Paper Reference(s) 1DT0/1F
Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Design and Technology
COMPONENT 1: Timbers

Total Marks

Time: 1 hour 45 minutes

In the boxes below, write your name, centre number and candidate number.

Surname						
Other names						
Centre Number						
Candidate Number						

Q71344A

Pearson

YOU MUST HAVE

Calculator, ruler, writing and drawing equipment, protractor, compass

YOU WILL BE GIVEN

Diagram Booklet

INSTRUCTIONS

Answer ALL questions.

Answer the questions in the spaces provided in this Question Paper or in the separate Diagram Booklet – there may be more space than you need.

Calculators may be used.

Any diagrams may NOT be accurately drawn, unless otherwise indicated.

You must show all your working out with your answer clearly identified at the end of your solution.

INFORMATION

The total mark for this paper is 100.

The marks for EACH question are shown in brackets – use this as a guide as to how much time to spend on each question.

There may be spare copies of some diagrams.

ADVICE

Read each question carefully before you start to answer it.

Try to answer every question.

Check your answers if you have time at the end.

SECTION A

Core

Answer ALL questions. Write your answers in the spaces provided.

1 (a) The materials that products are made from are chosen because of their properties.

Look at FIGURE 1 for Question 1(a) in the Diagram Booklet. It shows a table of products.

For each of the products shown, give a property of the material it is made from that makes the material suitable for the product.

The first one has been done for you.

(continued on the next page)

1 continued.

(b) Explain ONE disadvantage of using urea formaldehyde for the 3-pin plug.
(2 marks)

The pins of the 3-pin plug are made from brass.

Brass is an alloy of copper and zinc in the ratio of 13:7 (13 parts copper to 7 parts zinc).

(c) On the next page calculate how much copper is required to make 50 kg of brass.
(2 marks)

(continued on the next page)

1 continued.

Answer _____ kg

(Total for Question 1 = 8 marks)

2 Look at FIGURE 2 for Question 2 in the Diagram Booklet. It shows a wall mounted book holder manufactured from mahogany.

(a) Name ONE other appropriate hardwood that could be used to make the wall mounted book holder.
(1 mark)

(b) Explain ONE working property of mahogany that makes it an appropriate choice of material for the wall mounted book holder.
(2 marks)

(continued on the next page)

2 continued.

Each wall mounted book holder is made as a one-off.

(c) Explain ONE advantage for the manufacturer of making each wall mounted book holder as a one-off.
(2 marks)

Look at FIGURE 3 for Question 2(d) in the Diagram Booklet. It shows the sizes of two pieces of mahogany used to make the wall mounted book holder.

The mahogany has a cross sectional area of $5\,cm^2$

(d) On the next page calculate the cost of the mahogany required to make one wall mounted book holder if the mahogany costs £1,200 m^3.
(4 marks)

(continued on the next page)

2 continued.

Cost £ _____

(Total for Question 2 = 9 marks)

3 Look at FIGURE 4 for Question 3 in the Diagram Booklet. It shows an electrically powered hand drill and the circuit symbol for an electrical component.

(a) Name the type of electrical component from the circuit symbol shown in Figure 4.
(1 mark)

The electrically powered hand drill is being redesigned. The manufacturer is considering using a bevel gear inside.

(b) Explain ONE reason for using a bevel gear inside the electrically powered hand drill.
(2 marks)

(continued on the next page)

3 continued.

(c) The electrically powered hand drill also has a compound gear train inside.

Look at FIGURE 5 for Question 3(c) in the Diagram Booklet. It shows a schematic diagram of the compound gear train.

Calculate the revolutions per minute (RPM) of the driven gear if the driver gear rotates at 400 RPM. (2 marks)

Driven gear _____ RPM

(d) Explain ONE benefit of using a battery for the electrically powered hand drill.
(2 marks)

(continued on the next page)

3 continued.

The manufacturer of the electrically powered hand drill is considering using carbon fibre for the main body.

(e) Explain TWO benefits of using carbon fibre for the main body of the electrically powered hand drill. (4 marks)

1

2

(Total for Question 3 = 11 marks)

4 A not-for-profit organisation has developed some agro-textiles that can be used by farmers.

(a) Explain TWO ways that agro-textiles can be used by farmers.
(4 marks)

1

2

(continued on the next page)

4 continued.

(b) A farmer requires 420 m^2 of agro-textile to cover their field.

The agro-textile is available in rolls 50 m long measuring 1·2 m wide.

Calculate the number of rolls of agro-textile the farmer needs to cover their field.
(2 marks)

Number of rolls _____

(continued on the next page)

4 continued.

(c) Discuss how fair trade products have been used to support farmers and societies in developing countries.
(6 marks)

(continued on the next page)

4 continued.

(continued on the next page)

4 continued.

(continued on the next page)

4 continued.

(continued on the next page)

4 continued.

(Total for Question 4 = 12 marks)

TOTAL FOR SECTION A = 40 MARKS

SECTION B

Timbers

Answer ALL questions. Write your answers in the spaces provided.

5 Look at FIGURE 6 for Question 5 in the Diagram Booklet. It shows a design solution for a bird feeder together with some additional information.

(a) The bird feeder holds a full jar of peanut butter and needs to be improved to include the following specification points.

