



National
Qualifications
2023 MODIFIED

X819/77/11

Design and Manufacture

TUESDAY, 30 MAY

1:30 PM – 3:45 PM

Total marks — 65

SECTION 1 — 15 marks

Candidates should attempt EITHER question 1 OR question 2

SECTION 2 — 50 marks

Attempt ALL questions.

Write your answers clearly in the answer booklet provided. In the answer booklet you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give your answer booklet to the Invigilator; if you do not, you may lose all the marks for this paper.



* X 8 1 9 7 7 1 1 *

SECTION 1— 15 marks

Candidates should attempt EITHER question 1 OR question 2

1. During your course you will have analysed the manufacture of a commercial product(s).

Identify a commercial product(s) you have analysed.

- | | |
|--|---|
| (a) Outline the features of parts of the product(s) that enabled you to identify the processes that had been used in their manufacture and explain why these processes were suitable. | 4 |
| (b) Describe how the materials and assembly methods used in the manufacture of the product(s) could impact the environment and society. | 4 |
| (c) Describe how you evaluated the product(s) and outline key points from your findings. | 5 |
| (d) Discuss the suitability of a production system(s) that could have been used in the manufacture of the product(s). | 2 |

OR

2. During your course you will have researched the evolution of a commercial product(s).

Identify a commercial product(s) you have researched.

- | | |
|---|---|
| (a) Identify and describe how changes in society have influenced the evolution of the product(s). | 5 |
| (b) Describe key changes which occurred during the evolution of the product(s).
Your answer may include: <ul style="list-style-type: none"> • reasons that led to each change, other than changes in society • when the changes occurred • reasons these changes were failures or successes. | 6 |
| (c) Describe the work of a designer or company you are familiar with and how they have contributed to the evolution of the product(s).
Your answer may include: <ul style="list-style-type: none"> • a description of a key product • key features of the designer's or company's work • how these features influenced other products. | 4 |

SECTION 2 — 50 marks

Attempt ALL questions

3. The Air Pocket, designed by Seam Lee and Young Jo In, is designed to be thrown into burning buildings to purify the poisonous air and convert it into safe-to-breathe air.



The designers of the Air Pocket would have had a brief and specification.

- (a) Explain the importance of defining a clear brief and specification before developing products such as the Air Pocket.

4

Effective material selection is vital for products such as the Air Pocket.

- (b) Discuss the issues that may have influenced the selection of materials for the Air Pocket.

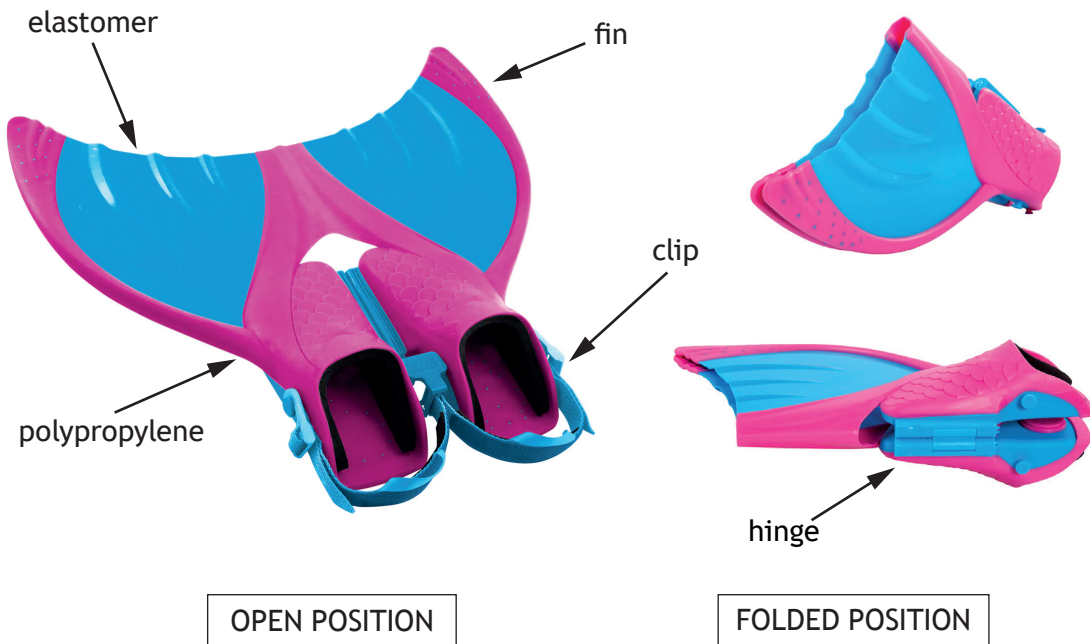
4

The Air Pocket is targeted towards fire safety professionals.

- (c) Identify **two** marketing techniques that could be used to reach this target market and explain why they would be suitable.

4

4. The Monofin is a compact foldable swim aid.



Idea generation techniques can help designers produce creative ideas.

- (a) Discuss the benefits and drawbacks of different idea generation techniques for developing ideas for products such as the Monofin. 4

Injection moulding and two-shot injection moulding were used in the manufacture of the Monofin.

- (b) Explain why each process is suitable for the Monofin. 4

Effective quality assurance is important to ensure the safety of products such as the Monofin.

- (c) Outline ways in which the safety of the Monofin could be quality assured. 4

- 5. A concept for a sustainable basketball shoe, designed by Dennis Johann Muller, has a customisable and modular design to improve user performance and product life span.



Products often come to market due to technology push and/or market pull.

- (a) Explain how technology push and market pull may have led to the development of the sustainable basketball shoe. 4

The sustainable basketball shoe has a 3D printed outer shoe.

- (b) Discuss the advantages of 3D printing in the design and manufacture of the outer shoe. 4

The time a new product takes to come to market can have an impact on its commercial success.

- (c) Discuss the issues that may delay a product coming to market. 3

The sustainable basketball shoe is a radical product.

- (d) Outline the potential risks for designers and manufacturers of launching a radical product and explain how they may be overcome. 4

6. 'The-O', designed by Kim Dombi and Kim Kyung Jin, doubles as a space-saving exercise bike and a functional piece of furniture.



Ergonomics would have been considered in the design of 'The-O'.

- (a) Describe how physiology and psychology may have influenced the design of 'The-O'.

4

The designers would have had to resolve conflict between important design issues during the development of 'The-O'.

- (b) Describe the conflicts which may have arisen between ergonomics, performance and aesthetics when 'The-O' was being developed.

4

Parts of 'The-O' have been die-cast.

- (c) Outline **three** features designers need to consider to ensure components can be successfully die-cast.

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- Section 2 Question 3 Images and reference to “The Air Pocket” designed by Seam Lee and Young Jo In.
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