

Surname					Other Names				
Centre Number					Candidate Number				
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General Certificate of Secondary Education
June 2005



**DESIGN AND TECHNOLOGY
(PRODUCT DESIGN)
Higher Tier**

**3544/H
H**

Thursday 26 May 2005 9.00 am to 11.00 am

In addition to this paper you will require:

- blue or black pen, pencil, coloured pencils and ruler.

Time allowed: 2 hours

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

- The maximum mark for this paper is 125.
- Mark allocations are shown in brackets.
- You are reminded of the need for good English and clear presentation.

For Examiner's Use	
Number	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	
Examiner's initials	

NO QUESTIONS APPEAR ON THIS PAGE

Answer **all** questions in the spaces provided.

Question 1 is about materials and components.
You should spend about 10 minutes on this question.

1 Materials can be classified into groups. Many fit into more than one group.

(a) Name a material which is renewable.
(1 mark)

(b) Name a material which is non-renewable.
(1 mark)

(c) **Circle** the correct classification for **four** of the following materials.

Material	Classification of material		
Copper	Non-ferrous metal	Ferrous metal	Alloy
High Impact Polystyrene	Thermosetting plastic	Natural plastic	Thermoplastic
Slip	Body clay	Liquid clay	Dried clay
Silk	Regenerated fibre	Natural fibre	Synthetic fibre
Plywood	Man-made board	Hardwood	Softwood
Rice	Vegetable	Protein	Cereal
Foil lined Duplex board	Composite	Paper	Cardboard
Nylon	Regenerated fibre	Natural fibre	Synthetic fibre

(4 marks)

(d) Briefly explain how trees are turned into paper/card.

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(3 marks)

(e) Explain why standard components are important when manufacturing products.

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.....

(2 marks)

Question 2 is about packaging design.
You should spend about 10 minutes on this question.

- 2 Pizza is a popular take-away meal that has to be packaged for transport.
- (a) Using the table shown below, complete the list of design requirements for a cardboard package for pizza.

An example has been done for you.

Design Requirement	Reason
The package must be supplied in flat-pack form	To reduce the amount of storage space needed in the shop
1
2
3

(6 marks)

- (b) Give **two** reasons why corrugated cardboard is a good material to use for pizza boxes.

