

Surname
Other Names

Centre Number

Candidate Number
0



GCSE

4141/01

**DESIGN & TECHNOLOGY
UNIT 1**

FOCUS AREA: Product Design

A.M. WEDNESDAY, 15 May 2013

2 hours

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Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
Question 6	
Question 7	
Question 8	
TOTAL MARK	

ADDITIONAL MATERIALS

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

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

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 book, taking care to number the continuation correctly.

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

INFORMATION FOR CANDIDATES

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

Section A

Marked out of 60 60 minutes

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

The photograph below is of a computer mouse.

Study in detail the information shown below.



Product Information:

- wireless design;
- rechargeable from base unit;
- fits the hand comfortably with ergonomic design;
- life time guarantee;
- retail price £23.99.

(a) A design specification was produced before designing the computer mouse. Write a detailed specification point for each of the following headings.

(i) Function [2]

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(ii) Aesthetics [2]

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(iii) Target Market [2]

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- (b) (i) Underline the most suitable scale of production to make the shell of the computer mouse. [1]

One-off Production Batch Production

- (ii) The shell of the computer mouse is made from ABS. State **one** property of ABS that makes it a suitable material. [2]

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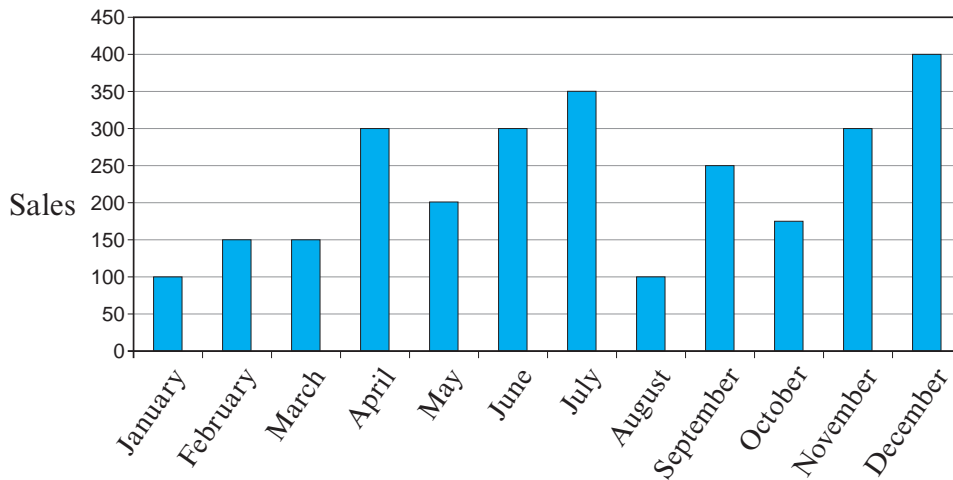
- (iii) The case for the computer mouse was made using injection moulding. State **one** advantage of using this process. [2]

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(c) The graph below shows the sales of the computer mouse.



- (i) State which month had the greatest number of sales. [1]
- (ii) The computer mouse is sold for £23.99. Calculate the average number of sales for the period April to September and the average monthly revenue. Show all your workings. [3]

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

(a) Designers of new products think about the 6 Rs. Complete the table below by inserting the missing Rs. [3]

<i>Description</i>	<i>R</i>
Cut down the amount of material and energy you use as much as you can.	Reduce
Use a product to make something else with all or parts of it.	
When a product breaks down or doesn't work properly, try to fix it.	Repair
Don't use a material or buy a product if you don't need it or if it's bad for people or the environment.	Refuse
Reprocess a material or product and make something else.	
Do we make too many products? Design in a way that considers people and the environment.	

(b) Many types of plastics are now being recycled. Discuss the positive impact that recycling plastics has on the environment. [3]

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(c) Explain in detail why it is important to think about life cycle analysis when designing. [4]

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

(a) The design and make process used in Design and Technology uses a number of stages in a specific order.

