



Rewarding Learning

General Certificate of Secondary Education
2025

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Technology and Design

Unit 2

Option C:
Product Design



[GTY23]

GTY23

WEDNESDAY 11 JUNE, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Questions which require drawing or sketching should be completed using an H.B. pencil.

All written questions must be completed using black ink only.

Do not write in pencil or with a gel pen.

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Quality of written communication will be assessed in Question 8.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.



Answer **all** questions

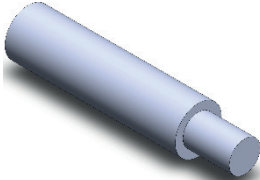
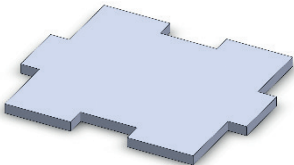
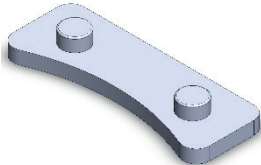
1 **Table 1** shows three component parts which are to be made using different computerised manufacturing techniques.

(a) (i) Complete **Table 1** by selecting the most appropriate computerised manufacturing technique for each part from the list below. Each technique should be used only once.

Computerised manufacturing techniques:

- CNC lathe
- Laser cutter
- 3D printer

Table 1

1		
2		
3		

[3]

(ii) Outline **three** reasons why a company may use computerised manufacturing techniques in the mass production of parts.

1. _____ [1]

2. _____ [1]

3. _____ [1]



- (b) A plan view and an end view of part 1 in **Table 1** are shown in **Fig. 1** and **Fig. 2**. The drawings also show **two** key dimensions and their tolerances.

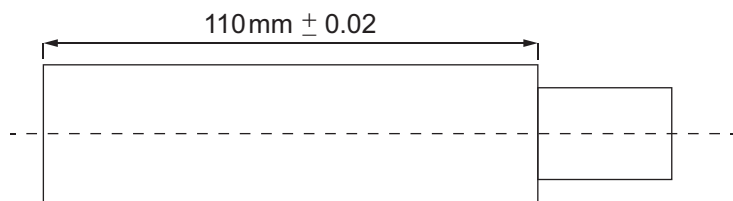
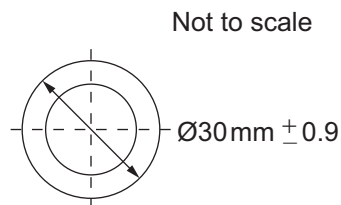


Fig. 1



Source: CCEA
Fig. 2

- (i) Calculate the maximum and minimum acceptable values for the dimension given in **Fig. 1**.

Candidates need to show their working out in the space below.

Maximum _____ Minimum _____ [2]

- (ii) Calculate the maximum and minimum acceptable values for the given dimension in **Fig. 2**.

Candidates need to show their working out in the space below.

Maximum _____ Minimum _____ [2]

[Turn over]



2 Fig. 3 shows a control arm that will attach to a car steering column.



Source: CCEA

Fig. 3

(a) The control arm is a standardised part. Outline **two** reasons why a car manufacturing company makes use of this standardised part.

1. _____

 2. _____

- [2]

(b) Control arms are made in batches. Outline **two** features of batch production.

1. _____

 2. _____

- [2]



(c) (i) Outline **two** reasons, apart from cost, why plastic would be a suitable material for the outer casing of the control arm.

1. _____

2. _____

_____ [2]

(ii) Suggest a suitable method of manufacturing the control arms.

_____ [1]

(d) The control arm is marked with the symbol shown in **Fig. 4**.

Fig.4 removed due to copyright

See image here: https://en.wikipedia.org/wiki/Kitemark#/media/File:BSI_Kitemark.svg

Fig. 4

(i) Name the symbol shown in **Fig. 4**.

_____ [1]

(ii) Explain the meaning of the symbol in **Fig. 4**.