Reason 1

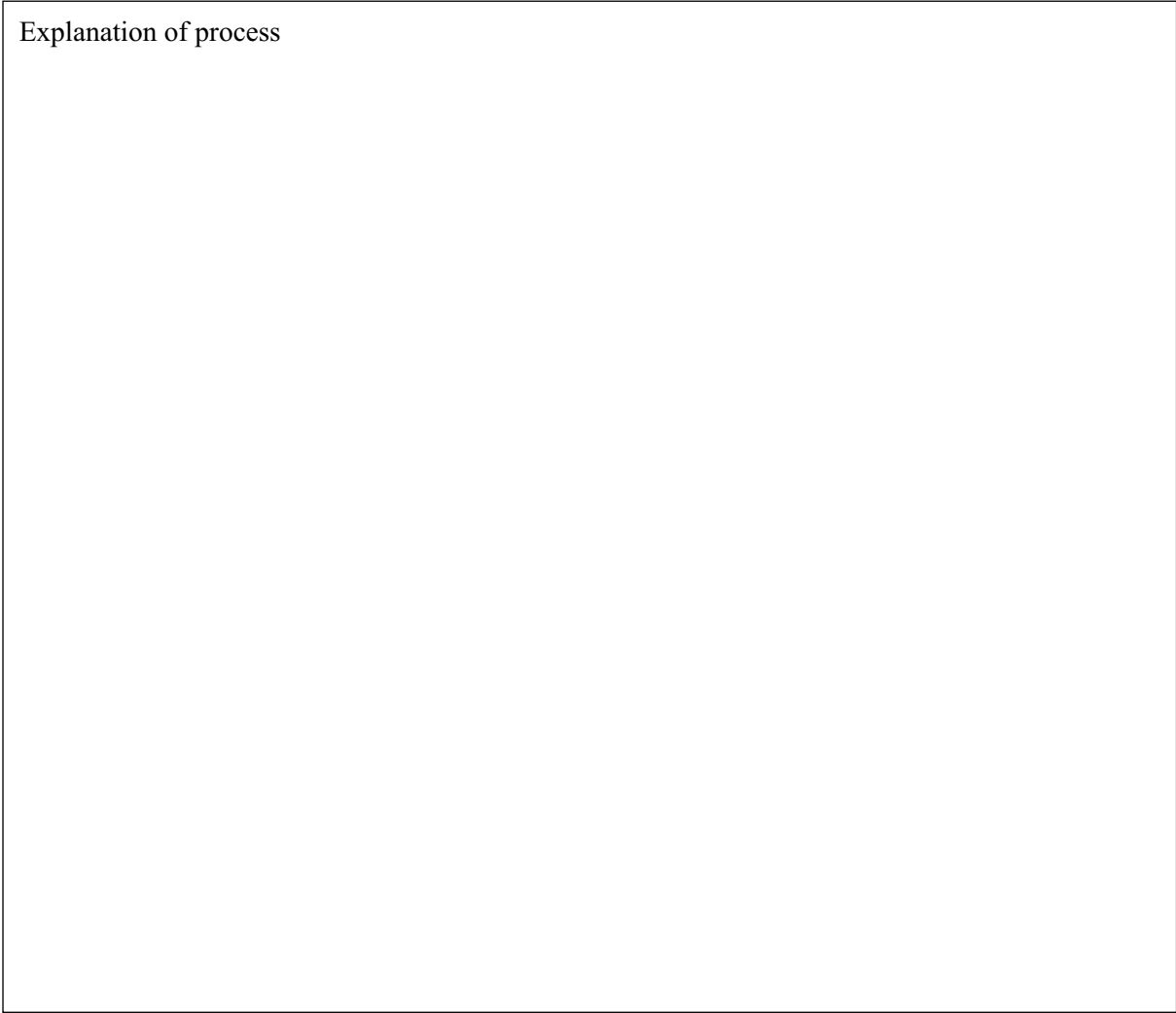
Reason 2

(2 marks)

- (c) Name the process and explain, using notes and sketches, how the pizza box would be cut out and creased in commercial production.

The process is called
(1 mark)

Explanation of process



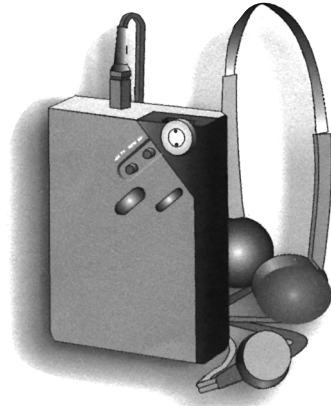
(3 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 3 is about product evolution.
You should spend about 20 minutes on this question.

3 Two personal music players are shown below.



Cassette player from 1978



MP3 player from 2004

(a) State **three** features which are common to both designs.

- Feature 1
- Feature 2
- Feature 3 *(3 marks)*

(b) Explain why changes have taken place with these products over the years.

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- *(4 marks)*

(c) Explain **one** advantage an MP3 player has over a tape cassette player.

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- *(2 marks)*

(d) Successful manufacturers improve their products continuously.

Explain the process of continuous improvement.

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(4 marks)

(e) Agencies such as the British Standards Institute and the Food Standards Agency often bring about improvements in the design of products.

Explain how this might happen.

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(3 marks)

(f) Name a designer you are familiar with and give reasons why his/her products are successful.

(i) Name of designer
(1 mark)

(ii) Why the products are successful

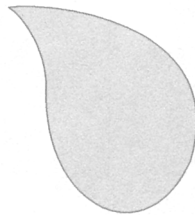
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(3 marks)

Question 4 is about manufacturing.
You should spend about 25 minutes on this question.



- 4 Each material area of the Technology Department of Hornbeam School has been asked by the head teacher to manufacture 200 of the leaf shapes found on their school crest. All the leaves must be the same. These are to be given away to visitors during their Industry Week to remind them of the event.



The shape needed

- (a) Choose a material you are familiar with and explain why it is suitable for this scale of production.

(i) Material
(1 mark)

(ii) Reason
(1 mark)

- (b) Use sketches and notes to explain how you would make 200 of these leaves.

