Practice Paper

Once you've been through all the questions in this book, you should feel pretty confident about the exam. As final preparation, here is a **practice paper** to give you a taste of what the exam will be like. Your exam might not look exactly like this paper, but it will give you some great practice with all of the topic areas.

CGP Practice Exam Paper GCSE Design and Technology

GCSE Design and Technology

In addition to this paper, you should have:
- Normal writing equipment
- A calculator
- A ruler

Centre name					
Centre number					
Candidate number					

Time allowed:
- 2 hours

Surname
Other names
Candidate signature

Instructions to candidates
- Write your name and other details in the spaces provided above.
- Answer **all** questions in the spaces provided.
- Do all rough work on the paper. Cross through any rough work that you do not want to be marked.

Information for candidates
- The marks available for each question are given in brackets.
- There are 100 marks available for this paper.
- You are allowed to use a calculator.
- You should use good English and present your answers in a clear and organised way.

Advice to candidates
For multiple-choice questions:
- Clearly shade the oval next to your chosen answer. For example: 
- If you wish to change your answer, put a cross through your original answer. For example: 
- If you wish to change your answer to one that you have previously crossed out, draw a circle around the answer. For example: 

Section A: Core Technical Principles

Answer **all** the questions in this section.

1 Which **one** of the following is a type of ferrous metal?

A Low carbon steel ⬭

B Aluminium ⬭

C Copper ⬭

D Brass ⬭

[1 mark]

2 Which **one** of the following is an approach to manufacturing designed to minimise the amount of resources used and waste produced?

A Computer aided manufacturing ⬭

B Lean manufacturing ⬭

C Computer aided design ⬭

D Flexible manufacturing ⬭

[1 mark]

3 Which **one** of the following describes a material's ability to be drawn into a wire?

A Malleability ⬭

B Fusibility ⬭

C Ductility ⬭

D Electrical conductivity ⬭

[1 mark]

4 Products can be redesigned in response to market pull.
Which **one** of the following describes market pull?

A New technology making a product cheaper to manufacture ⬭

B Making a product based on the wants and needs of consumers ⬭

C A new material allowing a product to be lighter ⬭

D Making a product more expensive to buy ⬭

[1 mark]

5 **Figure 1** shows a pair of jeans, which are made from a denim.

Figure 1

What type of fibre is used to make denim?

A Cotton ⬭

B Wool ⬭

C Elastane ⬭

D Polyester ⬭

[1 mark]

6 **Figure 2** shows a gear train. What is the gear ratio of this mechanism?

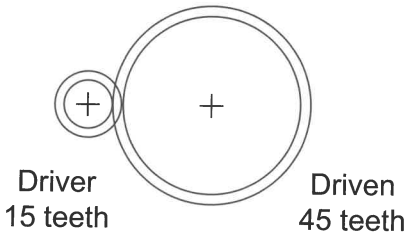

Figure 2

A 1 : 10 ⬭

B 1 : 30 ⬭

C 3 : 1 ⬭

D 60 : 1 ⬭

[1 mark]

7 What is the definition of a microcontroller?

A A small remote-controlled system ⬭

B A timer with memory ⬭

C A programmable integrated circuit (IC) with a processor and memory ⬭

D A counter made up of a series of logic gates ⬭

[1 mark]

8 Which **one** of the following statements is **true**?

A Ink jet card is designed to let the ink bleed when used with an ink jet printer. ⬭

B Solid white board is bleached white to make it suitable for printing on. ⬭

C Isometric grid paper has grid squares printed onto it to make it suitable for orthographic and scale drawings. ⬭

D Cartridge paper has a textured surface that can only be drawn on in pencil. ⬭

[1 mark]

9 **Figure 3** shows a cardboard net for sandwich packaging.

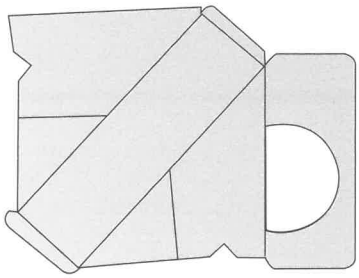

Figure 3

Which **one** of the following CAM machines could be involved in the manufacture of this product?