Complete the design process by adding the stages in the correct order from the list below. [3]

DESIGN BRIEF

GENERATE IDEAS

EVALUATION

APPLY A GOOD FINISH

	<i>STAGES</i>
1	
2	DESIGN SPECIFICATION
3	
4	DEVELOP AND MODEL A SOLUTION
5	THE FINAL SOLUTION
6	PLAN FOR MANUFACTURE
7	MAKE THE PRODUCT
8	

(b) (i) Name **one** research activity that could be used to collect information. [1]

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(ii) Explain why designers compare the finished product to their design brief and specification when writing a final evaluation. [3]

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- (c) Study the mood board below and use it as inspiration to design a new wall light for a bedroom.



Draw **one** idea for the bedroom wall light. Use notes and sketches to explain your idea.

Specification

The design must:

- reflect the style and colours from the mood board;
- show a suitable method of fixing to a wall;
- enable the level of light to be adjusted and directed.

Marks will be awarded for:

- designing a bedroom wall light;
- reflecting the style and colours of the mood board;
- showing a suitable method of fixing to the wall;
- showing how the level and direction of light can be adjusted;
- showing any **two** of the main dimensions of the wall light;
- specifying suitable materials and manufacturing processes;
- quality of communication.

[1]
[3]
[2]
[3]
[2]
[3]
[4]



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Draw your design in the box below.

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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) (i) State the most suitable scale of production for **each** of the products shown below. [2]

 <p style="text-align: center;">Concept Car</p>	 <p style="text-align: center;">Limited Edition</p>
<p>..... Production</p>	<p>..... Production</p>

(ii) Describe **one** quality control check that could be used during the manufacture of the games console shown above. [2]

Check:

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(b) (i) Study the images and place **one tick (✓)** in the table below to indicate the knock down fitting. [1]

		
<p>.....</p>	<p>.....</p>	<p>.....</p>

(ii) Describe **one** advantage to the manufacturer of using knock down fittings. [2]

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(c) Explain the difference between quality control and quality assurance.

[3]

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

(a) (i) Complete the table by inserting the correct words from the list below. 4 × [1]

- ABS Epoxy Resin Beech Pine Steel Aluminium
- Ferrous Metal Non Ferrous Metal

<i>Product</i>	<i>Material</i>	<i>Classification</i>
 Game Controller Case	Thermoplastic
 Workshop Mallet	Hardwood
 Screwdriver Blade

(ii) The picture below is of a screwdriver and the handle is made from polypropylene.



Explain why polypropylene is a suitable material for the handle. [2]

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(b) Underline the **most** appropriate adhesive to join the following materials together. [3]

<i>Materials</i>	<i>Adhesive</i>
Join Beech to Beech	PVA Solvent cement Double-sided tape
Join Acrylic to Aluminium	Epoxy resin PVA Solvent cement
Join Acrylic to Acrylic	Solvent cement PVA Rubber solution

(c) Explain why a thermo chromic material has been used for the lid of a take-away coffee cup shown. [3]



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(d) Product designers specify PET when designing drinks bottles. Explain the advantages of using PET when designing bottles. [3]



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7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.

(a) Complete the table below by adding the name or use of **each** of the tools shown below.

<i>Tool</i>	<i>Name</i>	<i>Use</i>
	Craft Knife [2]
 [2]	This tool is used to measure a length.
 [2]	This tool is used to mark out lines at 90 degrees.

