

Surname	Centre Number	Candidate Number
First name(s)		2



GCE A LEVEL

1603U30-1



WEDNESDAY, 7 JUNE 2023 – AFTERNOON

DESIGN AND TECHNOLOGY – A2 unit 3

Product Design

2 hours 30 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	8	
2.	8	
3.	12	
4.	12	
5.	8	
6.	8	
7.	12	
8.	12	
9.	8	
10.	12	
Total	100	

ADDITIONAL MATERIALS

A calculator, ruler, pencils and coloured pencils.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **ALL** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

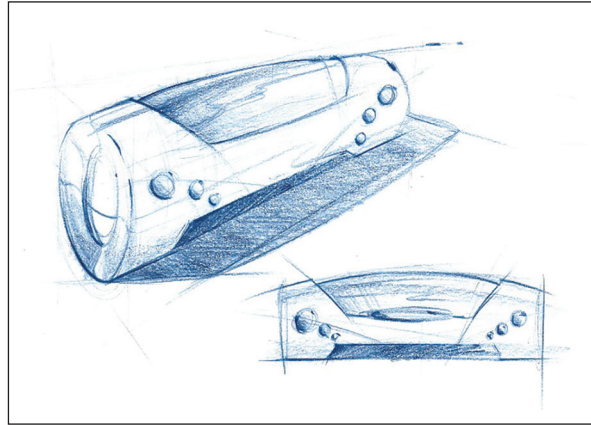
The number of marks is given in brackets at the end of each question or part-question. You are advised to divide your time accordingly.

The total number of marks available is 100.

You are reminded of the need for good English and orderly, clear presentation in your answers. The quality of your written communication, including appropriate use of punctuation and grammar, will be assessed in your answer to question **10**.

Answer **all** questions.

1. The speaker design below is at the development stage of the iterative design process.



- (a) Explain **one** benefit and **one** drawback of freehand sketching versus CAD modelling. [4]

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- (b) Explain **two** key aspects of aesthetics that need to be considered when developing the design proposal for the speaker. [4]

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2. As part of their research strategy, a designer is looking to carry out reverse engineering on the competitor product below.



- (a) Describe what is meant by the term 'reverse engineering'.

[2]

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- (b) Discuss how the designer can benefit from carrying out reverse engineering on the competitor product.

[6]

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3. A homeowner is looking to upgrade their security by installing a new smart lock.



Old night latch lock
RRP £40



New smart lock
RRP £120

- (a) Before developing the new smart lock, primary research was carried out. Identify a method of primary research and describe the main benefit to the designer. [2]

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- (b) Explain how the selection of materials and components relate to the price and performance of the two types of locks above. [4]

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- (c) Discuss the innovative use of technology incorporated into the new smart lock to benefit the consumer. [6]

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4. The one-piece salad container below has been manufactured by vacuum forming.



- (a) State the name of an appropriate polymer that can be used to create the one-piece salad container and explain the properties that make it a suitable material.

[4]

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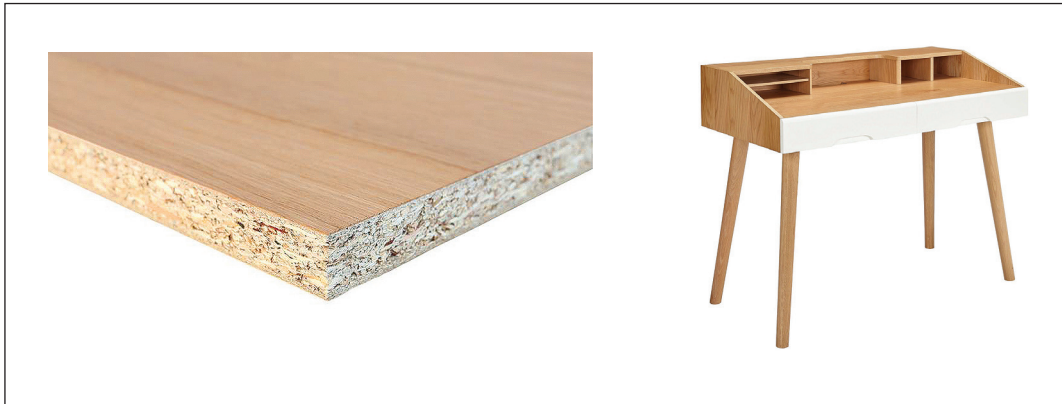
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- (b) Using notes and sketches, explain the features required to produce a successful industrial former for the one-piece salad container.

[8]

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5. Veneered chipboard is used in the construction of the desk shown below.