The bird feeder must:

- **hold the jar securely and allow an empty jar to be easily replaced**
- **include a cover that protects the backboard and jar support and keeps the jar dry**
- **be able to be hung up in a tree and easily moved to another tree.**

(continued on the next page)

5 continued.

In the Diagram Booklet, use notes and sketches, on the outline, to show how the bird feeder could be modified to include these three specification points.

You will be marked on how you apply your understanding of design and technology, not your graphical skills.
(6 marks)

(continued on the next page)

5 continued.

(b) Look at FIGURE 7 for Question 5(b) in the Diagram Booklet. It shows a wooden money box in the shape of a tea cup.

Explain TWO ways that the wooden money box meets, or fails to meet, the criteria of providing a method to encourage young children to save money.
(4 marks)

1 _____

_____

_____

_____

_____

_____

(continued on the next page)

5 continued.

2 _____

_____

_____

_____

_____

(Total for Question 5 = 10 marks)

6 Look at FIGURE 8 for Question 6(a) in the Diagram Booklet. It shows a children's easel.

The front and back sections of the frame are made from a hardwood and open using hinges.

Paper is placed on the MDF painting surface.

The MDF for the painting surface is manufactured from a standard sized board.

(a) Explain TWO advantages for the manufacturer of using a standard sized board for the MDF painting surface.
(4 marks)

1 _____

_____

_____

_____

_____

_____

(continued on the next page)

6 continued.

2 _____

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_____

_____

_____

(continued on the next page)

6 continued.

(b) Look at FIGURE 9 for Question 6(b) in the Diagram Booklet. It shows a rebate on the inside of the top rail of the frame where a 25 mm butt hinge is fixed.

In the space below and on page 28, use notes and sketches to show how the rebate for the hinge would be cut using hand tools.

You will be marked on how you apply your understanding of design and technology, not your graphical skills.
(4 marks)

(continue on the next page)

6 continued.

(continued on the next page)

6 continued.

(c) The frame of the children's easel has been finished with varnish.

Explain ONE reason why varnish has been applied to the frame of the children's easel.
(2 marks)

(continued on the next page)

6 continued.

(d) Give TWO different wood joints that could be used to join the bottom rail and an upright on the easel.

For each wood joint, explain ONE advantage of using the wood joint to join the bottom rail and an upright on the easel.
(6 marks)

Joint 1

Explanation

(continued on the next page)

6 continued.

Joint 2

Explanation

(Total for Question 6 = 16 marks)

7 Look at FIGURE 10 for Question 7 in the Diagram Booklet. It shows a flower vase that holds a test tube.

The main body is cut out from a single piece of ash and the two side pieces are bent outwards by placing in the top part to form the curves.

(a) State the type of force the top part is subjected to from the two side pieces of the main body.
(1 mark)

(continued on the next page)

7 continued.

(b) Explain TWO working properties of ash that make it an ideal material for the flower vase.
(4 marks)

1 _____

2 _____

(continued on the next page)

7 continued.

Look at FIGURE 11 for Question 7(c) in the Diagram Booklet. It shows a dimensioned drawing of the main body of the flower vase before the sides are bent.

The main body is manufactured from a single piece of ash.

(c) On this page and page 34 calculate the volume of waste material produced when making the main body.

Give your answer to the nearest whole cm^3.

Use $\pi = 3{\cdot}142$

(5 marks)

(continued on the next page)

7 continued.

Answer _____ cm^3

(continued on the next page)

7 continued.

The main body of the flower vase could be fabricated from separate pieces of ash rather than from a single piece.

(d) Explain TWO reasons for fabricating the main body of the flower vase from separate pieces of ash rather than manufacturing it from a single piece.
(6 marks)

1 _____

_____

_____

_____

_____

_____

_____

_____

(continued on the next page)

7 continued.

2

(Total for Question 7 = 16 marks)

8 Look at FIGURE 12 for Question 8 in the Diagram Booklet. It shows a dinner tray manufactured from plywood.

The dinner plates, glasses and knife and fork are all placed in slots that are 9 mm deep.

(a) Explain ONE benefit of manufacturing the dinner tray from plywood.
(2 marks)

(continued on the next page)

8 continued.

The dinner trays are subjected to quality control checks during manufacture.

(b) Explain ONE advantage of carrying out a quality control check on the dinner trays during manufacture.
(3 marks)

(continued on the next page)

8 continued.

(c) Explain TWO reasons for using a router to manufacture the dinner trays.
(4 marks)

1 _____

2 _____

(continued on the next page)

8 continued.

(d) The dinner tray is manufactured from plywood and has an oak veneer applied to its surface.

Look at FIGURE 13 for Question 8(d) in the Diagram Booklet. It shows some additional information about the dinner tray.

(continued on the next page)

8 continued.

Analyse the information in Figure 13.

Evaluate the dinner tray with reference to social and availability factors including:

- use for different social groups
- use of stock materials
- use of specialist materials.

(9 marks)

(continued on the next page)

8 continued.

(continued on the next page)

8 continued.

(continued on the next page)

8 continued.

(Total for Question 8 = 18 marks)

TOTAL FOR SECTION B = 60 MARKS

TOTAL FOR PAPER = 100 MARKS

END OF PAPER