



GCSE

4141/01

DESIGN AND TECHNOLOGY

UNIT 1

FOCUS AREA: Product Design

TUESDAY, 23 MAY 2017 – MORNING

2 hours plus your additional time allowance

Surname _____

Other Names _____

Centre Number _____

Candidate Number 0 _____

For Examiner's use only			
	Question	Maximum Mark	Mark Awarded
Section A	1.	15	
	2.	10	
	3.	10	
	4.	25	
Section B	5.	10	
	6.	15	
	7.	20	
	8.	15	
	Total	120	

ADDITIONAL MATERIALS

You will need basic drawing equipment, coloured pencils and a calculator for this examination.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

Answer ALL questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue at the back of the booklet, taking care to number the continuation correctly.

You are reminded of the necessity for good English and orderly presentation in your answers.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.



PRODUCT INFORMATION:

Modern curved shape and colour.

Cost: £39.99.

Injection moulded ABS casing and buttons.

Built in wrist support.

SECTION A

MARKED OUT OF 60

60 MINUTES

- 1. This question is about Product Analysis. It is worth a total of 15 marks.**

Study the information opposite about a computer keyboard.

- (a) Explain how the following specification points have been met for this product.**

- (i) The computer keyboard must be made from a material that withstands excessive wear and tear. [2]**

1(a) (ii) The computer keyboard must be competitively priced. [2]

(iii) The computer keyboard must be aesthetically pleasing. [2]

1(b) The computer keyboard has been designed with specific ergonomic features. Name TWO ergonomic features and describe how they improve the product for the user.

Ergonomic Feature 1: [1]

Improvement: [2]

1(b) Ergonomic Feature 2: [1]

Improvement: [2]

- 1(c) The table below shows anthropometric measurements from a group of female product design students.

STUDENT	HAND LENGTH (MM)	HAND BREADTH (MM)
A	175	75
B	190	80
C	160	70
D	185	80
E	180	70

- (i) State which student has the longest hand

length _____ [1]

- (ii) Calculate the average hand breadth for the group of students. [2]
(SHOW ALL YOUR WORKINGS).

DESCRIPTION	R
Make use of old components in new products.	
Reconsider the best way to make a product more sustainable.	Rethink
Try to fix a product instead of throwing it away.	
Reprocess a material to make a new product.	Recycle
Minimise the amount of energy and material you use.	
Don't buy a product unless there is a real need.	

2. This question is about the general issues of Design and Technology. It is worth a total of 10 marks.

- (a) Complete the table opposite by inserting the correct R for each of the descriptions. [4] (TWO EXAMPLES HAVE BEEN DONE FOR YOU.)
- (b) The ruler pictured has been made from recycled plastic cups.



Describe why this is beneficial for the environment. [3]

2(c) Explain in detail what the term 'sustainable design' means. [3]



DESIGNER 1: _____



DESIGNER 2: _____

3. This question is about the designers that you have studied. It is worth a total of 10 marks.

During your course you have studied the work of Philippe Starck and James Dyson.

- (a) State the name of EACH designer pictured opposite. [2]**

- (b) Write a short essay that describes the work of James Dyson. Identify the main features of his products and discuss the innovations he has introduced over time. [8]**

Marks will be awarded for the content of the answer and the quality of written communication.

4. This question is about the Design Process and how it is used. It is worth a total of 25 marks.

(a) Match the design stage to the correct related activity. 3 x [1]

DESIGN STAGE	
Research	A
Evaluation	B
Final design	C

For example if you think the answer for (i) is **A**

write

A

 in the box.

	RELATED ACTIVITY	
(i)	Detailed presentation drawing	
(ii)	Target market analysis	
(iii)	Review of final product	

4(b) (i) Explain what is meant by the term ‘design brief’. [2]

(ii) Describe the importance of making a prototype when developing a new idea. [2]



- 4(c) Using the images on the mood board opposite as inspiration, design a new concept toaster that will be used in a modern household kitchen.**

Use notes and sketches to present your idea for the toaster in the space provided on page 17.

