



General Certificate of Secondary Education

Centre Number

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Candidate Number

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Technology and Design

Unit 2

Option C:
Product Design



[GTY23]

GTY23

Assessment

TIME

1 hour 30 minutes.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

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 (a) (i) Name each of the two symbols labelled X and Y in **Fig. 1**.



Fig. 1

X _____ [1]

Y _____ [1]

(ii) Select, from the two options given below, the correct name for the type of symbols shown in **Fig. 1**.

- Standards symbols
- Safety symbols

_____ [1]





(iii) Discuss the function of these symbols. Your discussion should focus on:

- the need for the symbols;
- how and where they are used;
- why they are used.

[4]

(b) Based on personal safety in the workshop, explain what is meant by a risk assessment.

[2]



2 A manufacturing company engaged in the production of laptop computers uses bought-in batteries to power the computers and sub-contracts the manufacture of the laptop casing or housing.

(a) (i) Bought-in batteries are considered to be a cost-effective option by the company.

Explain what is meant by this statement.

[2]

(ii) Outline what sub-contracting is.

[1]

(b) (i) The laptop casing is to be manufactured by the process of injection moulding.

Select, from the two materials below, the most appropriate material for this manufacturing process and give a reason for your choice.

- Urea formaldehyde
- Acrylonitrile butadiene styrene

Material _____ [1]

Reason _____

_____ [1]



(ii) Outline **one** technological reason to suggest why the company has sub-contracted the manufacture of the laptop casing.

[1]

(c) In-line assembly is employed by the manufacturing company to produce the computers.

Describe some of the main features or advantages of in-line assembly which make it very suitable for the assembly of the computer. Your answer should focus on **three** main points.

[3]

[Turn over



3 A design portfolio, which is an integral part of the design process, requires a number of different techniques to be used.

(i) Other than freehand concept sketches, name another graphical technique that is used in the design process.

_____ [1]

(ii) Give **one** reason to suggest why the disassembly of existing products can help generate initial ideas.

_____ [1]

(iii) Explain, by focusing on **two** key points, why freehand concept sketches are important in the design process.

_____ [2]

(iv) Explain, by focusing on **two** key points, why brief or succinct annotation is important in the design process.

_____ [2]



(v) Explain, by focusing on **three** key points, why anthropometrics would influence your design thinking in the development of a child's toy.

[3]



- 4 **Fig. 2** shows the Newman TV Stand which is part of the Newman range of solid oak furniture produced and designed by Bethan Gray.



Source: © Bethan Gray Design

Fig. 2

- (a) (i) Look at the Newman TV Stand in **Fig. 2** and describe **two** features that are associated with its design.

1. _____ [1]

2. _____ [1]

- (ii) Form and function are two features in product design. Does form follow function or does function follow form in the product in **Fig. 2**?

_____ [1]



(iii) Give a reason why this Newman TV Stand would not be mass-produced.

[1]

(b) Outline **five** facts associated with the work of Bethan Gray.

1. _____

2. _____

3. _____

4. _____

5. _____

[5]

[Turn over



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5 Fig. 3 shows a typical muffin tray for baking up to twelve muffins.



Source: © Getty Images

Fig. 3

(a) (i) Name a suitable metal that could be used for a muffin tray.

_____ [1]

(ii) Suggest a manufacturing method for the muffin tray.

_____ [1]

(iii) Give **two** reasons why the recess shapes for baking the muffins are designed as shown.

_____ [2]

[Turn over



(iv) Outline **two** properties of the metal used for the muffin tray which make it suitable for its function.

1. _____

2. _____

[2]



(b) A manufacturer mass-produces a number of muffin trays from large sheets of metal. Each sheet measures 2400 mm by 1200 mm. The amount of material required for each muffin tray is 390 mm by 290 mm.

(i) Calculate the maximum number of muffin trays that can be manufactured from each sheet.

Show your working out in the space below.

Answer _____ [2]

(ii) If each sheet of metal costs £25.00 and each muffin tray is sold for £2.75, how much profit is made per sheet?

Show your working out in the space below.

Answer _____ [2]

[Turn over



(c) **Fig. 4** below shows the muffin tray and an outline sketch showing the depth of the tray. When muffins are baked, the hot muffin tray needs to be safely removed from the oven.

Design a suitable handle that can be attached to the muffin tray to enable its removal from the oven. The depth of the muffin tray is 45 mm.



Source: © Getty Images



Fig. 4

Using clear annotated sketches and details, produce a suitable design of a handle. Your solution should:

- show how the handle can be easily attached and removed from the muffin tray;
- show how the handle can lift the muffin tray;
- show the insulation features of the handle.





Design

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[Turn over

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- 6 **Table 1** shows the number of bicycles sold by a manufacturing company over a five-month period.