Marks will be awarded for:

(i) accurate description of each stage of the process; *(4 marks)*

(ii) correct naming of tools and equipment; *(3 marks)*

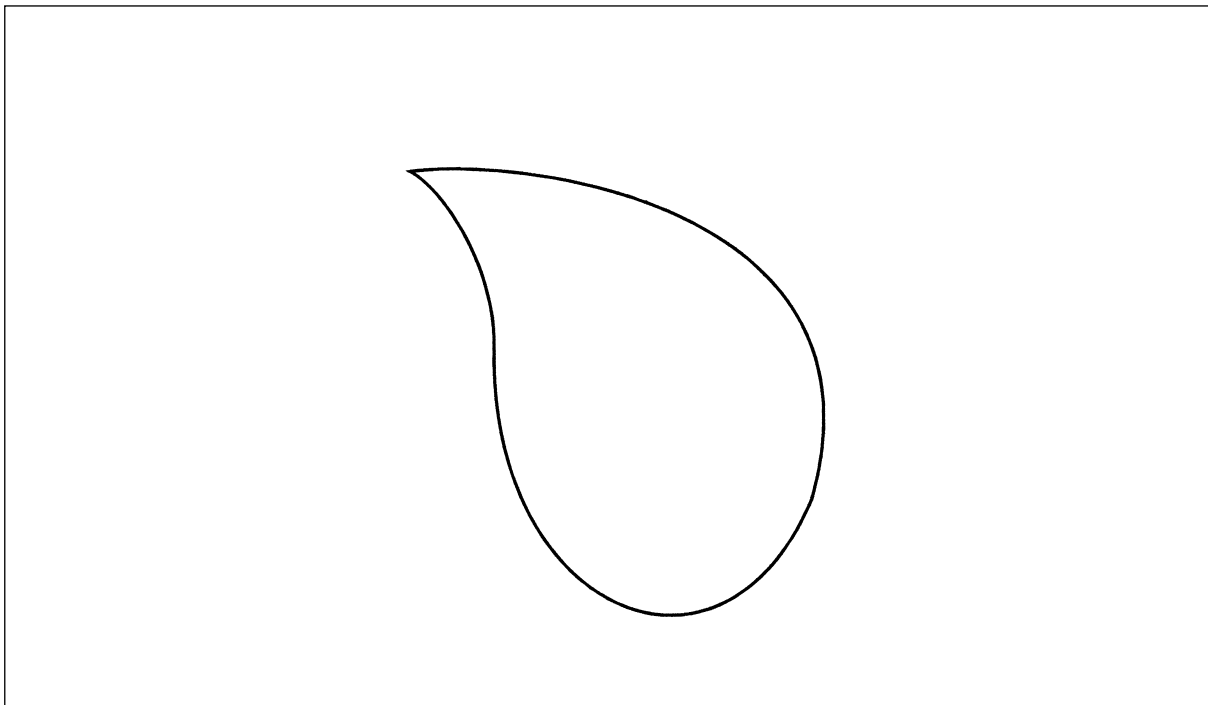
(iii) quality of communication. *(3 marks)*

Use the space below and on the next page to complete your answer.

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Tools and equipment

- (c) Use sketches and notes to explain how you could make the leaf more interesting by adding some form of appropriate decoration during manufacture of the 200.



(4 marks)

QUESTION 4 CONTINUES ON THE NEXT PAGE

Turn over ►

(d) Explain what quality control measures or quality assurance systems you would put in place to ensure that each of the leaves is exactly the same.

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(3 marks)

(e) (i) Explain the importance of risk assessment when manufacturing.

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(2 marks)

(ii) Give an example of risk assessment in the manufacture of the 200 leaves.

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(2 marks)

Question 5 is about human factors.
You should spend about 25 minutes on this question.

