



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.

[Turn over]



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



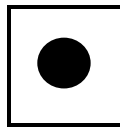
SECTION A – Core technical principles

Answer ALL questions in this section.

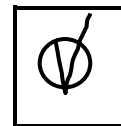
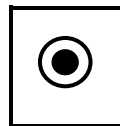
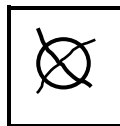
Each of Questions 01 to 10 is followed by four responses, A, B, C and D.

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

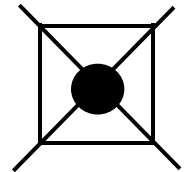
CORRECT METHOD



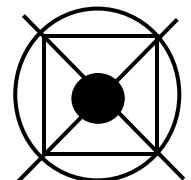
WRONG METHODS



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.



01

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

☐

A Biomass

☐

B Solar

☐

C Tidal

☐

D Wind

[Turn over]



0 2

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

☐

A to be repairable.

☐

B to have a short lifespan.

☐

C to have replaceable sections.

☐

D to take upgrades.



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

FIGURE 1

☐

A To detect pressure levels

☐

B To detect temperature levels

☐

C To switch equipment on or off

☐

D To switch the direction of a motor

[Turn over]



0 4

Identify the smart material used to darken windows in bright sunlight. [1 mark]

☐

A Aluminium foam

☐

B Photochromic pigment

☐

C Shape memory alloy

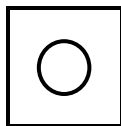
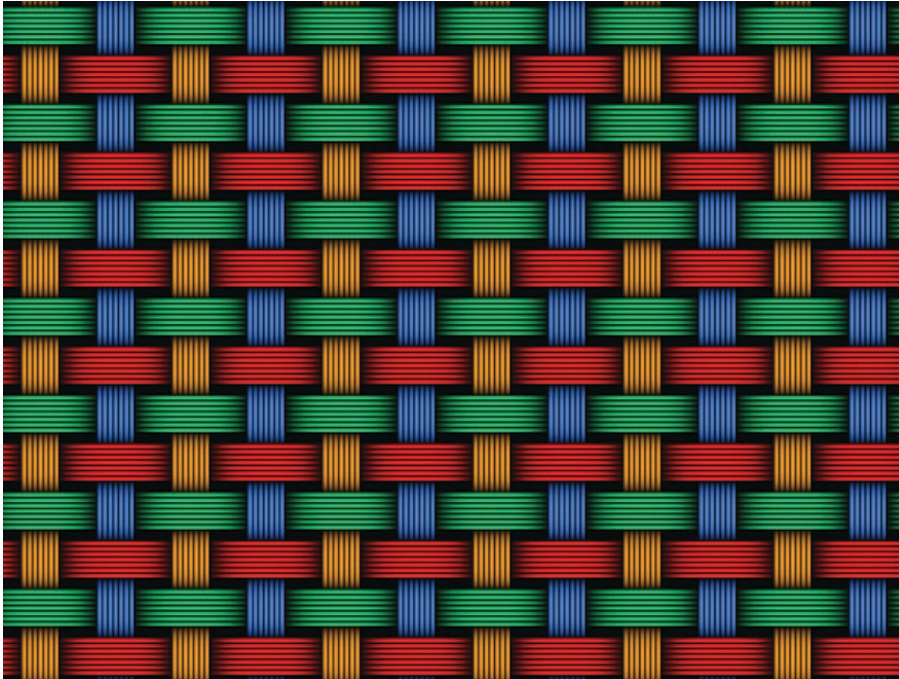
☐

D Thermochromic pigment

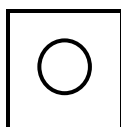


- 05** Identify the textile fabric shown in FIGURE 2.
[1 mark]

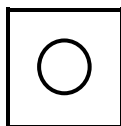
FIGURE 2



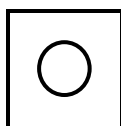
A Bonded fabric



B Felted fabric



C Knitted fabric



D Woven fabric

[Turn over]



06

‘Technology push’ describes when products are developed [1 mark]

☐

A due to improvements in new materials.

