SPECIMEN MATERIAL

Please write clearly, in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

AS level

DESIGN AND TECHNOLOGY (PRODUCT DESIGN)

Paper 1

Date of Exam Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- Normal writing and drawing instruments
- a scientific 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 outside the box around each page or 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 80.
- There are 45 marks in Section A and 35 marks in Section B.

Advice

- Illustrate your answers with sketches and/or diagrams wherever you feel it is appropriate.

SECTION A

0 1 Select the correct manufacturing process for a roll of Low Density Polyethylene (LDPE) food wrap film.

[1 mark]

Injection moulding ⬭

Calendaring ⬭

Extrusion ⬭

Compression moulding ⬭

0 2 **Figure 1** shows a dimension drawing of a paper weight that is to be cast in pewter.

[5 marks]

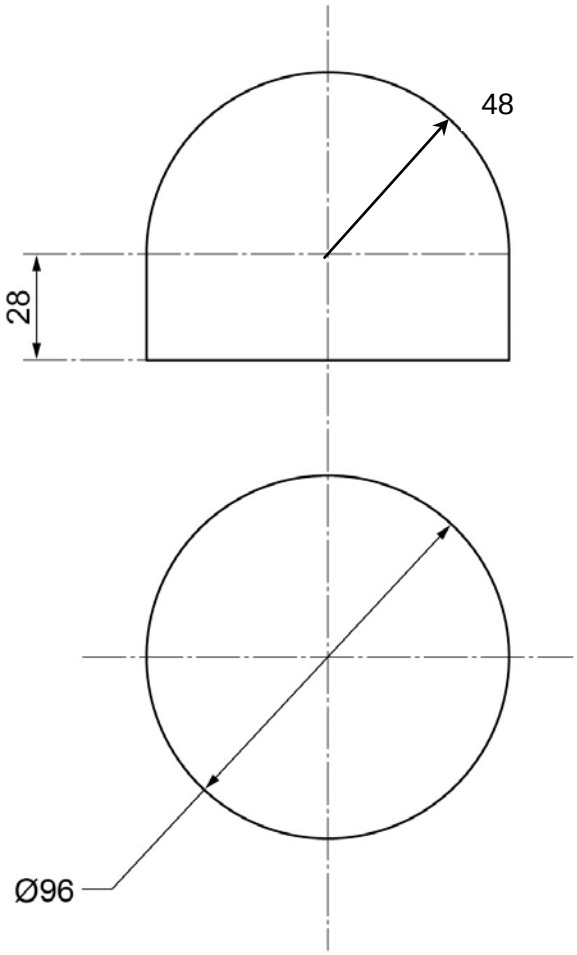


Figure 1

All dimensions in mm

The density of pewter is 7.29g/cm^3. Calculate the mass of the paper weight to the nearest whole gram.

Answer _____

0 3 If there is 10kg of pewter available, how many paper weights can be made?

[1 mark]

0 4 Evaluate the environmental issues associated with the use of polymers such as Polyvinyl Chloride (PVC).

[6 marks]

0 5 Define the meaning of the term ‘smart material’.

[2 marks]

0 6 Name a specific ‘smart material’ and an energy saving product that it is used in.

[2 marks]

0 7 Describe how the properties of the smart material you have chosen enable energy to be saved.

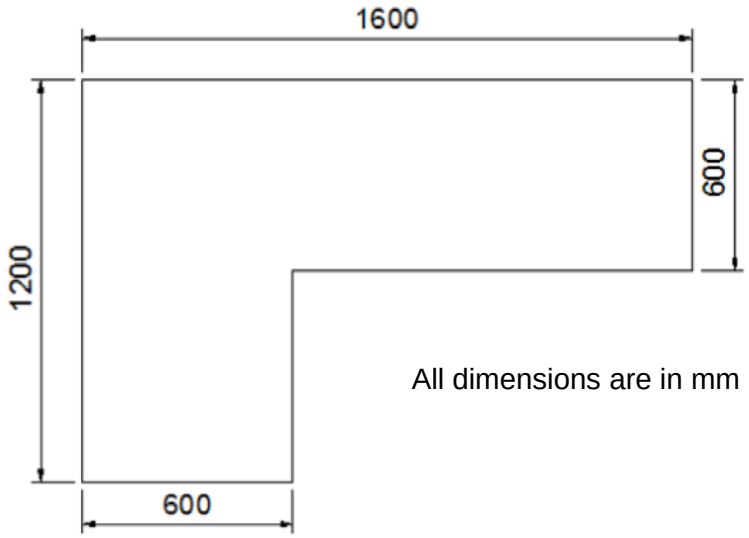
[2 marks]

0 8 Explain how a comparative workshop test for hardness would be carried out in order to select a suitable wood to manufacture a child's toy.

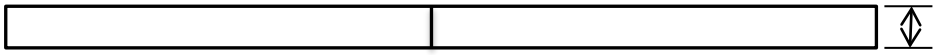
[8 marks]

0 9

Figure 2 shows an office desk. The top of the office desk can be made from **either** solid oak or oak veneered MDF.
The dimensions of the desk top are shown below.



All dimensions are in mm



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The stock forms and prices of solid oak, oak veneered MDF and edging tape are shown in the table below.

	Solid oak	Oak veneered MDF	Edging tape
Stock Size	PAR plank 100 × 18	Sheet 2440 × 1220 × 18	50 meter roll 19mm thickness
Cost	£ 6.70 per metre	£46.60	£1.50 per metre

How much would it cost to make the table top in each of the two materials?

[6 marks]

Oak Veneered MDF desktop cost £ _____

Solid oak desktop cost £ _____

1 0 Compare the material properties and performance characteristics of solid oak and oak veneered MDF. Which is the most appropriate material for the office desk in **Figure 2**?

[6 marks]

1 1 The legs of the office desk in **Figure 2** are made from tubular low carbon steel. Suggest a suitable applied finish for the desk legs and explain why this finish is appropriate.

[6 marks]

SECTION B

External view:

Internal view:

Figure 3

Craft knife manufactured using die casting process.
The body is made from metal, the grip is made from an elastomer.

1 2 Analyse the environmental impact at the end of life for the craft knife shown in **figure 3.**

[6 marks]

1 3 Explain how maintenance has been considered in the design of the craft knife.

[6 marks]

Turn over for next question

1 4 **Figure 4** and **Figure 5** show chairs from the modernist and post-modernist design movements.

Figure 4
Modernist

Figure 5
Post-modern

Evaluate how well each of the chairs meets the design principles of the movement to which it belongs.

[8 marks]

1 5 Explain how the development of touchscreen technology has improved the inclusivity of mobile phone design.

[7 marks]

1 6 What responsibilities does a manufacturer have to ensure the safety of employees?

[8 marks]

END OF QUESTIONS