



GCSE

3603U10-1

MONDAY, 19 JUNE 2023 – MORNING

DESIGN AND TECHNOLOGY

Unit 1

PRODUCT DESIGN

2 hours plus your additional time allowance

Surname _____

First name(s) _____

Centre Number _____

Candidate Number 0 _____

For Examiner's use only

Question	Maximum Mark	Mark Awarded
1.	10	
2.	20	
3.	25	
4.	15	
5.	20	
6.	10	
Total	100	

ADDITIONAL MATERIALS

In addition to this examination paper, you will need a calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball-point pen or your usual method.

Write your name, centre number and candidate number in the spaces provided on the front cover.

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 5 (c).



Auxiliary handle



Fits existing garden tools

Answer ALL questions.

1. The auxiliary handle shown opposite has been designed to fit onto existing garden tools.

(a) Describe ONE 'market pull' factor that has resulted in the design of the auxiliary handle.

[2 marks]

1 (b) Anthropometrics involves studying human sizes. Explain TWO anthropometric considerations that the designer would need to include for the auxiliary handle to be successful. 2 × [2 marks]

Consideration 1: _____

Consideration 2: _____



2. The images opposite show a bicycle carrier which can be mounted to the roof of most vehicles.
- (a) The frame of the bicycle carrier is made from aluminium tubing. Describe TWO benefits of using aluminium for the bicycle carrier. 2 × [2 marks]

Benefit 1: _____

Benefit 2: _____

The clamp shown, which holds the bicycle frame, is made from ABS.



2 (a) Explain TWO properties of ABS that make it a suitable material for the clamp of the bicycle carrier. 2 × [2 marks]

Property 1: _____

Property 2: _____



Lock 1



**Roof bar
fitted to
vehicle**

Bicycle frame



Lock 2





3. Study the details opposite of the ‘power & play’ product.

Features:

- Includes a 4000 mAh power bank with LED display and torch feature.
- 3-in-1 cable compatible with Apple Lightning, Apple 30-pin, and micro USB connections.
- Earbud style in-ear headphones with in-line microphone.

(a) (i)

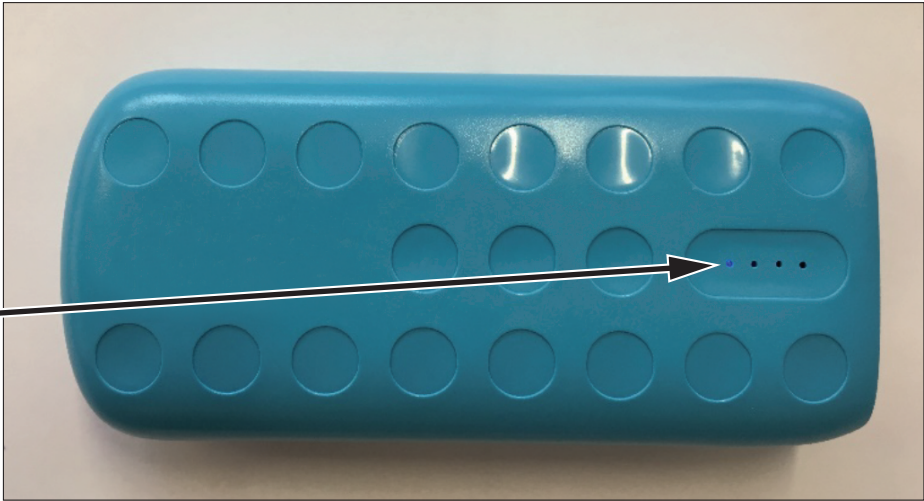
Explain why this product has been developed.

[2 marks]

3 (a) (ii)

Describe the target market that the 'power & play' product was designed for. [2 marks]

LEDs



3 (b) The LEDs shown in the image opposite indicate the charge in the power bank.

(i) Explain ONE benefit for including the indicator in the power bank. [2 marks]

(ii) Explain ONE limitation for including the indicator in the power bank. [2 marks]



3 (c) The ‘power & play’ is sold in a casing consisting of a two-part transparent outer shell.

(i) Give ONE reason why the manufacturer would choose to make the two-part casing transparent.

[2 marks]

(ii) Explain why transparent polycarbonate is a suitable material for injection moulding the two-part casing. [2 marks]

(Turn over)



3 (d) The white opaque insert fits inside the casing and securely holds the component parts of the ‘power & play’ product.

(i) State the name of a suitable thermoplastic sheet for making the insert. [1 mark]

3 (d) (ii)

Name and describe in detail a suitable manufacturing process that could be used to make the insert in a school workshop.