☐

B due to increased consumer demand.

☐

C in response to consumer feedback.

☐

D with the user in mind.



07

Which **ONE** of the following statements about industry is true? [1 mark]

☐

A An increased use of robotics has led to a reduction in manual jobs.

☐

B 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.

☐

D The use of CAD and CAM in industry has led to less efficiency.

[Turn over]



08

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

☐

A Alkaline battery

☐

B Oil field

☐

C Photovoltaic cell

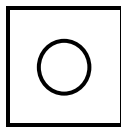
☐

D Turbine

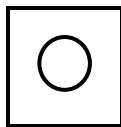


09 Name the identified component shown in
FIGURE 3. [1 mark]

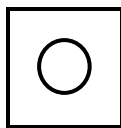
FIGURE 3



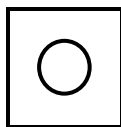
A Cam



B Gear



C Lever



D Pulley

[Turn over]



1 0

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 oxidation.

☐

D shatters under a sudden impact.

1 1 . 1

Name ONE alloy. [1 mark]



1 1. 2 Explain why metals are alloyed. [2 marks]

[illegible]

[Turn over]



- 1 2 . 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 _____

[Turn over]



- 1 2 . 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 _____

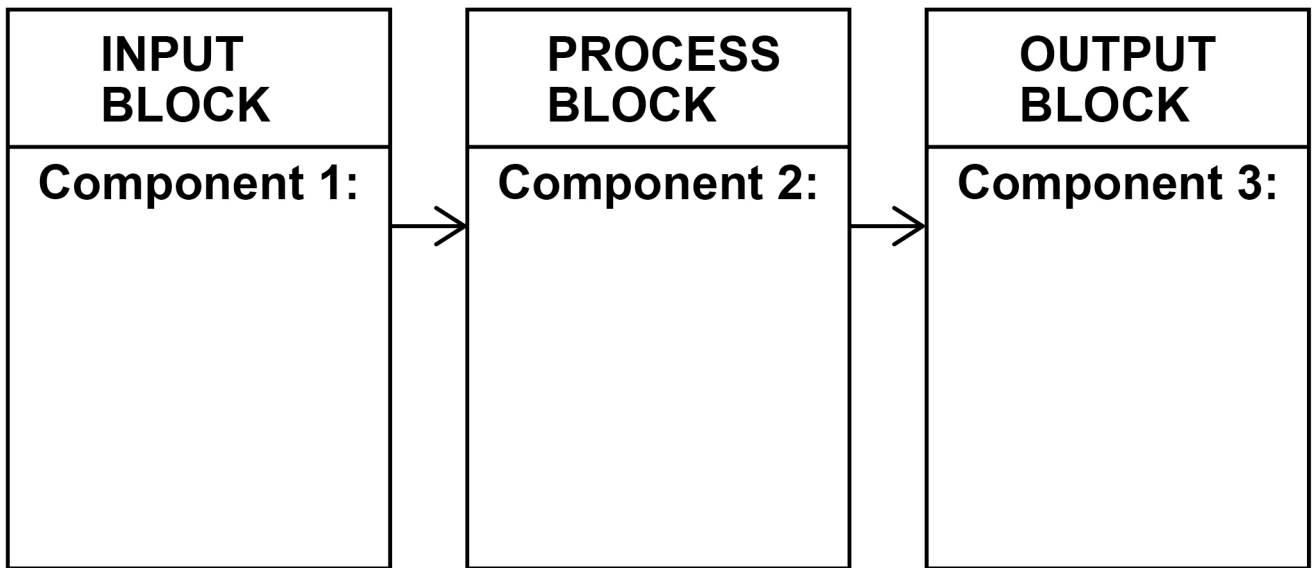


1 3

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



[Turn over]

20



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 _____

Using notes and/or sketches describe the process you have named above. [4 marks]



1	5
---	---

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

[Turn over]



16.1

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]



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]

FIGURE 5

1187 mm



Material sheet

841 mm

FIGURE 6

280 mm



Calendar
page

210 mm

The diagrams are not drawn to scale.

