

Surname	
Other Names	
Centre Number	
Candidate Number	
Candidate Signature	

I declare this is my own work.

GCSE
DESIGN AND TECHNOLOGY

Unit 1 Written Paper

8552/W

Friday 22 May 2020

Afternoon

Time allowed: 2 hours

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.



For this paper you must have:

- normal writing and drawing instruments
- a calculator
- a protractor.

INSTRUCTIONS

- Use black ink or black ball-point pen.
 Use pencils only for drawing.
- Answer ALL questions.
- You must answer the questions in the spaces provided. Do not write on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.



INFORMATION

- All dimensions are in millimetres.
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 100.
- There are 20 marks for Section A, 30 marks for Section B and 50 marks for Section C.

DO NOT TURN OVER UNTIL TOLD TO DO SO



SECTION A – Core technical principles

Answer ALL questions in this section.

Each of Questions 01 to 10 is followed by four responses, A, B, C and D.

For each question completely fill in the circle alongside the appropriate answer.



CORRECT METHOD



WRONG METHODS

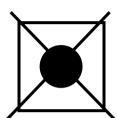




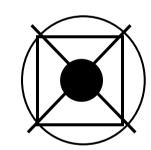




If you want to change your answer you must cross out your original answer as shown.



If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.





Which type of renewable energy is sourced from plants? [1 mark]







O D Wind



Planned obsolescence is when a product is designed [1 mark]









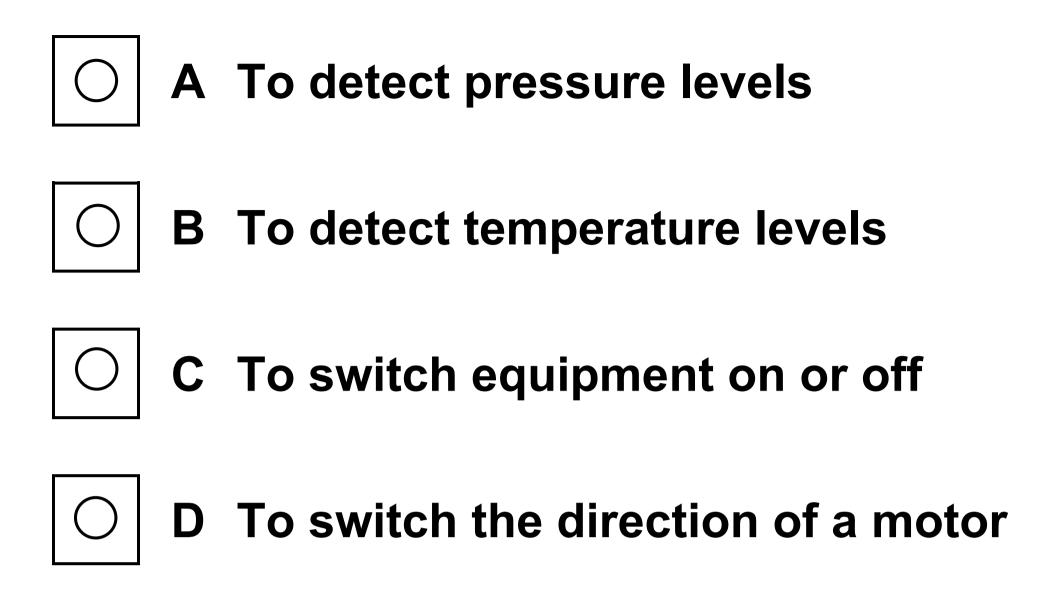


What is the electrical component shown in FIGURE 1 used for? [1 mark]

FIGURE 1









0 4	
Identify the smart material us	sed to darker
windows in bright sunlight.	[1 mark]



