DRAFT SPECIMEN MATERIAL

Please write clearly, in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
DESIGN AND TECHNOLOGY

Date of Exam Morning Time allowed: 2 hours

Materials

For this paper you must have:

- normal writing and drawing instruments
- a calculator.

Instructions

- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information

- 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.

SECTION A Core Technical Principles

This section contains multiple choice questions. For each multiple choice question you should shade in **one** box.

1 A designer has created a security system for use in a home. The system is intended to alert the home owner to an intruder. What is the input in this system?

A Alarm sound ⬭

B Automatic message sent to mobile phone ⬭

C Flashing light ⬭

D Motion sensor ⬭

[1 mark]

2 You have marked out and cut a design to a measurement of 100 x 100mm with a tolerance of ±2mm. Which **one** of the following measurements is in tolerance?

A 97.9 x 100.58mm ⬭

B 98.2 x 102.56mm ⬭

C 99.9 x 101.07mm ⬭

D 102.58 x 96.2mm ⬭

[1 mark]

3 **Figure 1** shows a stool.

Figure 1

When a person sits on this stool, what is the main force on the stool leg?

A Compression ⬭

B Shear ⬭

C Tension ⬭

D Torsion ⬭

[1 mark]

4 You are designing a product to be used outside. Which material would rust?

A Aluminium alloy ⬭

B Copper ⬭

C Low carbon steel ⬭

D Zinc ⬭

[1 mark]

5 Which **one** of the following is a production method based on replacing stock as it is needed?

A Computer Aided Manufacture ⬭

B Flexible Manufacturing ⬭

C Integrated Manufacture ⬭

D Just in Time Manufacturing ⬭

[1 mark]

6 Which **one** of the following is a natural material?

A Cotton ⬭

B Lycra ⬭

C Medium Density Fibreboard ⬭

D Urea formaldehyde ⬭

[1 mark]

7 . 1 What is the definition of a smart material?

A A material that can hold data ⬭

B A material that can withstand excessive force ⬭

C A material that reacts to changes in the environment ⬭

D A material that shrinks when heated ⬭

[1 mark]

7 . 2 Name a smart material.

[1 mark]

8 Designers often create products that they know will have a limited life span. What is this called?

A Design for disassembly ⬭

B Planned obsolescence ⬭

C Stock forms ⬭

D Sustainability ⬭

[1 mark]

9 What does the term 'thermosetting' describe?

A A type of fabric ⬭

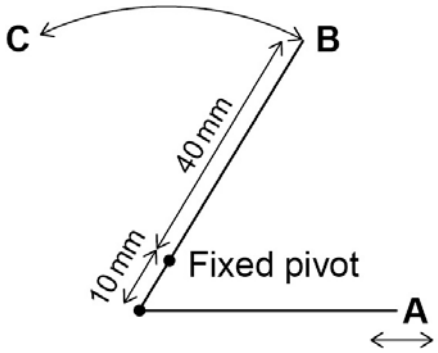
B A type of metal ⬭

C A type of polymer ⬭

D A type of wood ⬭

[1 mark]

10 The diagram shows the movement of a lever which is part of a toy. If point **A** travels 10mm to the right, what is the distance between points **B** and **C**?



A 10mm ⬭

B 20mm ⬭

C 30mm ⬭

D 40mm ⬭

[1 mark]

11 Which **one** of the following is a softwood?

A Beech ⬭

B Oak ⬭

C Pine ⬭

D Willow ⬭

[1 mark]

12 . 1 Name a composite material.

[1 mark]

12 . 2 State **two** properties of the composite material you have named in question **12.1**.

[2 marks]

Property 1

Property 2

13 State **two** reasons why corrugated cardboard is used as packaging for cooked pizzas.

[2 marks]

1.

2.

14 . 1 Name a non-renewable energy source.

[1 mark]

14 . 2 State two impacts of non-renewable energy sources on the environment.

[2 marks]

1.

2.

SECTION B Specialist Technical Principles

15 . 1 Circle **one** of the stock forms listed. Name **one** of the raw materials it is made from.

[1 mark]

Acrylic rod	Corrugated card	Aluminium sheet	Wool yarn	MDF board

Raw material _____

15 . 2 Choose **one** of the above stock forms. Describe the process of changing it from raw material to stock form.

[4 marks]

Name of stock form _____

16 Describe **two** ways that materials **and/or** products are strengthened or reinforced. Give examples in your answer.