Specification

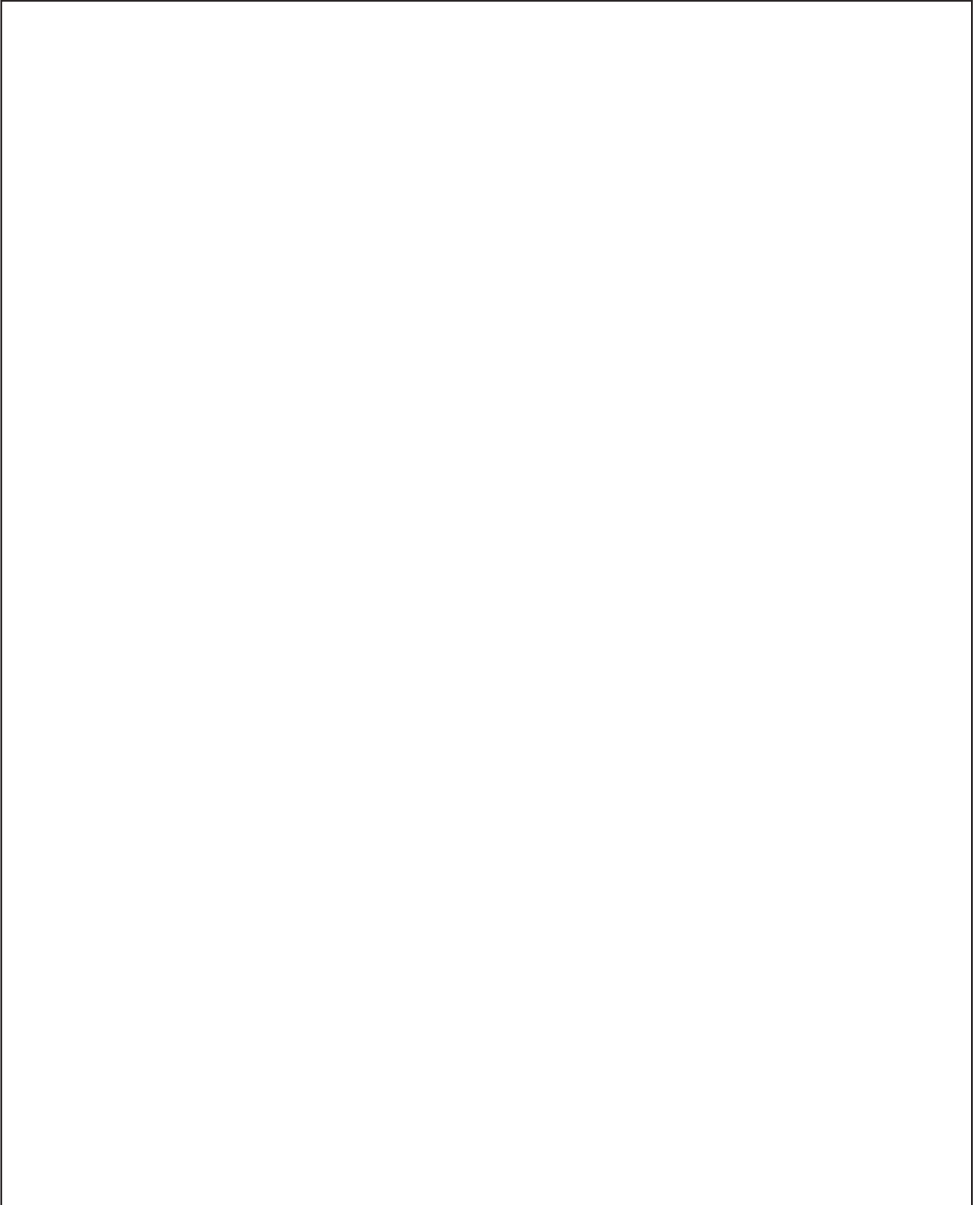
THE DESIGN MUST:

- **be inspired by the images, styles and colours presented in the mood board;**
- **have an innovative way of inserting bread into and removing it from the toaster;**
- **have an innovative way of removing crumbs from the toaster;**
- **be suitable for a modern household kitchen.**

4(c) MARKS WILL BE AWARDED FOR:

- (i) a design that is suitable for a modern household kitchen; [1]**
- (ii) reflecting the styles and colours of the mood board; [4]**
- (iii) an innovative way of inserting and removing the bread; [3]**
- (iv) an innovative way of removing the crumbs; [3]**
- (v) suitable sizes, materials and manufacturing processes; [3]**
- (vi) quality of communication. [4]**

4(c) Draw fully labelled details for the toaster in the box below.