Answer _____

[Turn over]



BLANK PAGE



16.3

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

[Turn over]



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 in your answer. [8 marks]



[illegible]

[Turn over]





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]

Mass _____

[Turn over]



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 _____



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 below.

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



20.1 Ergonomics [4 marks]

[illegible]

[Turn over]



20.2 Functionality [4 marks]

[illegible]

20.3 Innovation [4 marks]

[illegible]

[Turn over]



2	1
---	---

Describe the following TWO types of investigation.

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

Primary research



Secondary research

[illegible]

[Turn over]



- 22.1** A designer has been asked to design a prototype toy suitable for use by a child between 3 and 5 years of age. They are using the data in TABLE 4.

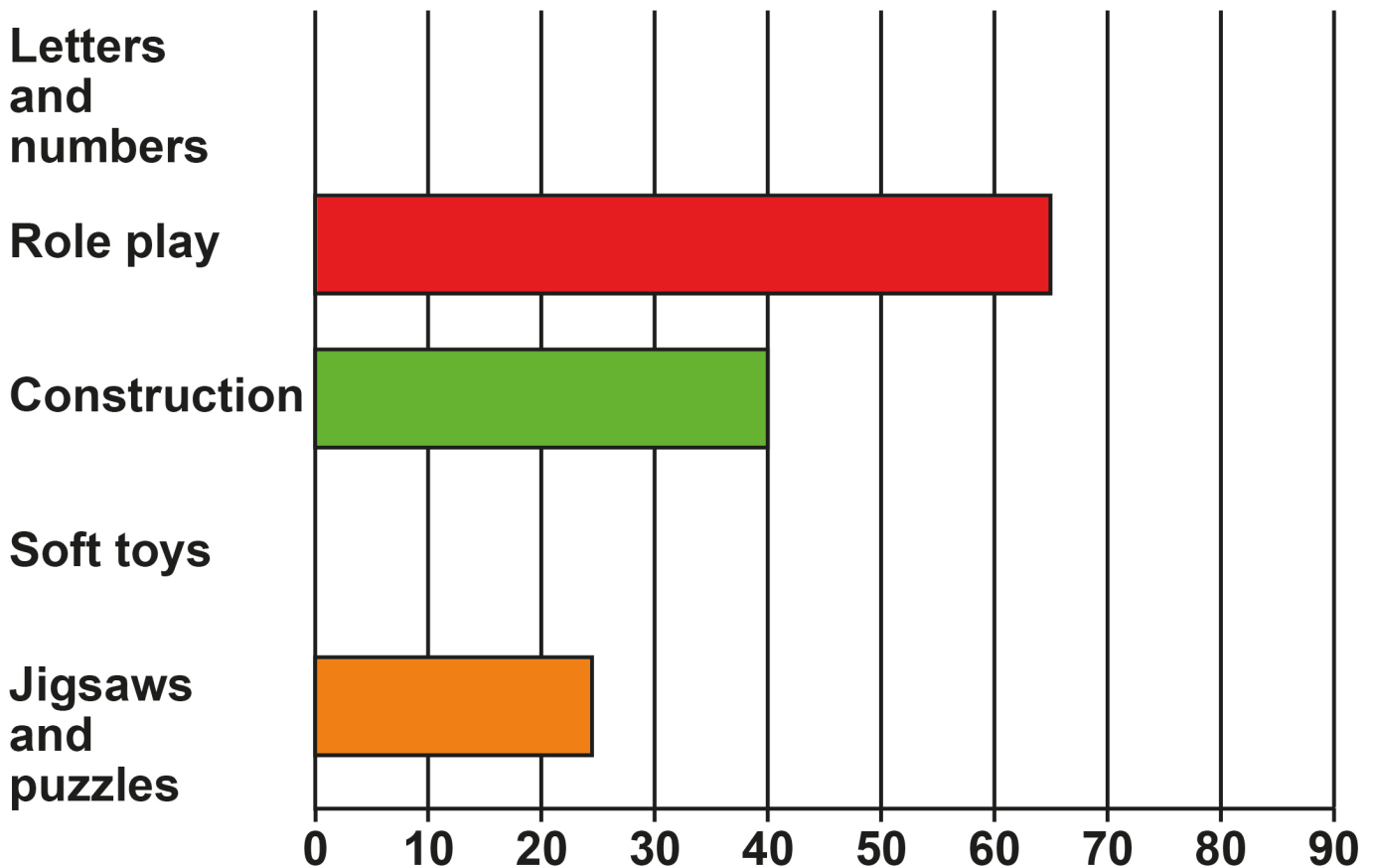
Complete the TWO missing values in TABLE 4 for popularity votes. [1 mark]