Manufacturing process: [1 mark]

Detailed description of the named process: [4 marks]

(Turn over)



Capacity: 4000mAh
Input: 5V/1A
Output: 5V/1A

CE RoHS X

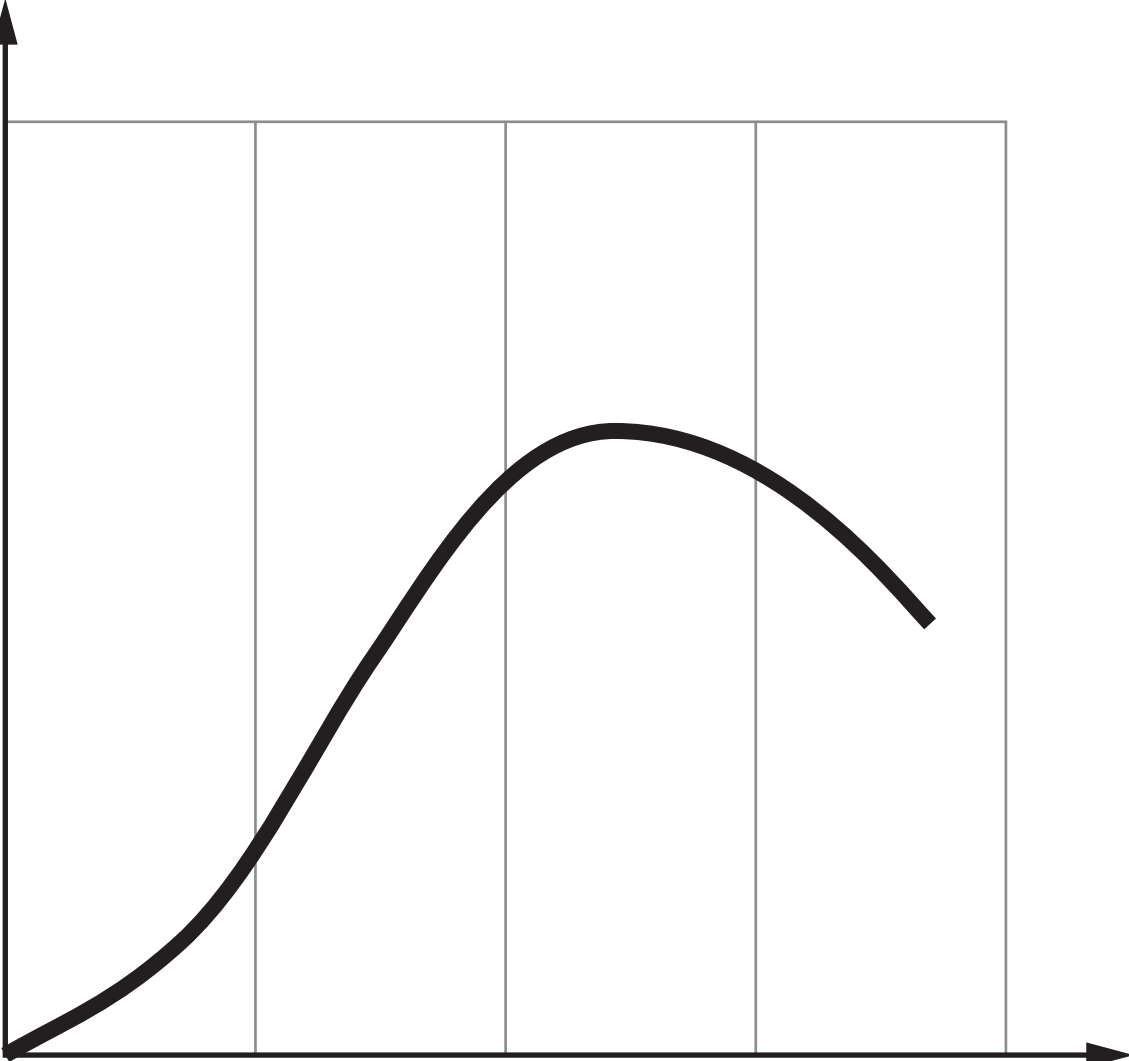


4. The portable self-assembly hockey goals shown opposite have been designed for primary school indoor games lessons.

(a) Explain ONE advantage to the primary school for purchasing the self-assembly hockey goals.