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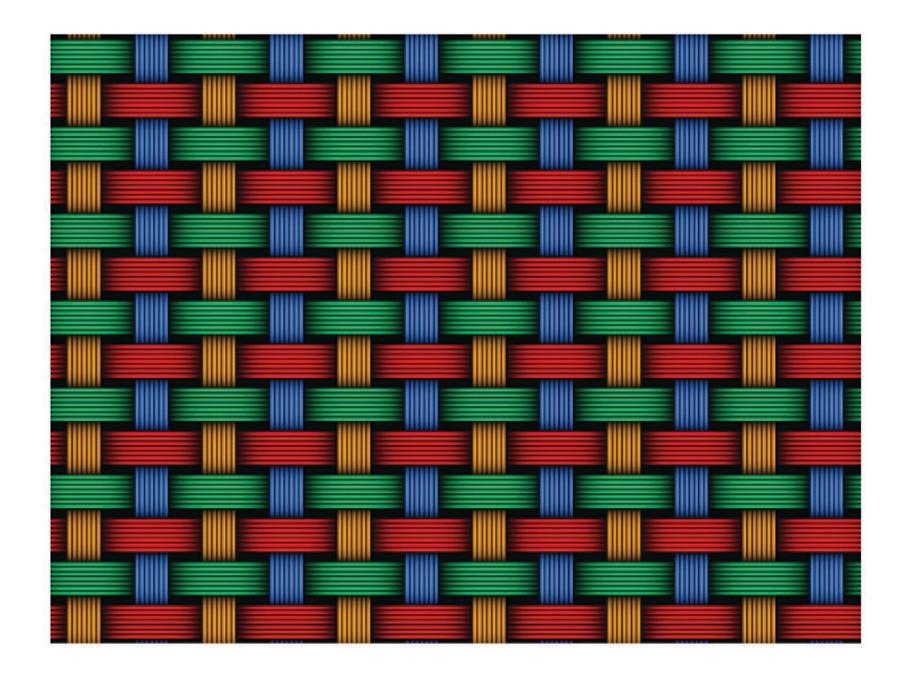
O D Thermochromic pigment



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Identify the textile fabric shown in FIGURE 2. [1 mark] FIGURE 2









C Knitted fabric

O D Woven fabric



0 6	5	
		ology push' describes when ts are developed [1 mark]
0	A	due to improvements in new materials.
0	В	due to increased consumer demand.
	С	in response to consumer feedback.
0	D	with the user in mind.



0 7	
	ONE of the following statements industry is true? [1 mark]
A	An increased use of robotics has led to a reduction in manual jobs.
В	An increased use of robotics means more people need to be employed.
C	The latest production lines require more people who can use hand tools skilfully.
\bigcap D	The use of CAD and CAM in

industry has led to less efficiency.



Which of the following is part of a kinetic pumped storage system? [1 mark]







O D Turbine



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Name the identified component shown in FIGURE 3. [1 mark]

FIGURE 3



Belt

Component











A ductile material is commonly described as one that [1 mark]

A can be drawn into a long length.

B does not scratch easily.

C resists corrosion and oxidisation.

D shatters under a sudden impact.



11.1
Name ONE alloy. [1 mark]
11.2
Explain why metals are alloyed. [2 marks]



-		
-		



12.1

Composite materials such as foil and polymer lined boards are used in food and drink packaging.





Give ONE advantage and ONE disadvantage of using composite materials for packaging. [2 marks]

Advantage		
Disadvantage		



12.2

TABLE 1 shows the number of food and drink containers successfully recycled by a manufacturer in 2010 and 2017.

TABLE 1

Recycling of composite food and drink containers			
2010 2017			
32 billion tonnes 46 billion tonnes			



What is the percentage increase in recycling of composite food and drink containers between 2010 and 2017? [2 marks]

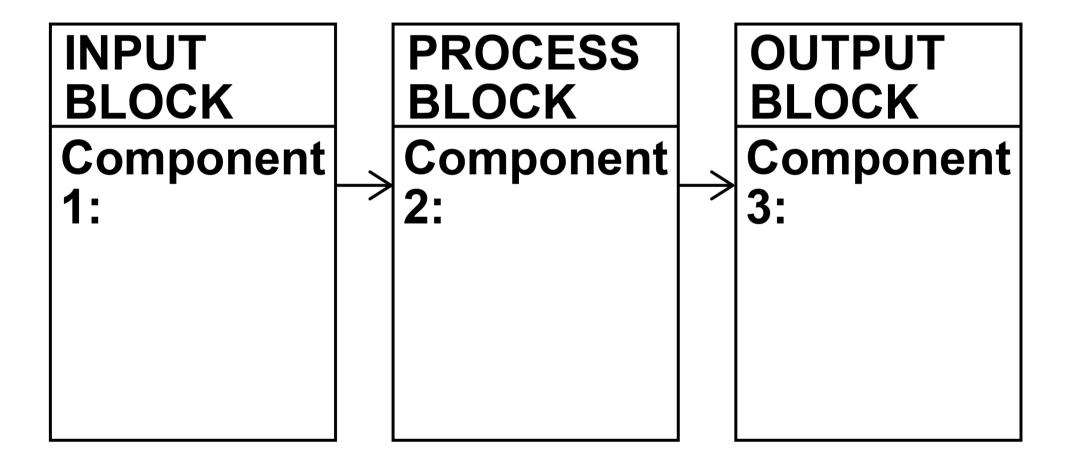
Answer			



FIGURE 4 shows a system diagram for an alarm.