A CNC router ⬭

B Laser cutter ⬭

C 3D printer ⬭

D CNC milling machine ⬭

[1 mark]

10 Which **one** of the following changes to a product is most likely to be damaging to the environment?

A Making a product more durable. ⬭

B Changing the design of a product so it can be taken apart for repair. ⬭

C Changing a component in the product to a newer version which gives higher performance but is less reliable. ⬭

D Making the product from materials that are all recyclable. ⬭

[1 mark]

11 State **two** properties of oak that make it suitable for use in flooring.

1. .....

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2. .....

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[2 marks]

12 Carbonfibre reinforced plastic (CRP) is an example of a composite material.
It can be used to make bulletproof vests.

Give **two** properties of CRP that make it a suitable material for this purpose.

1. .....

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2. .....

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[2 marks]

13 A new design of toothbrush is going to be made from a bioplastic.
This plastic is made from plant-based materials.

Explain why using a bioplastic to make toothbrushes is a more environmentally friendly choice of material than using oil-based plastic.

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[2 marks]

14 The bar chart in **Figure 4** shows the electricity generated from renewable and non-renewable energy sources in a small country over 20 years.

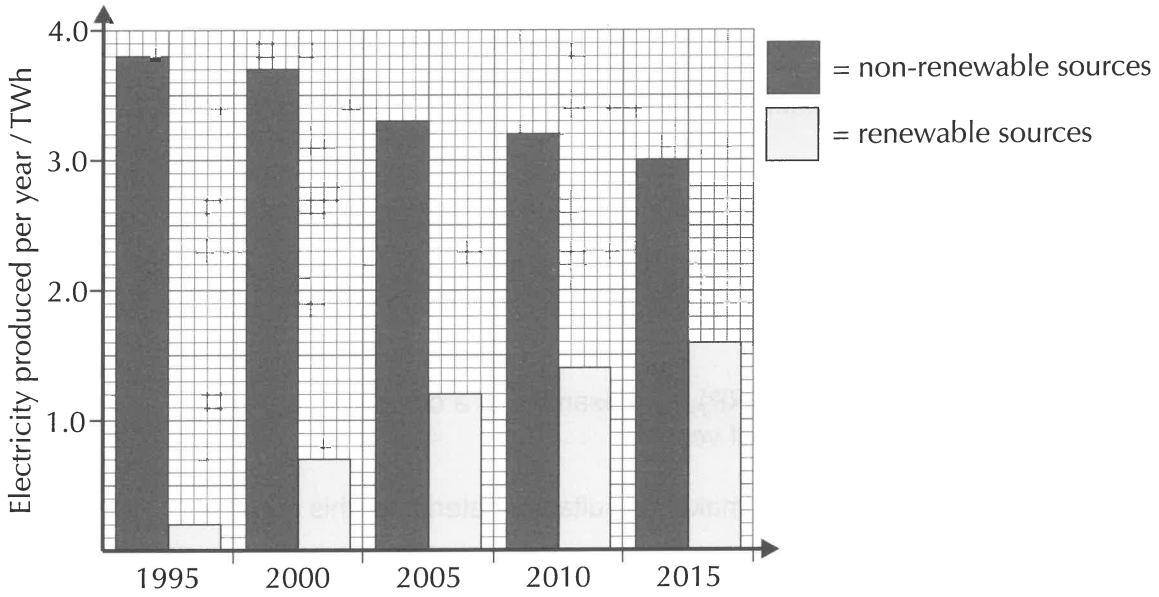

Figure 4

14.1 State the trend in the amount of electricity generated from renewable sources in **Figure 4**.

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[1 mark]

14.2 Suggest **one** reason for the trend you identified in question **14.1**.

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[1 mark]

14.3 Calculate how much **more** electricity the country produced per year in 2015 than in 1995.

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[2 marks]

[Total 4 marks]

Section B: Specialist Technical Principles

Answer **all** the questions in this section.

15 **Figure 5** shows a range of different items.