_____ [2]

[Turn over



3 Fig. 5 shows a suitcase used for hand luggage.



Source: © Getty Images

Fig. 5

(a) State **two** design features of the suitcase shown in Fig. 5.

1. _____ [1]

2. _____ [1]

(b) The designer of the suitcase has used aesthetics, ergonomics and anthropometrics to enhance their design.

(i) State what is meant by the term aesthetics.

_____ [1]

(ii) List **two** aesthetic features the designer has used to enhance the design of the suitcase.

1. _____ [1]

2. _____ [1]

(iii) State what is meant by the term anthropometrics.

_____ [1]



(iv) Give **two** examples of how the design of the suitcase may have been influenced by the use of anthropometric data.

1. _____
_____ [2]

2. _____
_____ [2]

[Turn over

14803



24GTY2307

4 **Fig. 6** is an iconic product designed by Philippe Starck.



Source: © Getty Images

Fig. 6

(a) (i) Form and function are two features of product design.

Does form follow function or does function follow form in the product shown in **Fig. 6**?

_____ [1]

(ii) What is the main function of this product?

_____ [1]

(iii) State **two** features that may be associated with the form of the product shown in **Fig. 6**.

1. _____ [1]

2. _____ [1]



(b) Suggest why the product shown in **Fig. 6** would not be mass produced.

[1]

(c) **Table 2** lists a number of statements. Place an **X** in the correct boxes to identify **four** factors which are true of Philippe Starck. Only **four** boxes should be completed.

Table 2

He was born in Cardiff, Wales.	
He studied at the École Nissim de Camondo, Paris.	
He held the position of Design Director in Habitat and this gave him a unique insight into global retail.	
He became his country's Ambassador of Creativity and Innovation in 2009.	
He was widely acclaimed for his work collaborating with the skilled Venetian glassblowers.	
He designed the London 2012 Olympic Torch.	
He designed the Ghost dining chair for Kartell.	
His vision for design is products that improve people's lives which were often sold at affordable prices, such as the optical mouse for Microsoft.	
His love for and curiosity about the arts has resulted in extensive travel in India, Asia, the Middle East, Northern Africa, and South America to research other cultures.	

[4]

[Turn over



5 A school workshop is an environment that has a number of potential hazards.

(a) Outline **two** potential hazards that are specific to a school workshop.

1. _____ [1]

2. _____ [1]

(b) (i) One method to reduce the risk of an accident is to use PPE.
What does PPE stand for?

_____ [1]

(ii) Name **one** item of PPE that is commonly used in the school workshop.

_____ [1]

(c) The school workshop should have a number of health and safety signs on display.

(i) Name the category of sign that is white on a solid blue circle.

_____ [1]

(ii) Name the category of a sign that is black on white with a red circle and a diagonal stripe.

_____ [1]



(d) **Table 3** shows four health and safety signs. Complete **Table 3** by using the correct names from the list below.

Health hazard. Hazardous to the ozone layer

Acute toxicity

Hazardous to the environment

Corrosive

Table 3

Source: © Crown copyright

[4]



6 Fig. 7 shows an industrial bucket, mop and wet floor sign.



Source: © Getty Images

Fig. 7

- (a) (i) Each wet floor sign is sold at £6.25, 18% of which is profit. Calculate how much profit is made on a sale of 3000 wet floor signs.

Candidates need to show their working out in the space below.

[3]



- (ii) If the cost of energy and plastic increases, the selling price must increase by 5.75%. Calculate the new selling price (to the nearest 1p).

Candidates need to show their working out in the space below.

[3]

- (b) Complete the chart in **Table 4** for the cost of materials and components for the manufacture of the bucket, mop and wet floor sign.

Table 4

Material / component	Sizes	No. needed	Price / unit	Cost £
Yellow injection moulding plastic pellets	250 g pellets	1	£12 per 1 kg bag of pellets	
Black injection moulding pellets	100 g pellets	1	£12 per 1 kg bag of pellets	1.20
Black vinyl stickers	600 mm × 300 mm	2	£10 per m ²	
Castor wheels	Ø 40 mm	4	£8 per 80 castor wheels	
Nut	M5	8	10p each	0.80
Extruded tube for mop handle	1.4 m	1	£4.00 per metre length	
Mop head	100 mm × 300 mm	1	78p each	0.78

[4]

[Turn over



- (c) Suggest **two** reasons why the bucket has a lip on the top edge, as labelled on **Fig. 7**.