SECTION B**MARKED OUT OF 60****60 MINUTES**

5. This question is about **Commercial Manufacturing Processes**. It is worth a total of 10 marks.
- (a) Study the image of the product below and **UNDERLINE** the correct manufacturing process used to make it. [1]

**Vacuum Forming****Injection Moulding**

- (b) Complete the table opposite by adding a description for **EACH** of the commercial scales of production listed.

Thermoplastic	Thermosetting Plastic
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

6. This question is about Materials and Components. It is worth a total of 15 marks.

(a) Complete the table opposite by inserting EACH material listed below under the correct classification of plastic. [3]

MELAMINE FORMALDEHYDE

ACRYLIC

POLYPROPYLENE

6(b) Glass Reinforced Polymer (GRP) is a composite material that is used in many products.

(i) Name ONE product that is made using GRP. [1]

(ii) Complete the following sentence that describes the structure of GRP. [2]

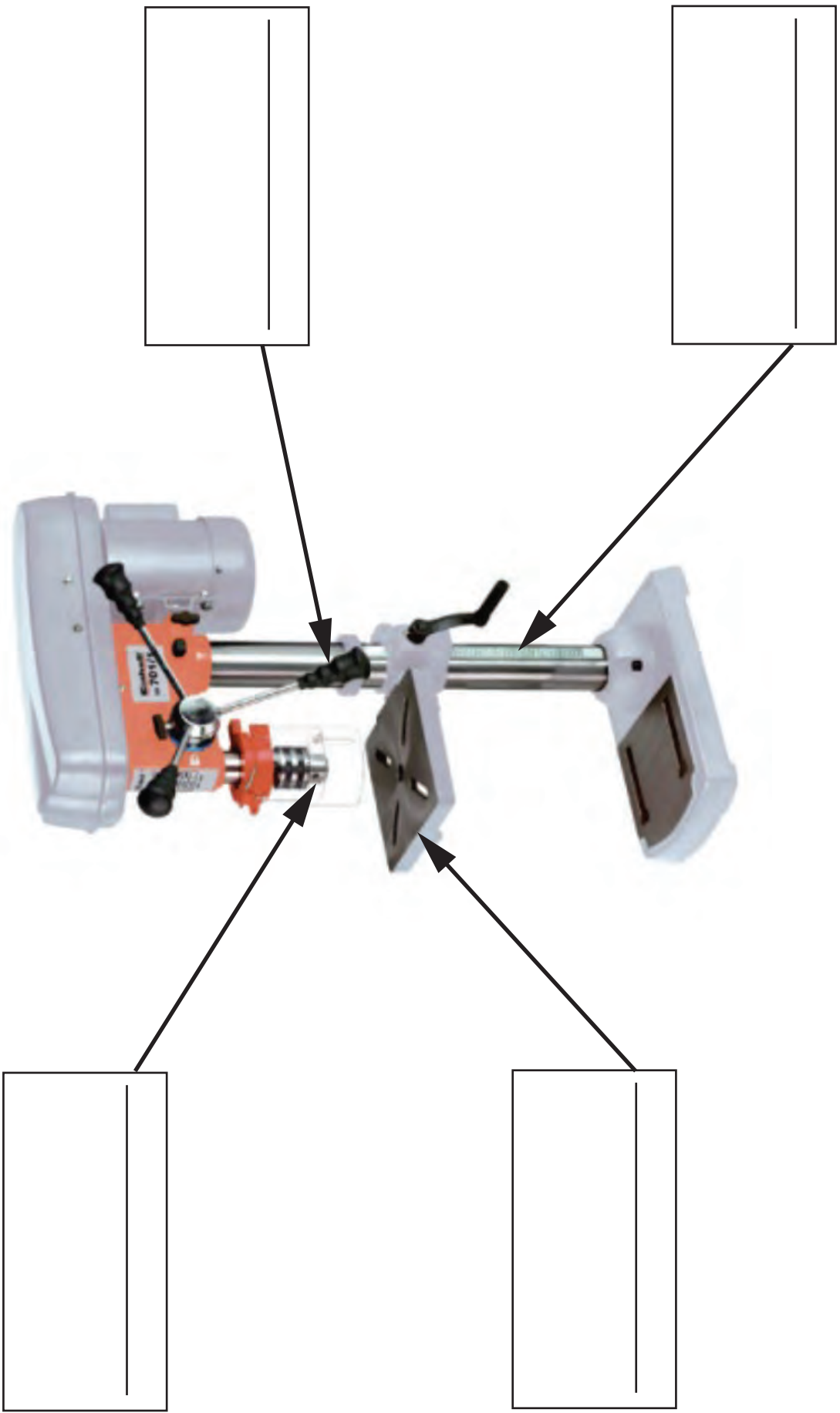
Glass Reinforced Polymer (GRP) is made up of _____ embedded in a _____ Resin.