5 Consider the chair you are now sitting on.

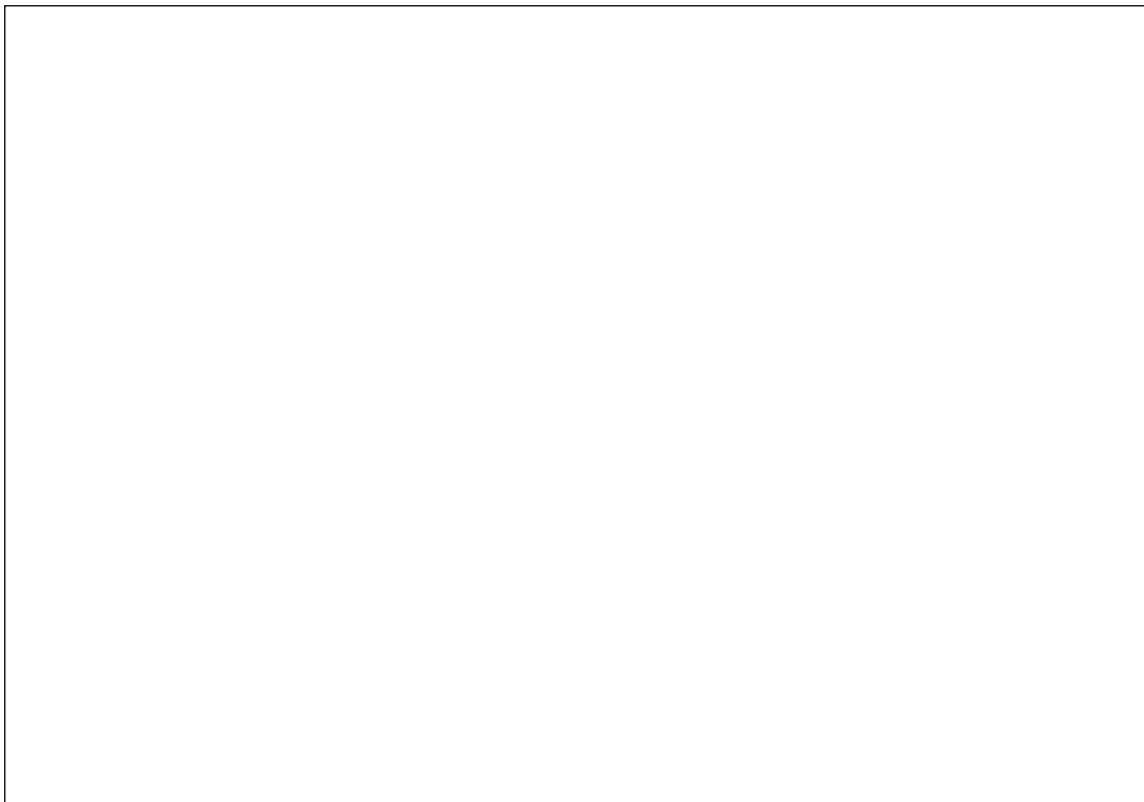
(a) What name is given to the study of human measurements?

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(2 marks)

(b) Explain why a **range** of data is necessary when considering human measurements.

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.....
.....
(3 marks)

(c) Use sketches and notes to show what **measurements of the human body** would have been taken in order to design the chair.



(6 marks)