Complete the diagram by naming ONE component that could be used in EACH block. [3 marks]

FIGURE 4







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SECTION B – Specialist technical principles

Answer ALL questions in this section.

1 4

Name ONE specific commercial manufacturing process and describe what it is used for.

Name of process	

On the opposite page, using notes and/or sketches describe the process you have named above. [4 marks]





Explain why EACH factor below would need to be considered by a manufacturer when sourcing materials/components.

[2 x 2 marks]

Bulk buying			
Ethical factors			



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The products/components shown below are manufactured from different materials.



Metal can opener



Card shoe box



Textile shopping bag with logo



Wooden toy





Polymer gears

Choose ONE product/component and complete TABLE 2. [3 marks]

My chosen product/component is

TABLE 2

Specific main material	Stock form used in manufacture	Appropriate finishing technique

[Turn over]

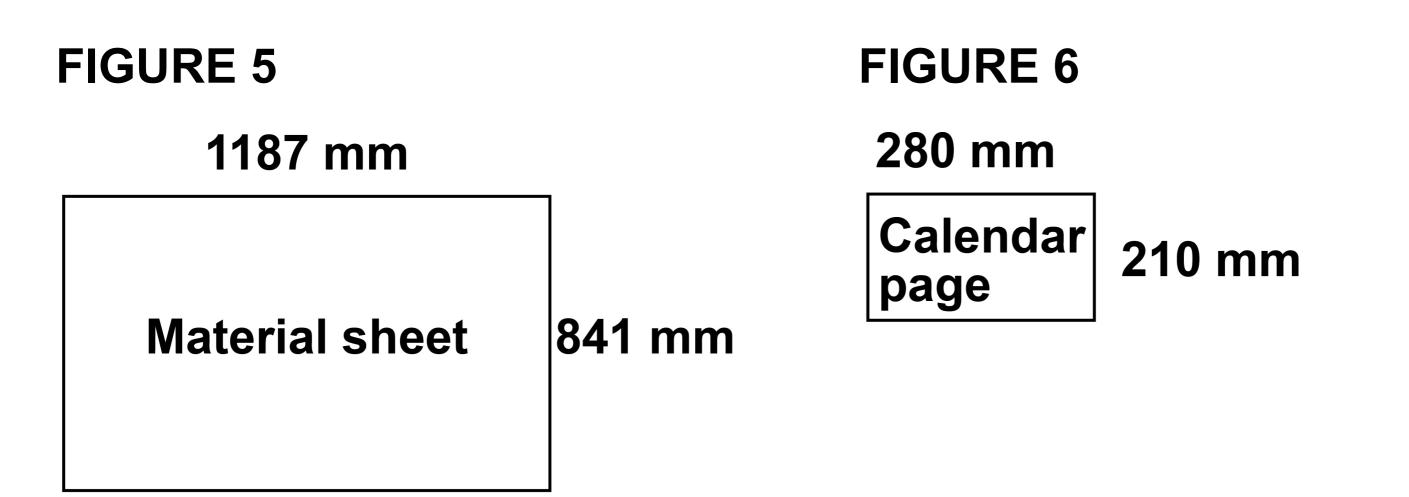


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16.2

A number of calendars are being made.

Given the sizes provided in FIGURE 5 and FIGURE 6, how many calendar pages can be made from ONE sheet? [2 marks]



The diagrams a not drawn to scale



Answer			







1	6		3
-		_	

What percentage of material is waste after cutting the pages calculated in Question 16.2?

Show your working and give your answer to TWO decimal places. [3 marks]

______Answer_____



1	7
	•

Responsible design should consider social issues in the design and manufacture of products.

Analyse and evaluate how pollution caused by the manufacture, use and disposal of products can impact the environment.

Give examples	m your	answer.	[o marks]







4	
1	8

Explain why the TWO methods below are used to manufacture products in different volumes.

Give specific examples of products in your answer. [2 x 3 marks]

wass _			



Batch			



[Turn over]	30



SECTION C – Designing and making principles

Answer ALL questions in this section.

1 9

TABLE 3

Alessi	Apple	Braun	Dyson
Gap	Primark	Under Armour	Zara

Choose ONE of the companies from TABLE 3.

Outline the design features and/or manufacturing techniques that have made your chosen company successful.

You should refer to specific products in your answer. [6 marks]



My chosen company is			





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20

FIGURE 7 shows THREE different kettles.

FIGURE 7



Cast iron stove kettle



Polymer electric kettle



Whistling kettle



Analyse and evaluate the kettles in terms of the THREE features identified on pages 50, 51 AND 52.

You should not use an analysis or evaluation point more than ONCE.