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%



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



[Turn over]



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

[Turn over]



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

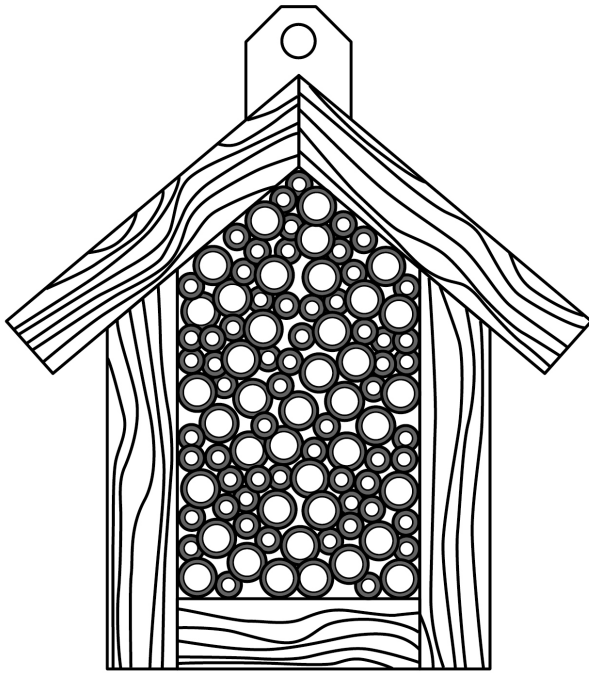
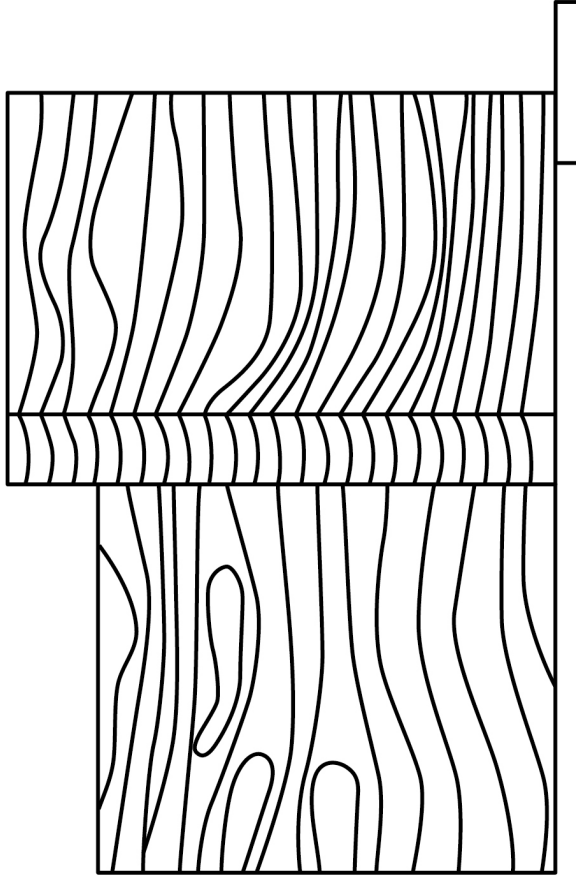