(c) Describe what is meant by the term 'material properties'. [2]

PRODUCT	EXPLANATION OF NAMED PROPERTY
<div> </div> <p>THERMOMETER STRIP</p>	<p>Material: Thermo-chromic Film</p> <p>Property: [1]</p> <hr/> <p>Reason:</p> <hr/> <hr/> <hr/> <hr/> <p>[1]</p>
<div> </div> <p>DRINKS CAN</p>	<p>Material: Aluminium</p> <p>Property: [1]</p> <hr/> <p>Reason:</p> <hr/> <hr/> <hr/> <hr/> <p>[1]</p>

EQUIPMENT	NAME	USED FOR
	<hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
	<hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
	<hr/>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

- 7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.**
- (a) Complete the table opposite by stating the correct name and the correct use for EACH piece of equipment shown. 6 x [1]**



- 7(b) Using the words from the list below, label the diagram opposite to show the correct name for EACH part of the pedestal drill. [4]

TABLE

CHUCK

LEVER HANDLES

ON/OFF SWITCH

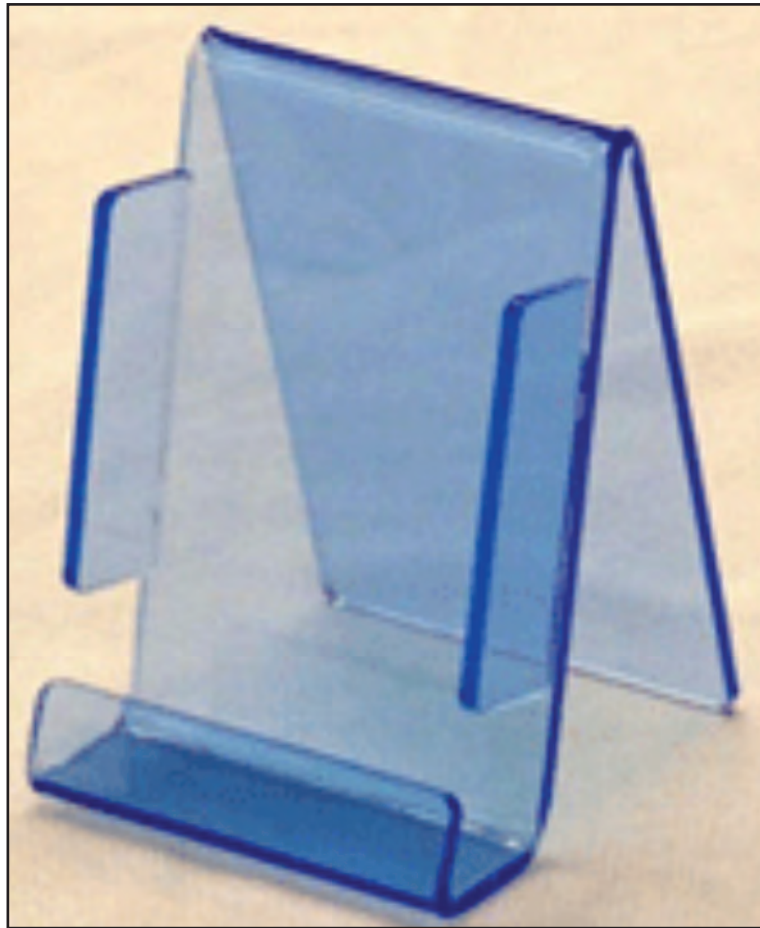
PEDESTAL

- (c) Describe TWO safety precautions to be considered when using the pedestal drill. [2]