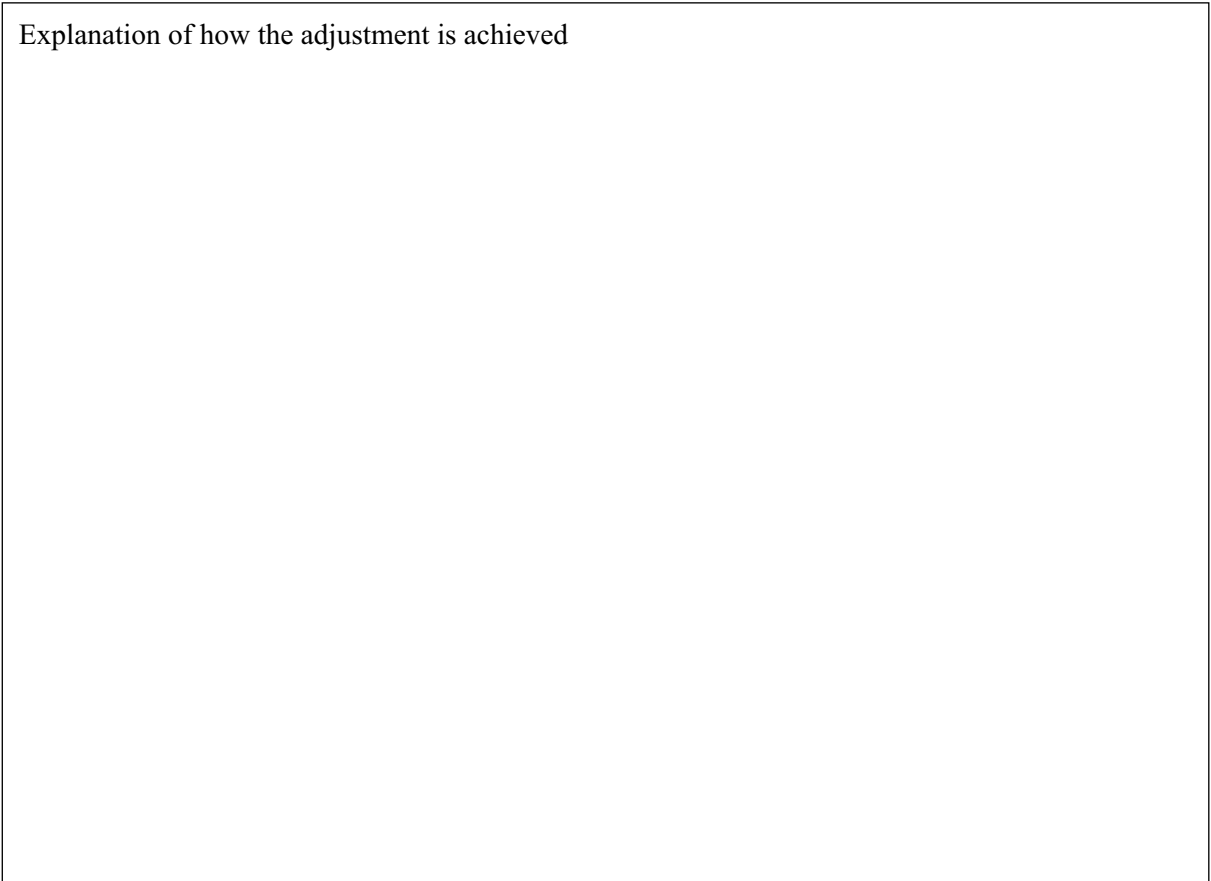
QUESTION 5 CONTINUES ON THE NEXT PAGE

Turn over ►

- (d) Choose a product which is adjustable for a range of sizes. Use notes and sketches to explain how the adjustment is achieved.

Product

Explanation of how the adjustment is achieved



(4 marks)

- (e) There are many products designed to meet specific human needs which are not required by the majority of the population.

(i) Name such a product.

(1 mark)

(ii) Explain what specific need the product is designed for.