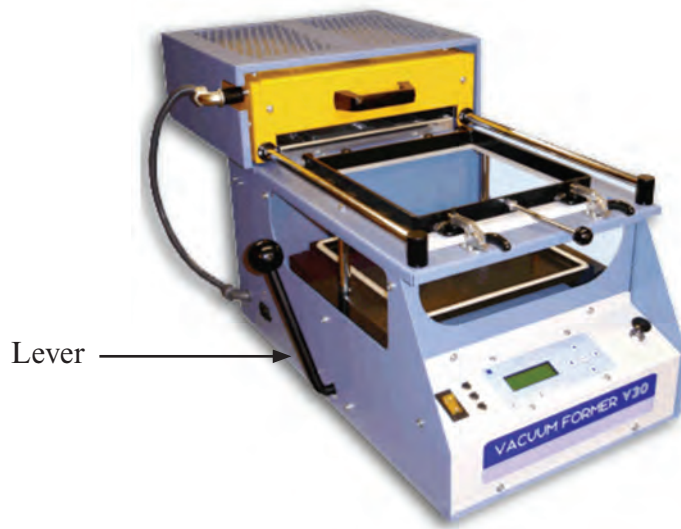
(b) Explain **two** safety precautions you should take when using a belt sander like the one shown below.



Safety precaution 1:
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..... [2]

Safety precaution 2:
.....
..... [2]

- (d) (i) A vacuum forming machine is shown below. Explain the function of the lever indicated.

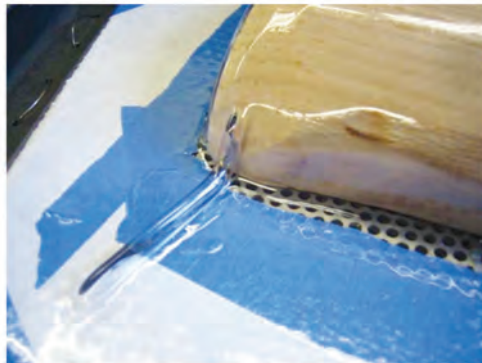


Explanation: [2]

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- (ii) When vacuum forming, webbing can sometimes occur.



Explain in detail why webbing can occur. [3]

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

(a) (i) State what the letters CAM stand for. [2]

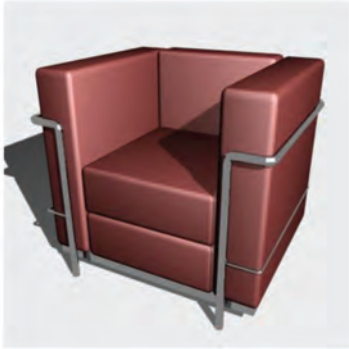
Computer A M

(ii) Name **one** appropriate software package you have used to operate a CAM machine. [1]

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(b) The image below shows a 3D CAD model of a new chair.

Describe **two** advantages of using a 3D CAD model when developing a design.



Advantage 1: [2]

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Advantage 2: [2]

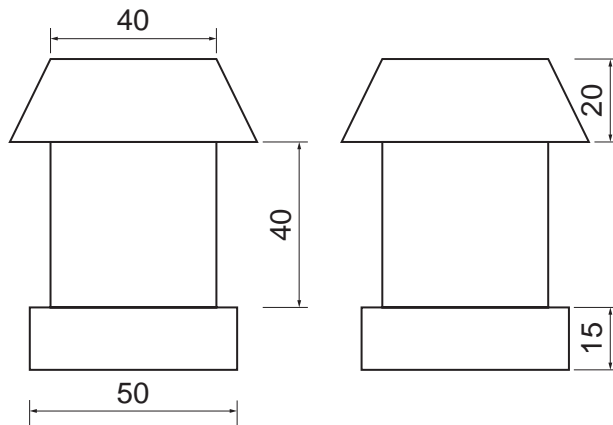
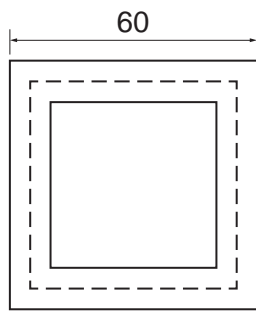
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(c) A 3D rapid prototyping machine was used to create a quick model of a product. Explain in simple terms how 3D rapid prototyping produces the model below. [3]