[2 x 2 marks]

1.

2.

17 . 1 Choose **one** product or component in **Figure 2** and describe **two** features that make it suitable for mass production.

[2 x 2 marks]

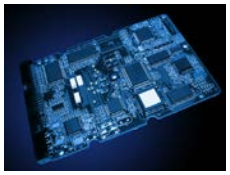
					
Steel car door	Polymer toy musical instrument	Newspaper	Cotton T - Shirt	Printed Circuit Board	Flat pack furniture

Figure 2

Name of product/component _____

Feature 1 _____

_____

_____

_____

_____

_____

Feature 2 _____

_____

_____

_____

_____

_____

17 . 2 Name the product or component you have chosen in **17.1**.

_____

[1 mark]

Name the main industrial process used in the manufacture of this product or component.

_____

Use notes and sketches to explain this process in detail.

[4 marks]

18 Choose **one** of the materials below and give **two** of its characteristics or properties. An example has been completed for you.

- Polypropylene
- Foam core board
- Brass
- Mahogany
- Silk

[2 marks]

Material	**Characteristics/Properties**
Cast iron	1 Brittle
	2 Can rust if unprotected
	1
	2

19 Designers sometimes make choices about the materials they use according to their impact on society.
Examples include the use of fair trade cotton, recycled components and biodegradable packaging.

Evaluate how the use of such materials might be seen as the ethical choice.

[10 marks]

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SECTION C Designing and Making Principles

20 . 1 Please select **one** of the products below.
This will be used as the basis for your answers in this section of the paper.

Stacking chair

Radio

Dress

State your chosen product _____

Who do you think the intended target market might be for this product and why?

[2 marks]

_____

_____

_____

_____

_____

_____

20 . 2 Evaluate your chosen product in terms of its:

(i) suitability for the user

[4 marks]

(ii) aesthetic quality

[4 marks]

(iii) environmental impact

[4 marks]

21 Anthropometric data is often used in designing products.

Give **two** examples of anthropometric data that would be used in the design of your chosen product and explain how each might be used.

[2 x 2 marks]

Example 1 _____

How is it used in the design of your product?

_____

_____

_____

Example 2 _____

How is it used in the design of your product?

_____

_____

_____

22 . 1 You have been asked to redesign your chosen product to make it suitable for a child aged between 3 and 5 years old.

The data in the table below shows the preferred colour scheme according to 250 children aged between 3 and 5 years old.

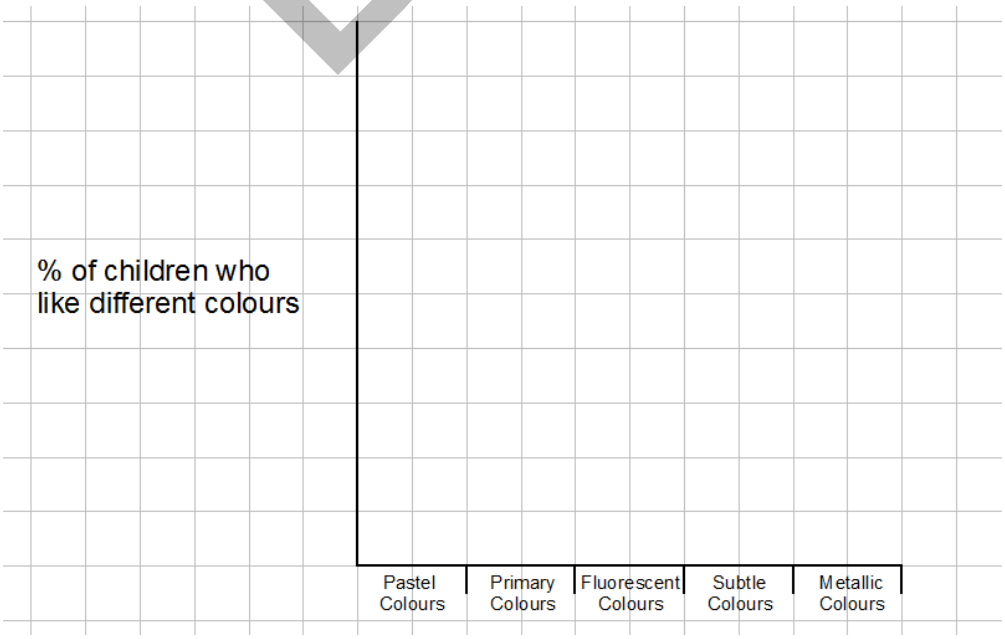
Calculate the missing percentages.