20.1		
Ergonomics	[4 marks]	



20.2

Functionality	[4 marks]



2	0	•	3
---	---	---	---

Innovation	[4 marks]



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2	1

Describe the following TWO types of investigation.

Give examples to show how they help when designing. [2 x 3 marks]

Filliary researci	11		



Secondary research				



Complete the TWO missing values in TABLE 4 for popularity votes. [1 mark]



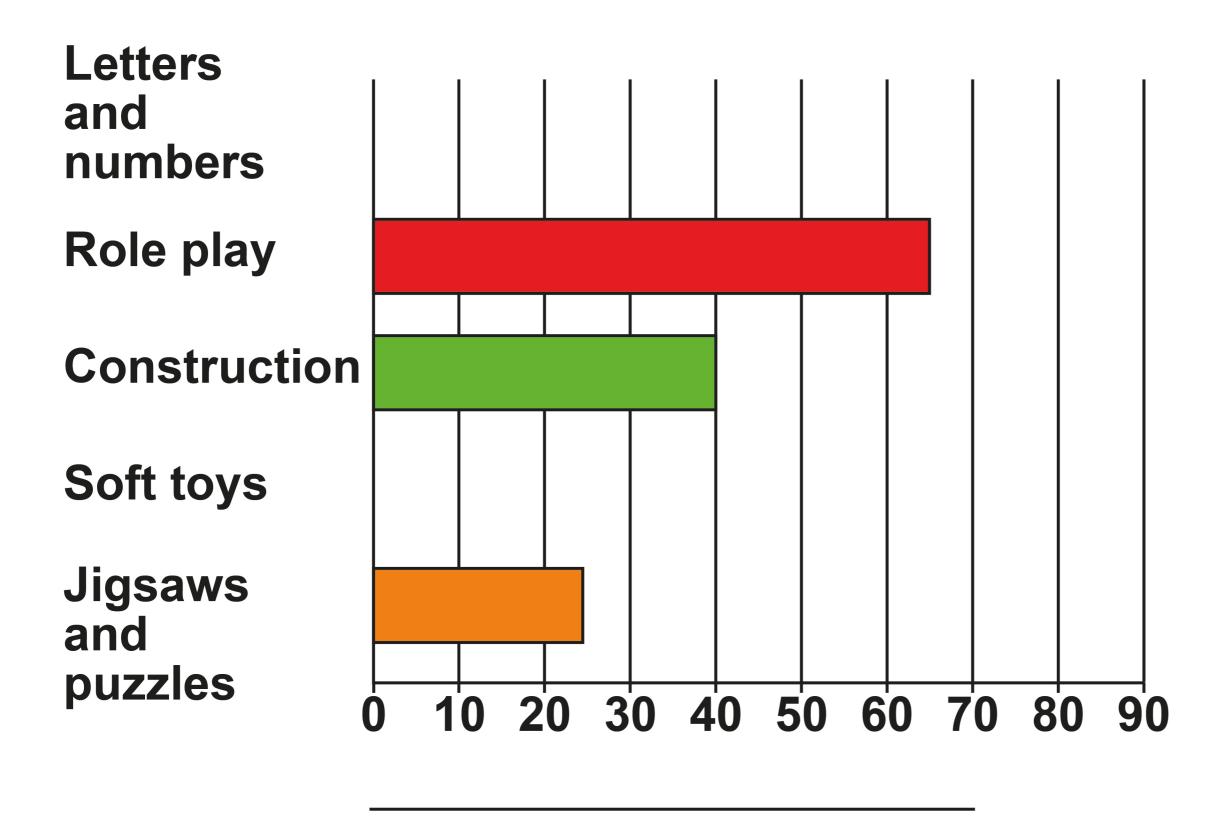
TABLE 4

Type of toy	Popularity votes	Popularity votes as a percentage
Role play	65	26%
Construction	40	16%
Letters and numbers		34%
Jigsaws and puzzles	25	10%
Soft toys		14%
Total	250	100%



Use your values from Question 22.1 to complete the bar chart, on the opposite page, and label the x axis. [3 marks]







7	2
	3

Give FIVE detailed specification points to help with the designing of a toy for use by a child between 3 and 5 years of age.
[5 marks]

1				
2				
3				
4				



5			



2 4

FIGURES 8 and 9 show a front and side view of a bug box used to encourage insects to visit a garden.