Table 1

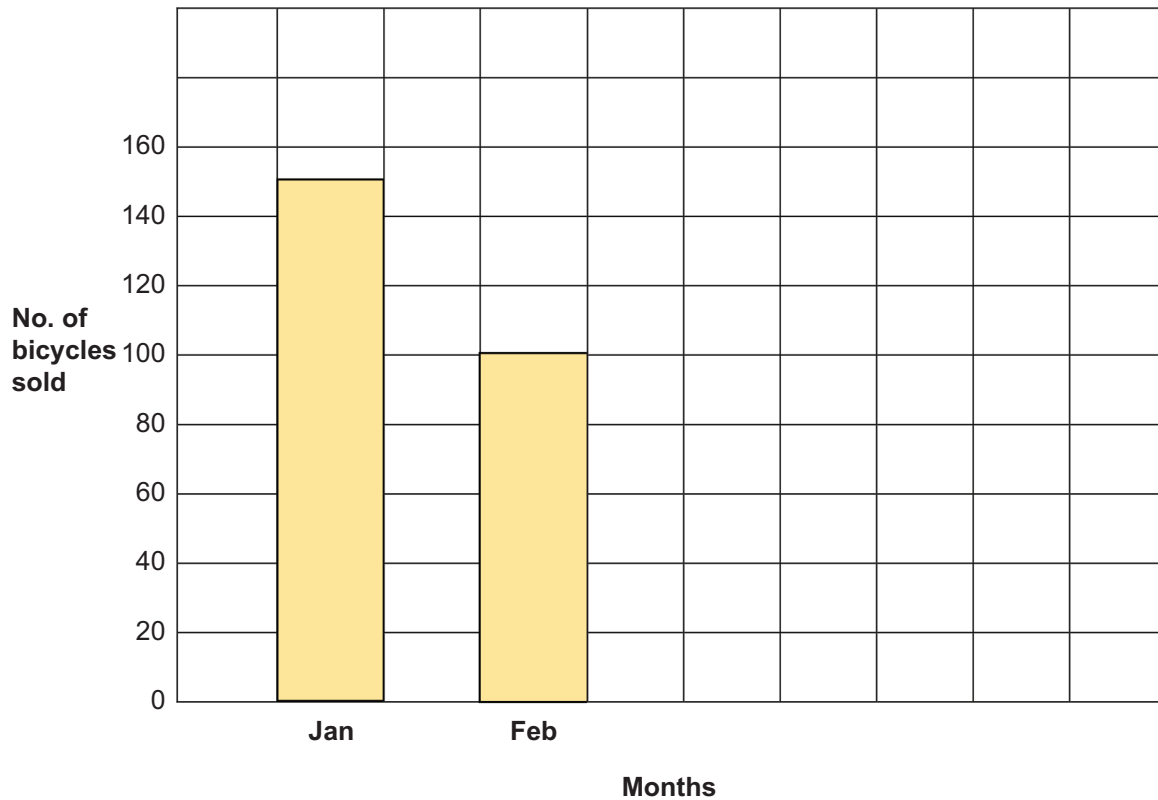
Month	Number of bicycles sold
January	150
February	100
March	30
April	70
May	110
Total	460

- (a) Using the information in **Table 1**, calculate the difference in sales between the best and worst sales months and express this as a percentage of the sales for the five-month period.

Answer _____ [3]



(b) Fig. 5 shows a bar chart. Following the layout shown in Fig. 5, complete the bar chart for the sales of the bicycles over the five-month period.



[6]

Fig. 5

(c) The manufacturing company makes a profit of 45% on each bicycle sold. If each bicycle is sold for £250, calculate the profit over the five-month period.

Answer _____ [3]

[Turn over



7 **Fig. 6** and **Fig. 7** show two different types of phone.



Fig. 6

Source: © Getty Images



Fig. 7

Source: © Getty Images

(a) (i) Identify one feature of the phone shown in **Fig. 6**, and give an explanation for the inclusion of this feature.

Feature: _____ [1]

Explanation: _____

_____ [2]

(ii) Identify a different feature from that used in **(a) (i)** above for the phone in **Fig. 7**, and give an explanation for the inclusion of this feature.

Feature: _____ [1]

Explanation: _____

_____ [2]



(b) Before a product is made available to the public, market research is carried out.

(i) Identify **two** methods of carrying out market research.

1. _____ [1]

2. _____ [1]

(ii) Describe how market research would be carried out using a particular method.

_____ [2]

(c) Explain why function is more important than form in the design of a mobile phone.

_____ [2]

[Turn over



8 The Royal Society for the Protection of Birds (RSPB) encourages adults and children to provide suitable nesting places for sparrows.