[2 marks]

	Number of children	**Percentage of total**
Pastel colours	55	22%
Primary colours	105	
Fluorescent colours	50	20%
Subtle colours	30	
Metallic colours	10	4%
Total	250	

22 . 2 Using the information from the table above create a bar chart showing the **percentages** of children who like different colours.
Label your axis with the scale of your graph.

[2 marks]



22 . 3 What does the data in your bar chart tell you about the target market?

Explain how this data would influence the way you redesign the product.

[3 marks]

23 In the space below show how the product you have selected could be redesigned to be more suitable for use by children between the ages of 3 and 5 years old.

Marks will be awarded for:

suitability of the design for the user **[3 marks]**

creativity and innovation **[3 marks]**

selection of materials **[3 marks]**

quality of communication **[3 marks]**

24 . 1 If you were to develop the idea you have shown in **question 23**, you might need to create a model of your design.

Name a suitable material **or** system that designers might use to create a model.

[1 mark]

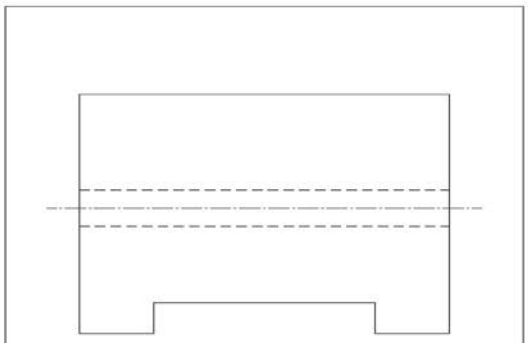
24 . 2 Explain why designers create models of their designs before final manufacture.

[3 marks]

25 Shown below is a drawing of part of the point of sale display for the product you have designed.

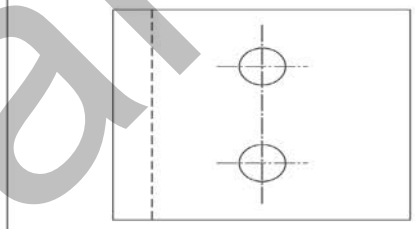
Complete the third angle orthographic projection by adding a **front view** and **isometric drawing** of the shape in the boxes provided.

[5 marks]



Plan view

Front view

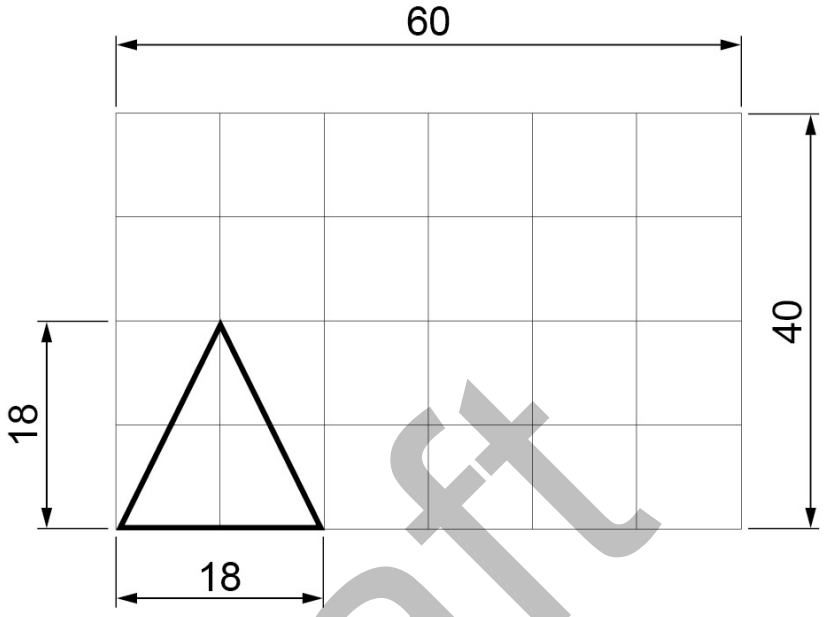


Side view

Isometric drawing

26 . 1 When packaging is cut out *'nesting'* is used to ensure that minimal material is wasted. The measurements below are in mm. Repeat the triangle on the grid below to ensure that as many fit on the material as possible.

[1 mark]



26 . 2 Calculate the amount of material wasted when producing the shapes you have drawn above.

[3 marks]

END OF QUESTIONS