Precaution 1:

Precaution 2:

7(d) Describe a possible safety hazard when drilling a hole in a piece of acrylic. [2]



**VEHICLE
SIGNAGE**



**ENGRAVED
ACRYLIC**



**PROTOTYPE
SHOE**



8. This question is about ICT, CAD/CAM, Systems and Processes. It is worth a total of 15 marks.

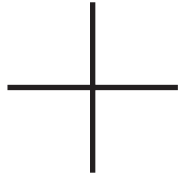
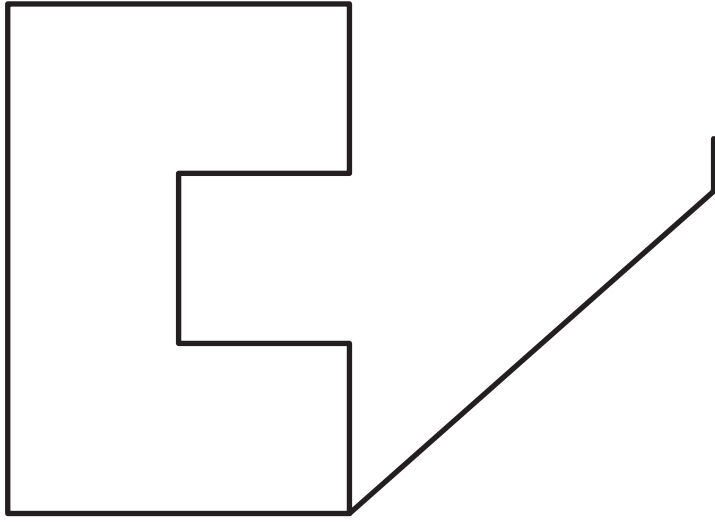
(a) State the full meaning of CAD. [1]

Computer A _____ D _____

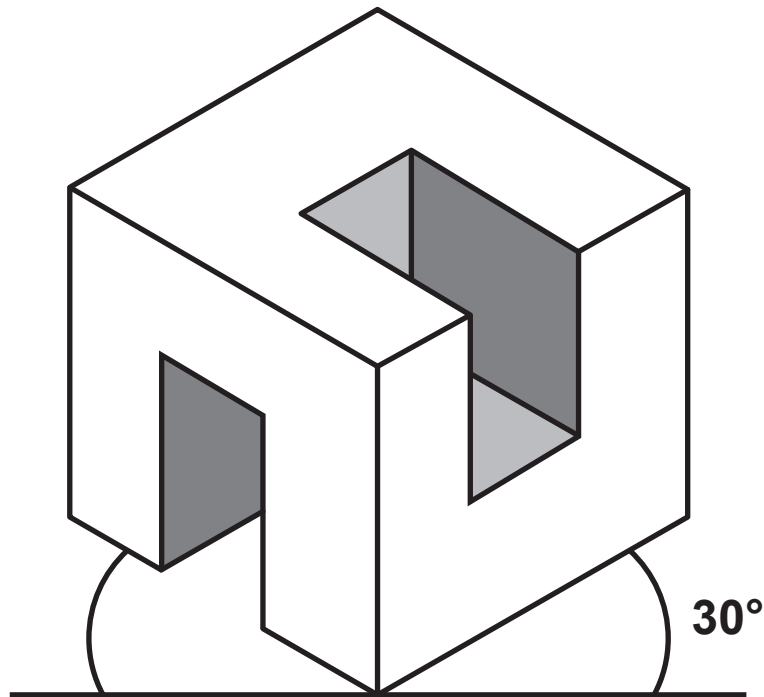
(b) Complete the table opposite by stating the name of the CAM machine used to produce EACH of the products pictured. [3]

(c) Systems are often used in modern products. Place a TICK (✓) in the correct box to indicate the correct term for each of the statements. [3]

STATEMENT	INPUT	PROCESS	OUTPUT
The sound produced by a speaker.			
Pressing the button on a computer mouse.			
A chain turning the gears on a bicycle.			



- 8(d) State the name of the recognised drawing method used to create the image below.



Name: _____ [1]

- (e) Complete the drawing opposite and make it 3D by using the one point perspective method. Use the cross provided as the vanishing point and add colour rendering to your finished drawing. [7]