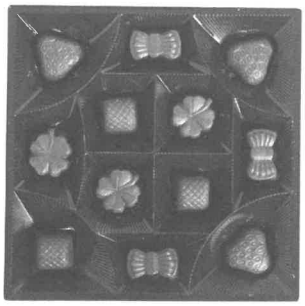	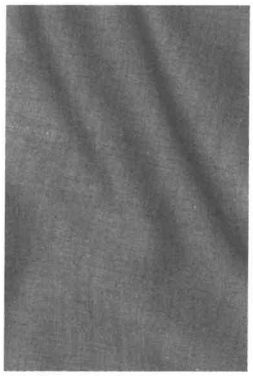		
Plastic packaging tray	Cotton fabric	Metal cogs in a watch mechanism	Printed wallpaper

Figure 5

15.1 Choose **one** of the items shown in **Figure 5**. .....

Name a process that is used to manufacture your chosen item.

Process: .....

In the box below, use sketches and/or notes to give a detailed description of this manufacturing process.

[5 marks]

Question 15 continues on the next page

15.2 For the item you have chosen in question **15.1**, describe in detail the main processes involved in the **extraction** of the raw material that it's made from, and its conversion to a useful form.

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[4 marks]

[Total 9 marks]

16 State whether one-off, batch, mass or continuous production would be the best method of production in the following situations. Explain your answer in each case.

16.1 Production of 150 double bed frames and 200 single bed frames.

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[2 marks]

16.2 Production of a 5-door family car.

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[2 marks]

[Total 4 marks]

17 Standard components are frequently used in the manufacture of products.

Choose **one** of the products in the box below.

Paper catalogue	Wooden cupboard	Coat	Bicycle

Name a suitable standard component that could be used in your chosen product.

Product: .....

Standard component: .....

In the box below, use sketches and/or notes to give a detailed description of how the standard component is used.

[4 marks]

18 For **one** of the items listed below, name a suitable finish or treatment that could be applied. Give a brief description of how your chosen finish/treatment is applied and a reason for your choice of finish/treatment.

- A book cover
- A garden shed
- The metal handle of a tool
- A 2000-metre roll of plain cotton
- A printed circuit board (PCB) in an air conditioning unit located outdoors

Chosen item: .....

Finish/treatment: .....

Description: .....

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Reason for choice: .....

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[3 marks]

19 Some products are designed so they can be reused many times.
Other products are designed for a small number of uses or even a single use.

Evaluate why products designed to be reused are considered more environmentally friendly than products designed to be used once.

[10 marks]

Section C: Designing and Making Principles

Answer **all** the questions in this section.

The product shown in **Figure 6** is a compact digital camera.
It is designed for keen adult photographers to use in a wide range of situations.

Figure 6

Specification:

- Camera features include: 20 × zoom, full HD video recording, GPS (for recording location information)
- Large 3-inch, high-resolution touchscreen
- Water and shock resistant
- Strap included (not shown)

20 Evaluate the camera in terms of its:

20.1 aesthetics

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[4 marks]

20.2 ergonomics

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[4 marks]

20.3 suitability for users

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[4 marks]

[Total 12 marks]

Turn over for the next question

21 Study the photo of the compact camera in **Figure 6** on **page 170**.

You have been asked to redesign the camera for elderly people.
It should be comfortable for them to use and easy to operate.

21.1 Suggest **four** additions or alterations that you would make to the camera's design specification.
Explain why each one would be appropriate for an elderly target market.

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3. .....

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[8 marks]

21.2 State an existing feature listed in the specification of the camera on **page 170** that is well suited to an elderly user. Give an explanation for your choice.

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[2 marks]

21.3 You have been asked to produce a manufacturing specification for the camera.

Explain what a manufacturing specification is.
Include **two** examples of details that this specification could contain.

Explanation: .....

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Example 1: .....

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Example 2: .....

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[3 marks]

[Total 13 marks]

Turn over for the next question

22 Identify **two** environmental considerations when designing a camera.
Explain how each one has an impact on the environment.

1. .....

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2. .....

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[4 marks]

23 Market research was carried out on the new camera design mentioned in **Question 21**, to find out the likes and dislikes of some potential users.
The research was carried out using questionnaires given to a group of 360 elderly people.
The results of the market research are shown in **Figure 7**.