- (a) Explain **two** advantages of using veneered chipboard compared to a natural timber when manufacturing the top of the desk.

[4]

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- (b) Discuss the issues related to joining separate parts of veneered chipboard to construct the desk and how these can be successfully overcome.

[4]

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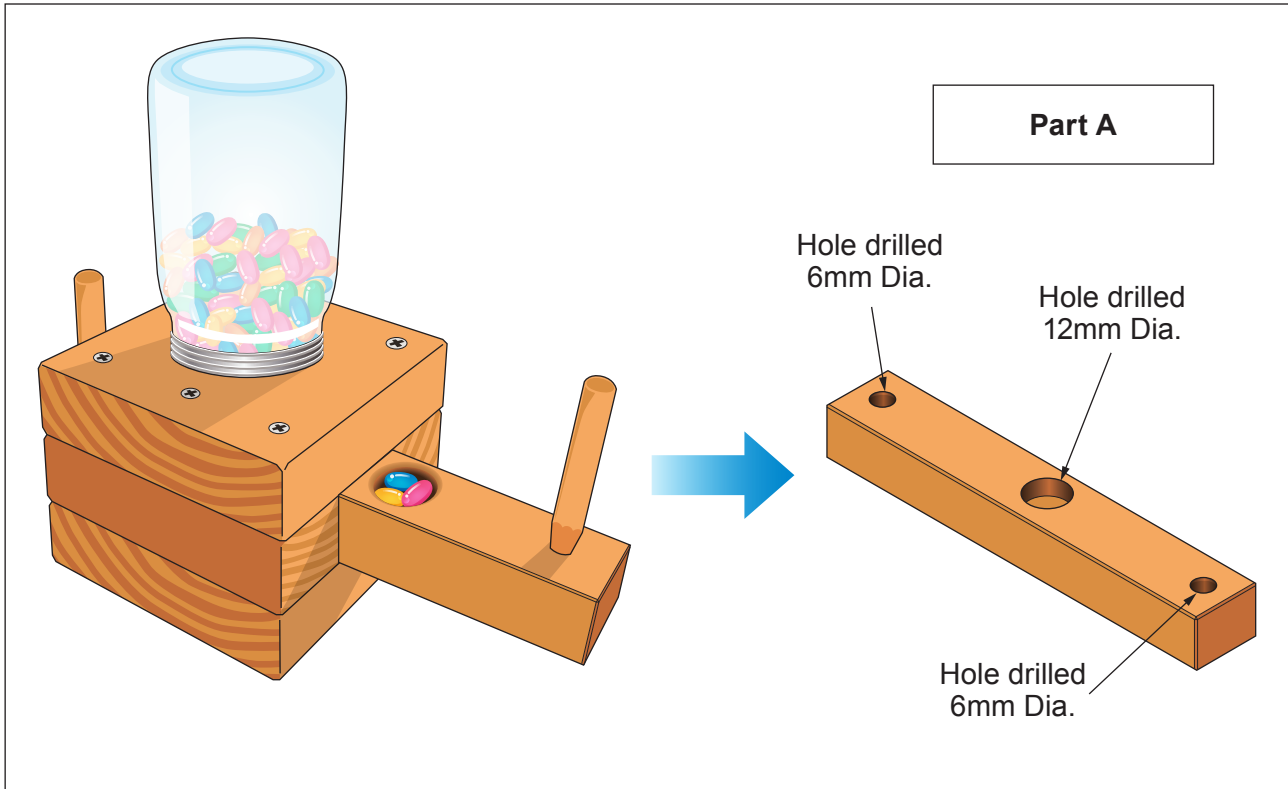
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6. The sweet dispenser below has been manufactured as a prototype before going into batch production.



- (a) Discuss why a jig would be used in the batch production of **Part A**.

[2]

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- (b) Using notes and sketches design a possible jig to batch produce **Part A**.

[6]

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[2]

[10]

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8. The following products have been manufactured from a range of materials suitable for their uses.



Corrugated cardboard pizza box



HDPE liquid detergent bottle



Stainless steel kettle

- (a) Pizza box

Describe the properties of corrugated cardboard that make it suitable for the pizza box.

[4]

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- (b) Liquid detergent bottle

Describe the properties of HDPE that make it suitable for the liquid detergent bottle. [4]

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(c) Kettle

Describe the properties of stainless steel that makes it suitable for the kettle.

[4]

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9. Before design and manufacturing takes place, companies will carry out feasibility studies.

Discuss the factors that will need to be considered during a feasibility study.

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- Marks will be awarded for the content of the answer and the quality of written communication.

Turn over.

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