

ADDITIONAL SPECIMEN ASSESSMENT MATERIAL

Please write clearly, in	block capitals.		
Centre number		Candidate number	
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Surname			
Forename(s)			
Candidate signature _			/

A-LEVEL DESIGN AND TECHNOLOGY PRODUCT DESIGN

Paper 2 Designing and Making Principles

Additional specimen

Morning Time allowed: 1 hour 30 minutes

Materials

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.
- Answer **all** questions.
- You must answer the questions in the spaces provided
- Do all rough work in this book.
- Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The total number of marks available for this paper is 80.

Section A

Answer all questions in the spaces provided.

0 1 . T Figure 1 shows a 2010s modern cordless kettle. Figure 2 and Figure 3 show a 1980s kettle.

Compare the two kettles shown.

In your answer you should refer to:

- Product safety
- Energy efficiency
- Ergonomics

[12 marks]

Figure 1

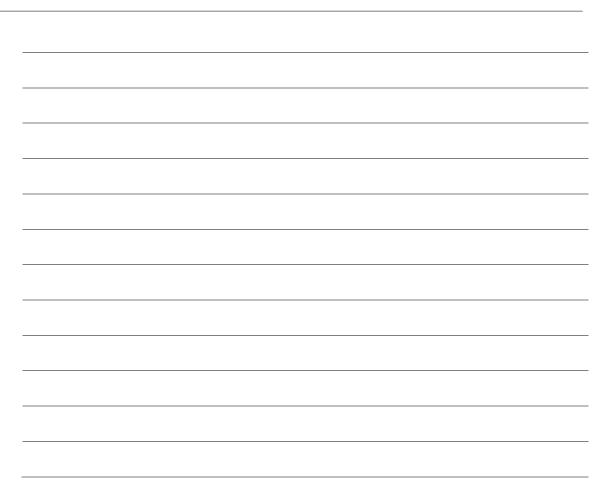






	Modern kettle	1980s kettle
Material	ABS	Stainless steel with a polymer handle.
Power supply	Detachable base unit	Plug in power cord
Method of filling	Hinged lid	Removable lid
Heating element	Flat hot plate	Heating filament





01. 2 Analyse and evaluate the impact of a circular economy on the design and manufacture of kettles.

[6 marks]

1. 3 Explain different methods of testing that would have been used before the 2010s modern cordless kettle (**Figure 1**) was made available for sale to the public.

[6 marks]

0 1 . 4 Describe the stages of a product life cycle in relation to a modern kettle. [6 marks]

End of Section A

Section B

Commercial Manufacture

Answer **all** questions in the spaces provided.

0 2 . **1 Figure 4** shows a tea infuser designed by Marianne Brandt.

Analyse and evaluate how well the tea infuser follows the principles and ethos of the Bauhaus Design School.

[6 marks]



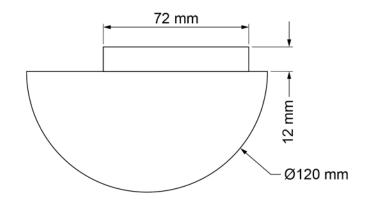
Turn over for the next question

0 2 . **2** The volume of a sphere is $4/3\pi r^3$

Figure 5 shows a side view of the hemispherical base and cylindrical top section of Marianne Brandt's tea infuser.

Calculate the total volume of these parts of the tea infuser.

[4 marks]





0 4 . 1 Figure 6 shows a standing workstation. The ideal height for the desk top is level with the elbow height of the user as shown in **Figure 7**.

Calculate the range of height adjustment required to accommodate the 15th to 85th percentiles of the sample shown in **Table 1**.





 Table 1 shows the ideal elbow height from a range of users.

Standing elbow height	Number in sample
937	5
962	12
987	17
1012	23
1037	30
1062	38
1087	32
1112	26
1137	19
1162	14
1187	4

04. 2 Discuss specific pieces of anthropometric data that would be used when designing adjustment controls for the standing workstation. [6 marks]

0 5

Describe specific primary investigations that could be undertaken in the development of the shopping trolley shown in **Figure 8** and **Figure 9**.

[6 marks]



Analyse and evaluate the impact of die casting on the environment.	[6 marks]	

Turn over for the next question

0 6

0 7	List the stages of six sigma . Stage 1 has been completed for you.	[4 marks]
	Stage 1: Define the issue with the process	
	Stage 2:	
	Stage 3:	
	Stage 4:	
	Stage 5:	
0 8	Give three reasons why consumers may look for the FSC logo on produpurchase.	ucts they
		[3 marks]

Table 2 shows the results from a focus group on a new toothbrush design.

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Using this data, calculate the maximum and minimum percentages of 20 - 29 year olds that could have thought the toothbrush was

- good value for money and
- cleaned effectively.

Show your working.

[4 marks]

Table 2

	Is the toothbrush good value for money?		Does the too	
Age bracket	Yes	No	Yes	No
Male 20-29	10	6	12	4
Males 30-39	8	8	10	6
Males 40+	4	12	11	5
Females 20-29	15	5	17	3
Females 30 – 39	9	7	10	6
Females 40+	12	6	13	5

Maximum:			

Minimum:

End of questions



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