FIGURE 8

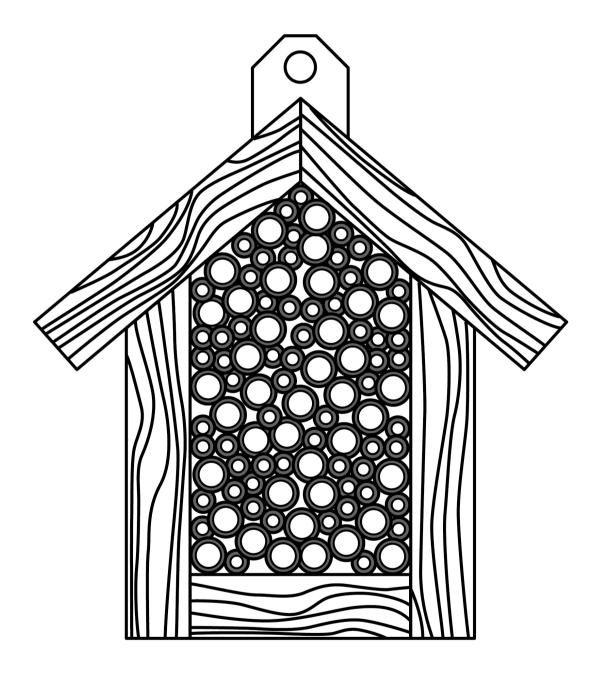
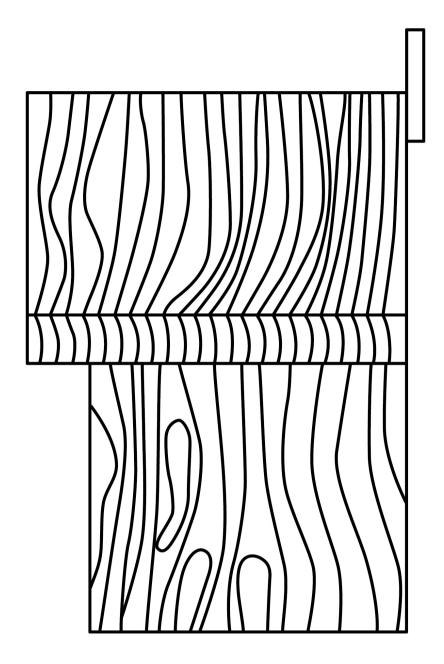




FIGURE 9



The front and side views are drawn in third angle projection Hidden detail has not been included



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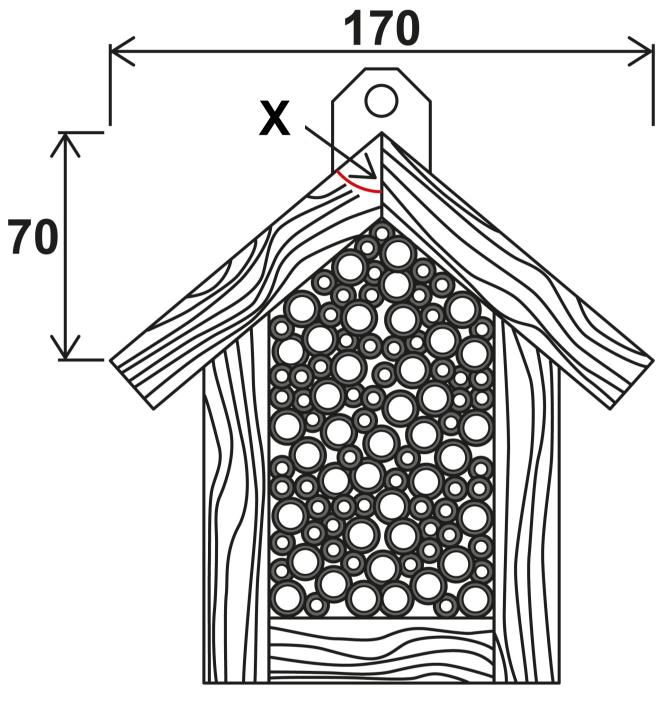
24.1

Complete a two-point perspective drawing of the bug box in the space provided below. [4 marks]



24.2

FIGURE 10



All dimensions are in millimetres
Not drawn to scale



Calculate the size of angle X in FIGURE 10 to the nearest whole degree to ensure an accurate fit of the two roof pieces.

Show your working/construction. [4 marks]

Answer			
--------	--	--	--



2	5

During manufacture it is important to use materials efficiently and minimise waste.

Nesting of shapes and parts/lay planning

Explain how each of the following improves material management. [2 x 3 marks]



Cutting techniques		



Describe how r	material	can be	formed
when making a	prototy	pe. [3	marks]

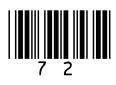
END OF QUESTIONS



Additional page, if required. Write the question numbers in the left-hand margin.



Additional page, if required.
Write the question numbers in the left-hand margin.



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Section	Mark	
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