



GCSE

3603U10-1

**WEDNESDAY, 15 JUNE 2022 –
AFTERNOON**

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.	12	
3.	13	
4.	20	
5.	20	
6.	25	
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.

You may use a pencil for graphs and diagrams only.

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

Answer ALL questions.

(Turn over)

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

INFORMATION FOR CANDIDATES

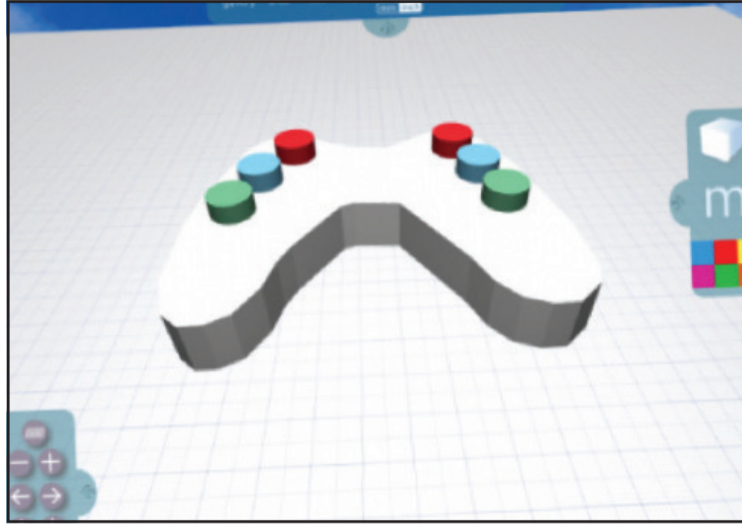
The number of marks is given in brackets at the end of each question or part question. You are advised to divide your time accordingly.

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 4(a).

(Turn over)



CAD model



Foam model



Final prototype

Answer ALL questions.

1. The images opposite show a new game controller at different stages of design.

(i) Describe why the designer of the new game controller would choose to create the CAD model. [2 marks]

(Turn over)

7

(Turn over)



2. The new solar bicycle light opposite has been developed as a result of market pull.

(i) Explain the advantages to the user of using the solar bicycle light.

[2 marks]

2 (iii) Identify and explain TWO possible problems that users might experience when using the solar bicycle light. 2 × [2 marks]

Problem 1: _____

Problem 2: _____

(Turn over)



2 (iv) The new solar bicycle light pictured opposite is intended to fit any bicycle. Explain how this has been achieved. [2 marks]

Explanation: _____



Stand **Pendant**



3. A student has designed and made a range of pewter jewellery items (opposite) aimed at surfers.

(a) (i) Describe the properties of pewter that make it a suitable material for the pendant. [2 marks]

3 (a) (iii)

Identify THREE possible hazards that the student would need to consider when casting the pewter.

3 × [1 mark]

Hazard 1: _____

Hazard 2: _____

(Turn over)

Hazard 3: _____



3 (b) The jewellery items opposite are displayed on transparent stands made from a thermoplastic.

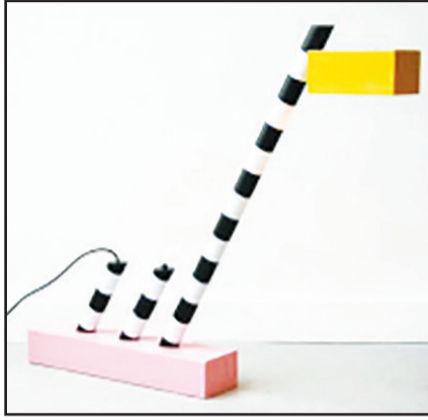
(i) Name a specific thermoplastic suitable for making the stands.

[1 mark]

(ii) Describe a suitable process for cutting the stands from sheet material and achieving the shape of the stand shown opposite.