[2]

- (d) Many cleaning businesses use the equipment shown in **Fig. 7**.

Using clear annotated sketches and construction detail, in the space opposite:

Design an attachment that could be fitted to the bucket to carry the wet floor sign.

- The attachment must not interfere with the use of the bucket.
- The attachment must allow for the wet floor sign to be securely held and removed.
- Reference should be made to the materials used.





14803

[10]
[Turn over]



24GTY2315

7 **Fig. 8** shows a chart that can be used to plan and manage the production of a press formed toy.

(a) Is press moulding classified as a reforming or deforming manufacturing process?

[1]

Task \ Time (minutes)	5	5	5	5	5	5	5	5	5
Press mould part A and B									
Glue part A and B									
Press mould part C									
Fold part C									
Glue all parts									
Solder circuit									
Assemble									

Source: CCEA

Fig. 8

(b) Name the type of chart shown in **Fig. 8**.

[1]

(c) Calculate how much time is saved by running some tasks simultaneously.

Candidates need to show their working out in the space below.

[3]



(d) The toy is being made as a one-off. Discuss **one** advantage and **one** disadvantage of this type of production method compared to mass production.

[4]

[Turn over

14803



24GTY2317

- 8 Using an annotated sketch or sketches, design a shower caddy/tidy that will securely hold at least three bottles in an easily accessible position inside a shower.

The design solution should show evidence of the following:

- Good quality annotated sketches giving consideration to line, shape, form and proportion. The annotated sketches should clearly convey your design thinking.
- The solution must be strong, stable and capable of holding at least three bottles, as shown in the diagram in **Fig. 9** below, in an easily accessible position for the average adult user.
- Capable of allowing water to drain.
- Be aesthetically pleasing.
- Include three key dimensions.
- Identify and justify the main manufacturing techniques to be used in the design's construction.
- Identify and justify the choice and use of materials.