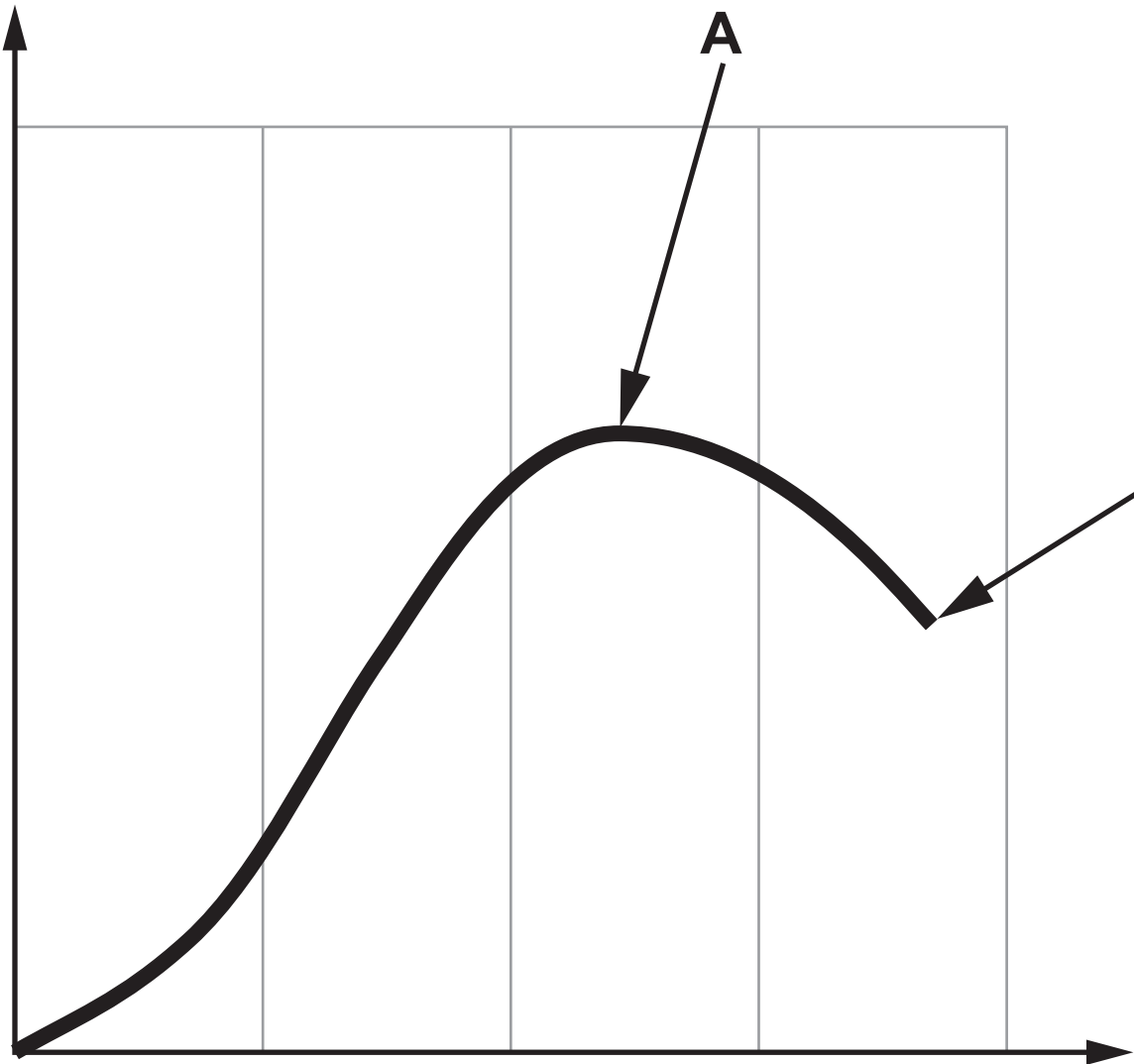
[2 marks]

Sales



Time

Sales



A

B

Time

4 (b) (iii)

Explain ONE possible benefit to the consumer of purchasing the product at point **B**. [2 marks]



dyson

5 (c) The Design Council encourages designers to ‘Discover, Define, Develop and Deliver’.



Evaluate how this is reflected in the iterative design process. [10 marks]

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

(Turn over)

6 (ii)

The legs of the menu holder are made using a laser machine and from 3 mm plywood. Describe TWO advantages to the designer of using laser cutting to make the legs. 2 × [2 marks]

Advantage 1: _____

Advantage 2: _____

6 (iii)

Describe how a restaurant's logo could be added to the legs when laser cutting. [2 marks]

END OF PAPER

(Turn over)