Q1 What amount of money would you expect this camera to be worth?

Price range	Number of people
£100-125	27
£126-150	41
£151-175	83
£176-200	132
£201-225	47
£226-250	25
More than £251	5
Total	360

Note: the specification of the camera was shown on the questionnaire.

Q2 What is the minimum number of photos you would want the camera to store?

Number of photos	Number of people
Less than 400	38
401-800	69
801-1200	110
1201-1600	98
More than 1601	45
Total	360

Q3 What type of material would you prefer the main body of the camera to be made from?
Metal: 20% **Plastic: 55%**
Don't mind: 25%

Figure 7

23.1 Using the results of **Q3** shown in **Figure 7**, calculate the number of people who answered 'metal' and the number of people who answered 'plastic'.

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[1 mark]

23.2 Using the results of **Q1** in **Figure 7**, calculate the percentage of people who said they would expect to pay £200 or less for the camera. Give your answer to **1 decimal place**.

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[1 mark]

Question 23 continues on the next page

23.3 Describe how the results of the market research shown in **Figure 7** should affect the design of the camera. Discuss the results of each question and use data to support your answers.

Q1 results: .....

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Q2 results: .....

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Q3 results: .....

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[6 marks]

[Total 8 marks]

24 **Figure 8** shows the net of a gift box.

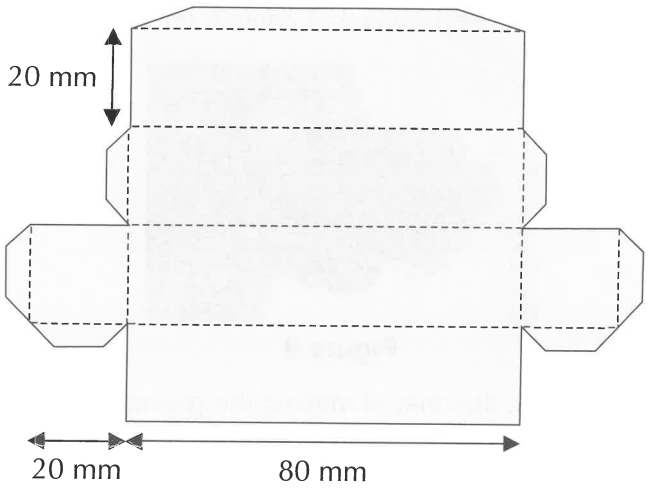

Figure 8

24.1 On the isometric grid below, produce an isometric drawing of the gift box shown in **Figure 8** when it is assembled.

10 mm

[2 marks]

24.2 Each dimension of the gift box has a tolerance of ± 1.5 mm.
The assembled gift box has a height of 21.2 mm, a width of 18.4 mm and a length of 79.1 mm.
Explain why this box does **not** fall within the stated tolerance.

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[2 marks]

[Total 4 marks]

25 **Figure 9** shows a pair of gloves for use in cold conditions that allow the wearer to use a touchscreen device (e.g. a smartphone) whilst wearing them. The gloves work because they have patches of material in the fingertips that contain conductive thread.

Figure 9

A clothing company is working out the cost of making the gloves. Lengths of conductive thread are available from several different suppliers. Each length of thread is supplied on a plastic cone.

25.1 Complete the table below to calculate the cost per metre for each supplier.

[1 mark]

Supplier	Length of thread per cone (m)	Cost of cone (£)	Cost per metre (£)
A	1650	246.50	0.15
B	1000	40.00	
C	2250	202.50	

25.2 One of the designs for the gloves uses 65 cm of conductive thread in each pair.
Calculate the total cost of thread that would need to be purchased to make 7000 pairs of gloves.
The thread will be purchased from supplier A and can be bought in whole cones only.

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[3 marks]

[Total 4 marks]

26.1 Give the design strategy that is centred around a constant process of evaluation and improvement.

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[1 mark]

26.2 Collaborating with other people is an important part of the design process.
State **two** groups of people that a designer could collaborate with.
Explain how collaboration could be useful in each case.

1. .....

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2. .....

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[4 marks]

[Total 5 marks]

END OF QUESTIONS