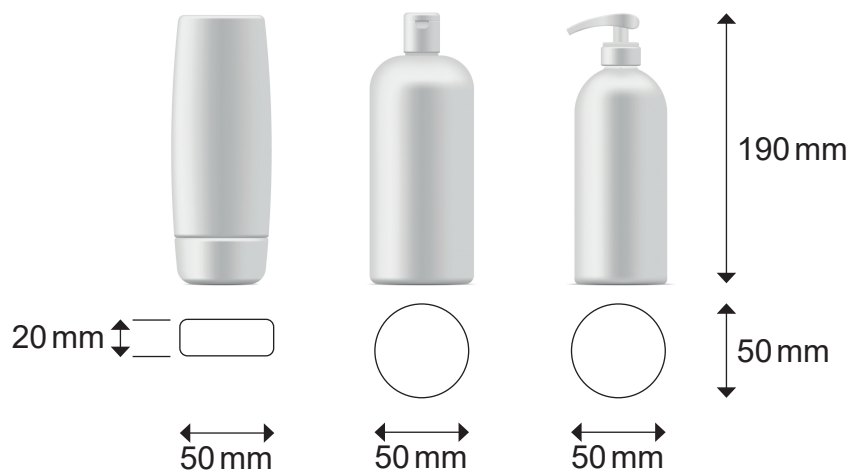
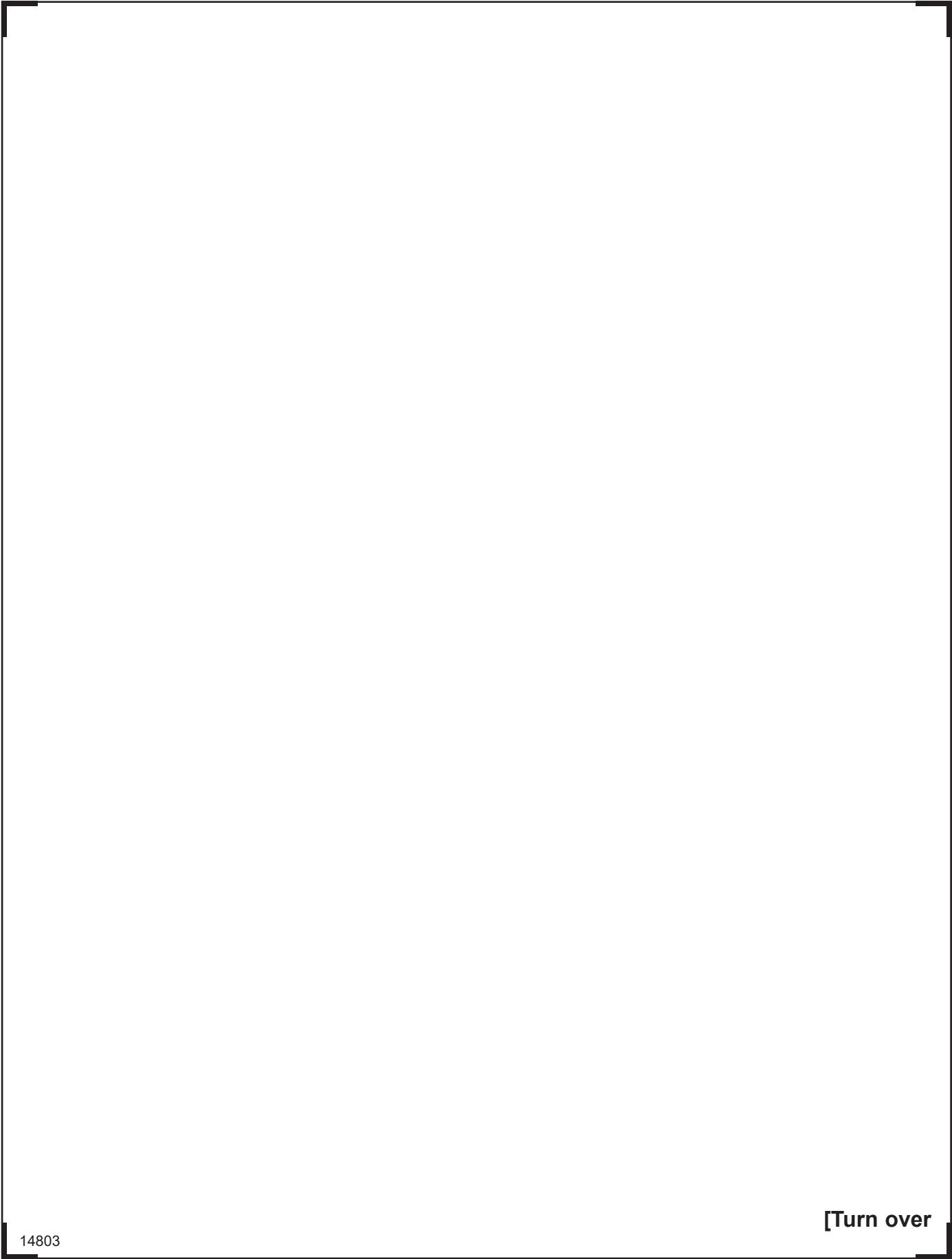


Fig. 9

Use the following two pages for your answer.

Quality of written communication will be assessed in this question.





14803

[Turn over



24GTY2319





THIS IS THE END OF THE QUESTION PAPER

14803



24GTY2321

BLANK PAGE
DO NOT WRITE ON THIS PAGE

14803



24GTY2322



BLANK PAGE

DO NOT WRITE ON THIS PAGE

14803



24GTY2323

DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Total Marks	
-------------	--

Examiner Number

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.

GTY23/4
296499

