



National
Qualifications
2022 MODIFIED

X819/77/11

Design and Manufacture

TUESDAY, 10 MAY
9:00 AM – 11:15 AM

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. 6
- (b) Describe the method(s) you used to evaluate the **performance** of the product(s).
You should make reference to:
- the reasons for selecting the method(s)
 - the actions or activities that took place
 - the findings. 5
- (c) Describe how value for money influenced the product(s) you analysed. 4

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) Describe how the function **and** safety of the product(s) has changed during its evolution. 6
- (b) Describe how the evolution of the product(s) was influenced by **two** of the following:
- society
 - external factors
 - designers
 - technology. 6

Products will continue to evolve.

- (c) Describe possible future developments in the product(s) you have researched and explain why they are likely to happen. 3

SECTION 2 — 50 marks
 Attempt ALL questions

3. The ‘Snoweel’, designed by Kuan Yu Lin, is a collapsible wheelchair that operates efficiently on snow, ice and sand.



A range of materials was used for the ‘Snoweel’.

- (a) Discuss the issues that may have influenced the selection of materials used in different parts of the ‘Snoweel’.

4

A range of manufacturing and assembly processes was used for the ‘Snoweel’.

- (b) Discuss the issues that may have influenced the selection of processes for parts of the ‘Snoweel’.

4

The designer used composite materials for the wheels of the ‘Snoweel’.

- (c) Describe the possible benefits of using composite materials for the wheels.

2

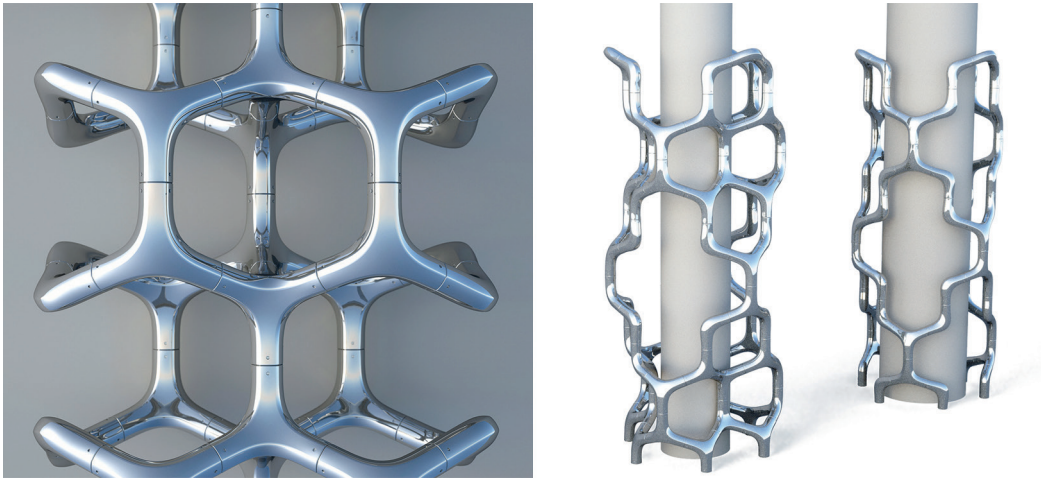
Several aspects of the ‘Snoweel’ were developed using models.

- (d) Describe a range of ways in which modelling could have been used to develop the ‘Snoweel’.

6

[Turn over

4. The 'IVY radiator', designed by Tomasz Orzechowski and Katrzyna Jakubowska, is a modular heating system.



It is important for designers of innovative products to protect their Intellectual Property Rights (IPR).

- (a) Outline the key features of **one** suitable method of IPR that could be used to protect the intellectual property of the designers of the 'IVY radiator'.

4

The 'IVY radiator' components shown below were die-cast.

- (b) Outline the features designers need to consider to ensure components can be successfully die-cast.

4



5. The ‘Vivid-timepiece’, designed by Jack Bates, reinvents how time is displayed, reshaping the way visually impaired individuals access the time.



During the development of the ‘Vivid-timepiece’ the designer had to resolve conflict between function and aesthetics.

- (a) (i) Describe the challenges of achieving a balance between function and aesthetics. 2
- (ii) Describe methods which could be used to achieve a balance between function and aesthetics. 2

The ‘Vivid-timepiece’ offers an inclusive solution as it is not only accessible to visually impaired individuals but also has an aesthetic appeal to a wider market.

- (b) Discuss how other everyday products or spaces you are familiar with have been designed to be more inclusive. 4

[Turn over

6. The 'Pod', designed by Kin Pan Lo, is a bench for everyday use which can be quickly transformed into a lifeboat during floods.



Ergonomics would have been researched and considered in the design of the 'Pod', in both its bench and lifeboat form.

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

4

Research was also carried out into a range of other design issues when developing the 'Pod'.

- (b) Outline information that may have been obtained about **two** different design issues and explain why it would be required.

4

(You must refer to design issues other than physiology and psychology.)

7. The 'Stay Lock', designed by a team from the University of Camerino, safely supports the load for delivery riders.



The increase in food delivery services has created a design opportunity for products like the 'Stay Lock'.

- (a) Describe two other ways in which design opportunities may be created. You should refer to products with which you are familiar. 4

There is a possibility that new products may have to be recalled.

- (b) Describe how a company can reduce the negative impact of a product recall. 3

Following a recall, a company may attempt to relaunch a product.

- (c) Describe how a company could ensure this relaunch is successful. 3

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