Using an annotated sketch or sketches, design a wall mounted nesting box for sparrows.

The design solution should show evidence of the following features:

- Good quality annotated sketches giving consideration to line, shape, form and proportion.
- Ease of entry and exit for the sparrows.
- Allow for easy internal cleaning.
- Be able to be attached and removed from the wall of a house or other building.
- Be aesthetically pleasing and have an appropriate outdoor finish.
- Identify and justify the choice and thickness of materials.
- Identify and justify the main manufacturing techniques used in the design's construction.
- Include three key dimensions.

Use the following 2 pages for your answer.

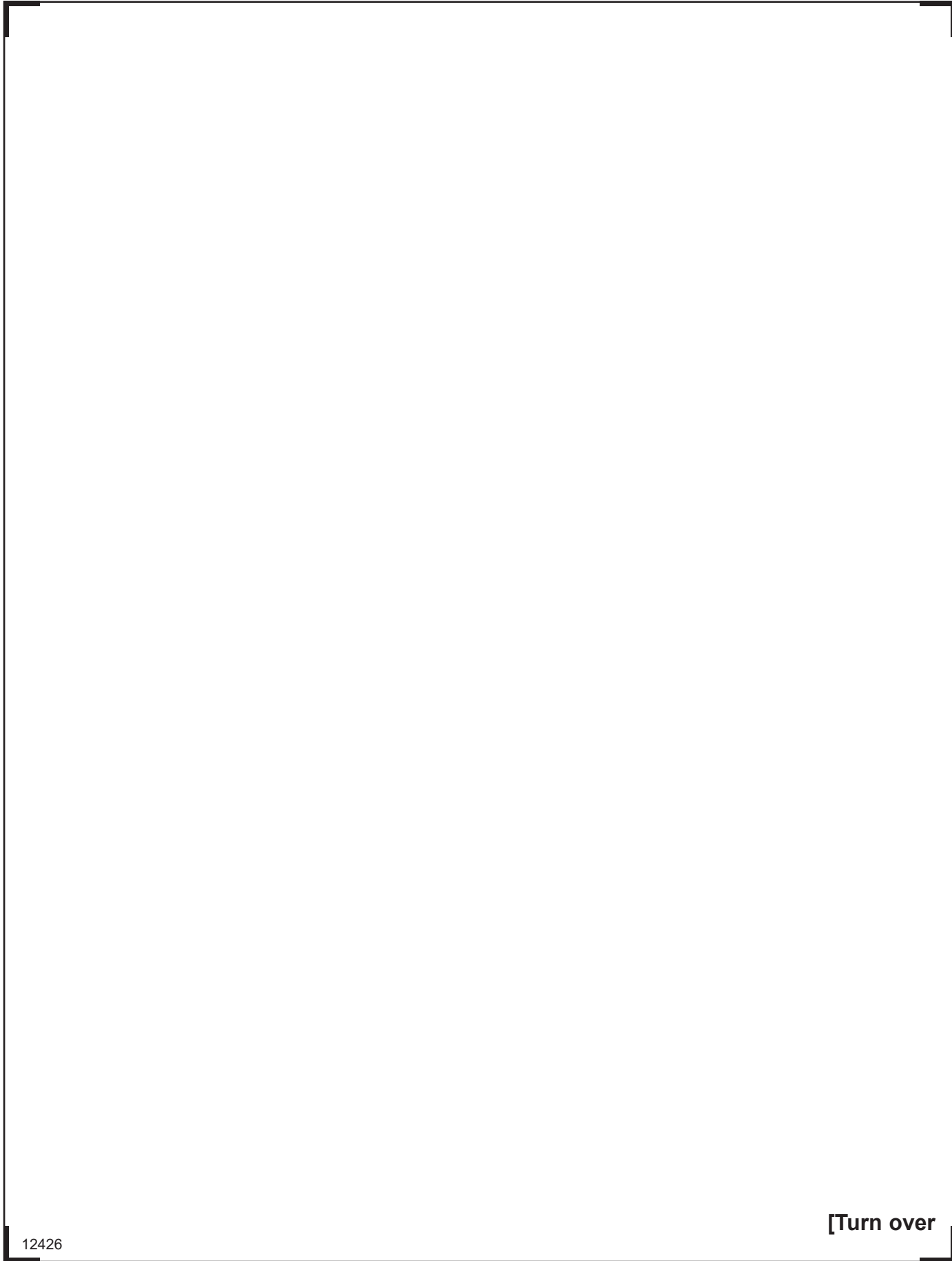
[20]

Quality of written communication will be assessed in this question.



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THIS IS THE END OF THE QUESTION PAPER

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- Fig.2.....© Bethan Gray Design
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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Number

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