FIGURE 9

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

[Turn over]

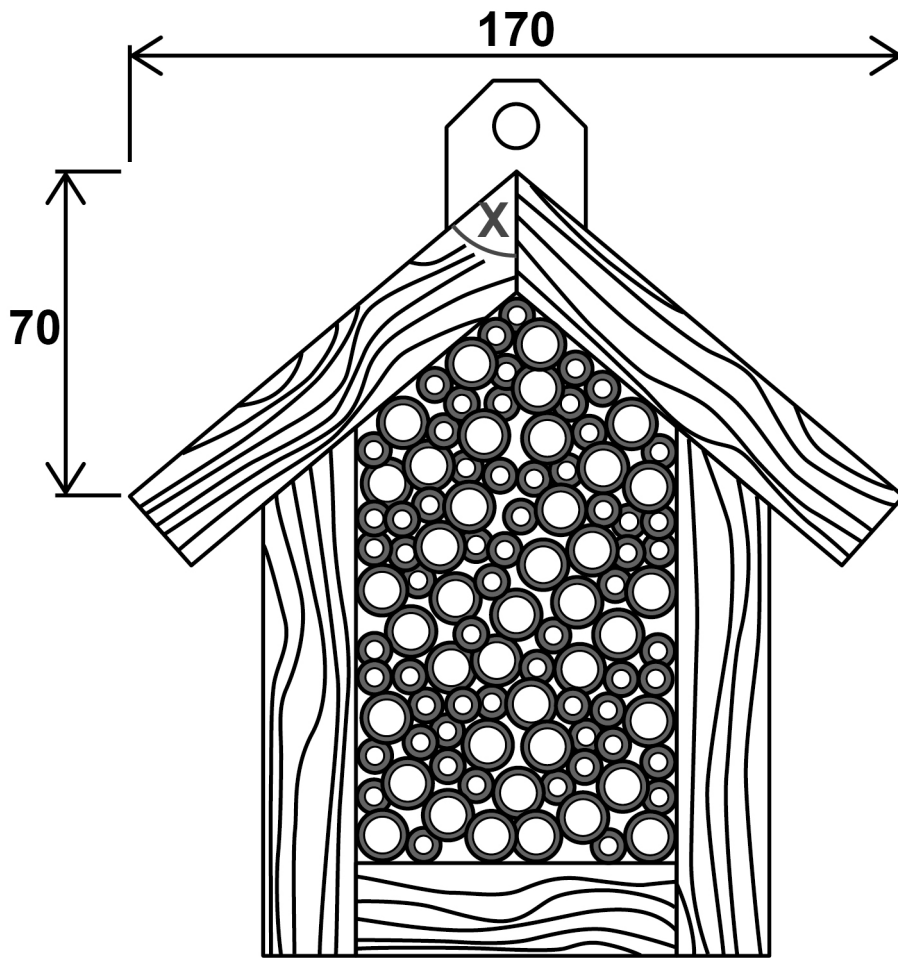
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- 24.1** Complete a two-point perspective drawing of the bug box in the space provided below.
[4 marks]

[Turn over]



2 4 . 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 _____

[Turn over]



2	5
---	---

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

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

Nesting of shapes and parts/lay planning

Cutting techniques _____

[Turn over]



2	6
---	---

Describe how material can be formed when making a prototype. [3 marks]

END OF QUESTIONS

50



Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

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For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	

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