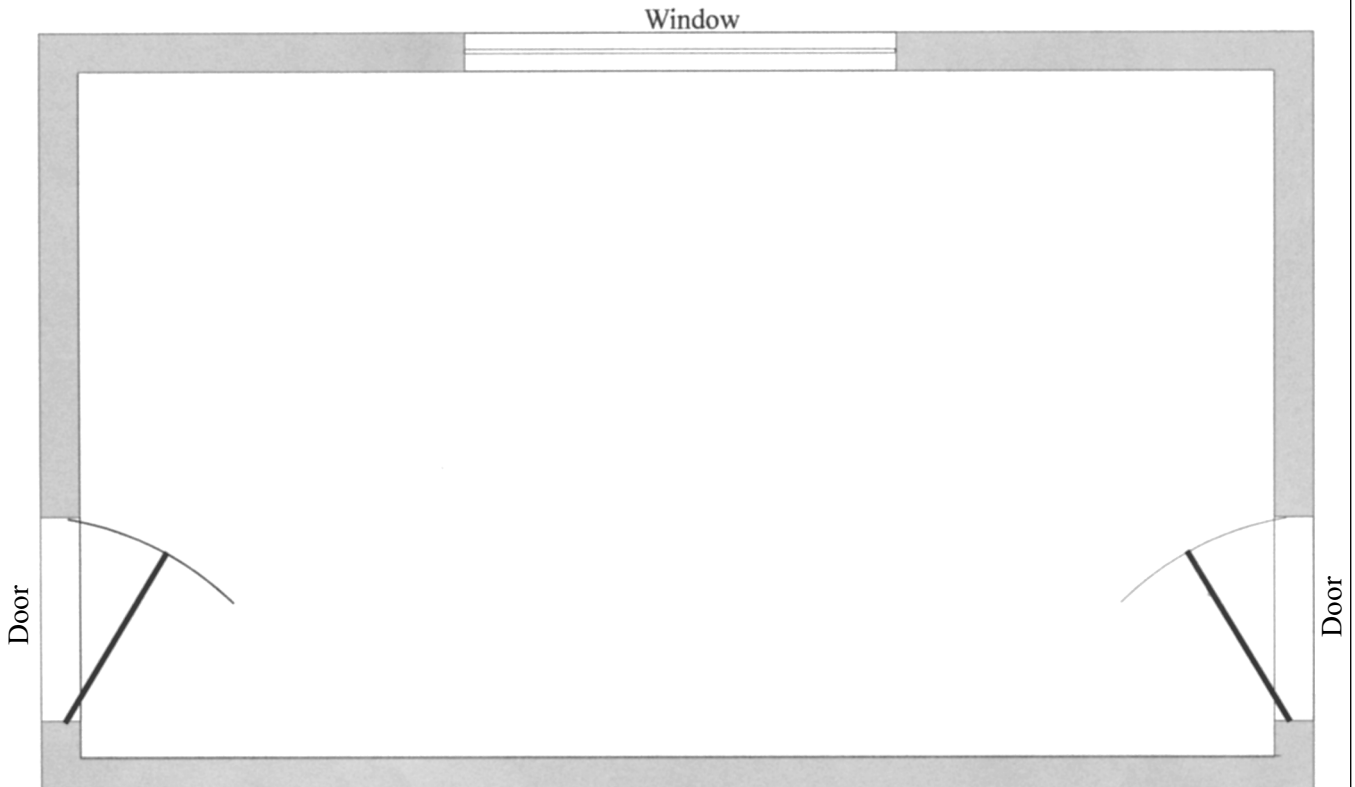
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(2 marks)

(f) Working triangles are often used when planning manufacturing areas to make the tasks easier to complete. On the plan of the kitchen shown below:

(i) draw a layout which creates a good **working triangle** when undertaking food preparation tasks; (8 marks)

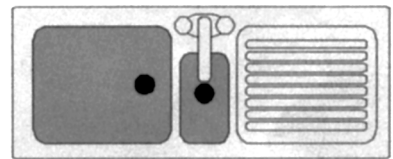
(ii) use a coloured pencil to indicate the triangle. (2 marks)



Single base unit



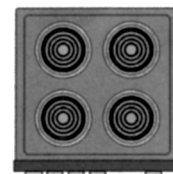
Double base unit



Sink



Worktop can be cut to fit



Cooker



Fridge

(g) Explain why you have arranged the equipment in this way.

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(3 marks)

Turn over ▶

**Question 6 is about the care and maintenance of products once purchased.
You should spend about 20 minutes on this question.**

6 Many products require some form of care or maintenance in order to increase their useful life.

(a) Explain what **four** of these symbols found on products, the packaging or labelling tell the customer.

	
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(8 marks)

(b) Many products require some form of surface finish to protect them from deterioration or to preserve their appearance.

(i) Name a product which requires such a finish.

(ii) Name a suitable finish.

(1 mark)

(iii) Describe how the process is carried out.

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(3 marks)

- (c) The drawings below show examples of products which require regular care and maintenance.

Choose **one** of the products shown and use notes to indicate on the drawing **four** essential maintenance tasks which need to be undertaken regularly.



(8 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

Question 7 is about the use of Information and Communications Technology in manufacturing. You should spend about 10 minutes on this question.

7 Information and Communications Technology (ICT) plays a major part in modern manufacturing.

Using specific examples, explain what you understand by this statement. Your answer should refer to at least **three** different detailed applications for ICT in modern manufacturing.

Application 1

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Application 2

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Application 3

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(8 marks)

END OF QUESTIONS