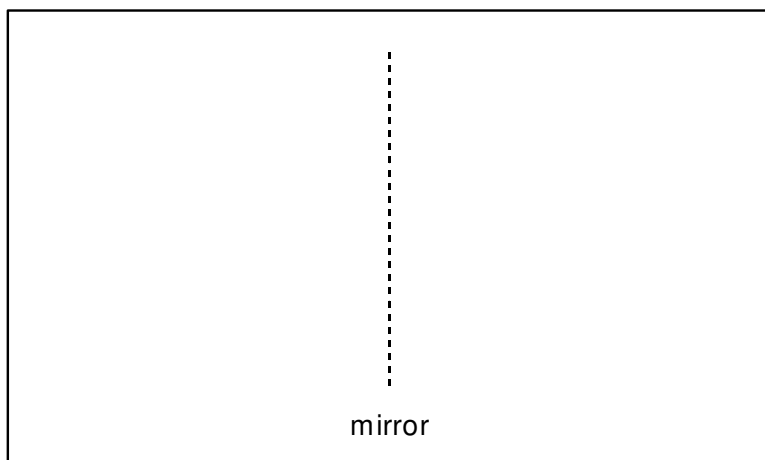
(c) Arginine forms two enantiomers.

(i) What structural feature causes arginine to have enantiomers?

.....

[1]

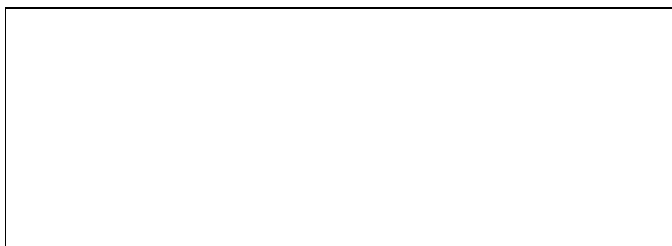
(ii) On the diagram below, draw the **three dimensional** structures of the two enantiomers to show how they are related.



[2]

(d) Arginine is one of the monomers used to make proteins.

Draw the full structural formula of the organic molecule formed when a molecule of arginine acts as a monomer and joins with a molecule of glycine,  $\text{NH}_2\text{CH}_2\text{COOH}$ , to make a dimer.



[2]

[Total 9 marks]