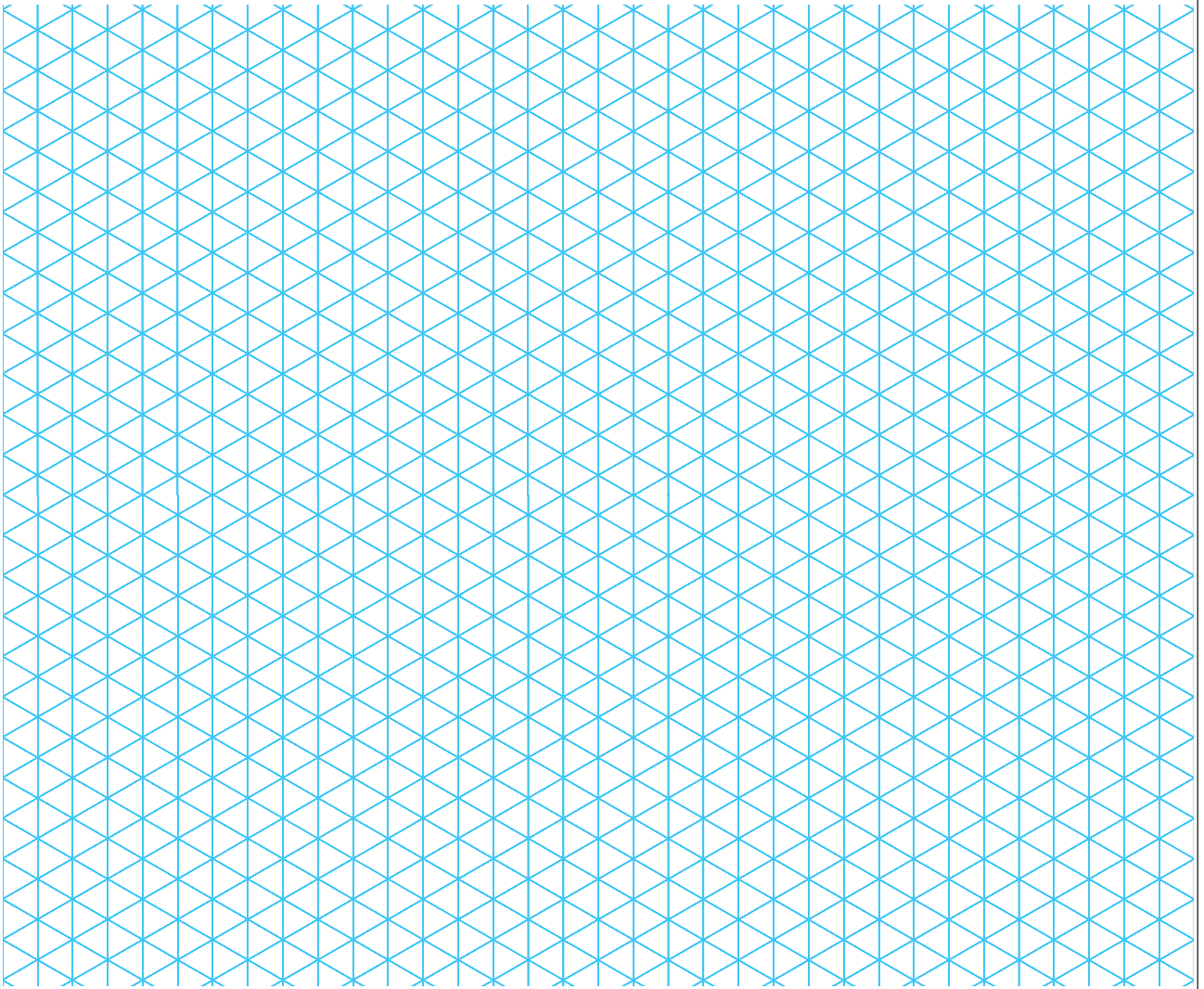


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(d) A dimensioned orthographic drawing is shown below.



Use the information to complete an accurate isometric drawing on the grid opposite. [5]



END OF PAPER