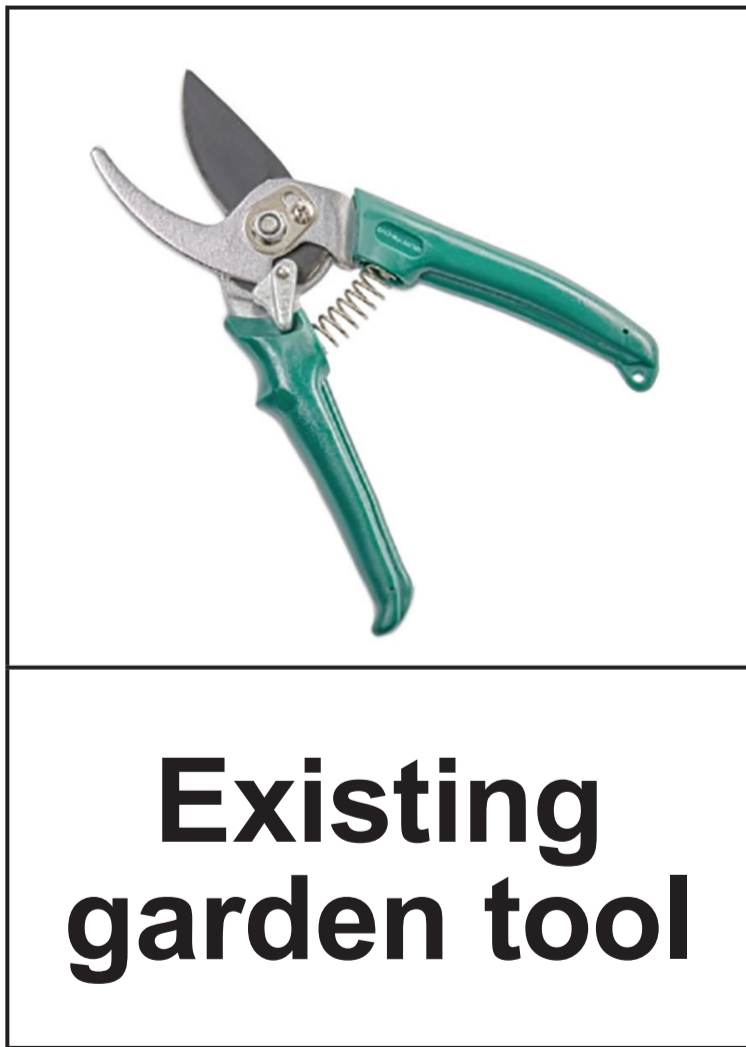
[4 marks]

(Turn over)



- 4. Study, in detail, the products shown opposite.**
- (a) Analyse how designers have used different sources of inspiration to develop these products. [10 marks]**

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



5. The new garden tool opposite has been designed to replace an existing garden tool for cutting and pruning plants and shrubs.

(a) The body of the new garden tool is made from aluminium with a Teflon coating.

(i) Describe TWO properties of aluminium that make it suitable for the body of the new garden tool.

2 × [2 marks]

Property 1: _____

(Turn over)

Property 2: _____

5 (a) (ii)

Explain the reason for applying the Teflon coating to the body of the new garden tool. [2 marks]

5 (b) The black cutting blade used in the new garden tool is made from carbon steel, and can be easily removed from the rest of the tool.

(i) Explain why carbon steel is an appropriate material for the cutting blade. [2 marks]

5 (b) (ii)

Describe TWO benefits to the user of being able to remove the cutting blade easily. 2 × [2 marks]

Benefit 1: _____

Benefit 2: _____

(Turn over)



5 (c) A detachable cleaning brush (opposite) is included in the new garden tool.

Describe the properties of nylon that make it suitable for the bristles of the cleaning brush. [3 marks]



6. The images opposite show a new swimming aid that has been developed in a range of colours.

(a) (i) Describe TWO reasons why the swimming aid is manufactured in a range of colours. 2 × [2 marks]

Reason 1: _____

Reason 2: _____

6 (a) (ii)

State and explain the most appropriate scale of production for making the range of swimming aids.

[1 mark] + [3 marks]

Scale of production: _____

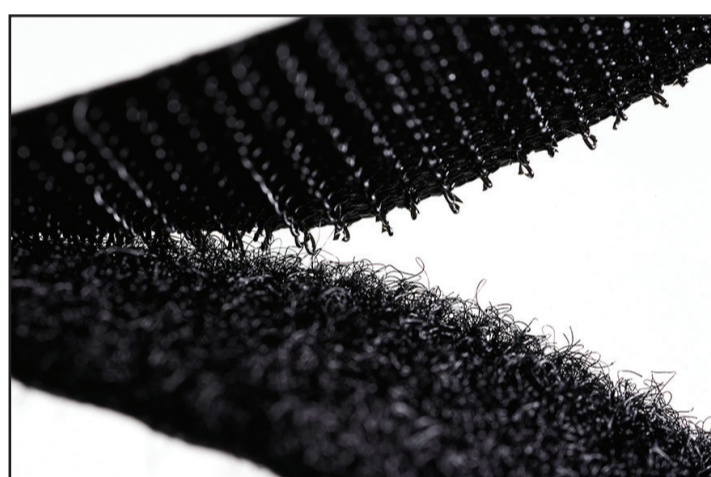
Explanation: _____

(Turn over)

6 (b) The swimming aid is made from an expanded foam and weighs 240 g. It will support users weighing between 15 kg and 100 kg.

(i) Describe why the properties of the expanded foam make it a suitable material for the swimming aid.

[2 marks]



6 (b) (iii)

The swimming aid has passed both Toy Safety and Buoyancy Aid International Safety Standards. Explain how this is important to the consumer. [2 marks]



