



National
Qualifications
2025

X819/76/11

Design and Manufacture

TUESDAY, 13 MAY

1:00 PM – 3:15 PM

Total marks — 80

SECTION 1 — 25 marks

Attempt ALL questions.

SECTION 2 — 55 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 6 1 1 *

SECTION 1 — 25 marks

Attempt ALL questions

1. Two equipment trolleys are shown below with product information.



Medical trolley

Materials

stainless steel shelves
tubular stainless steel frame
nylon castor wheels

Additional details

360° swivel wheels

Tool trolley

Materials

ABS shelves and handles
mild steel side panel
polypropylene tool hooks
galvanised mild steel wheel brackets

Additional details

360° swivel wheels
self-assembled



1. (continued)

- | | |
|---|---|
| (a) Explain why the materials chosen are suitable for the trolleys.
(You must give <i>six different explanations.</i>) | 6 |
| (b) Name three appropriate manufacturing processes used in the production of the trolleys and explain why each one is suitable. | 6 |
| (c) Describe how function has influenced the design of the trolleys. | 5 |
| (d) Explain the benefits and drawbacks of using standard components in the assembly of the trolleys. | 4 |
| (e) Explain the benefits of using physical modelling in the design of products such as the trolleys. | 4 |

[Turn over

SECTION 2 — 55 marks

Attempt ALL questions

2. A child's safety helmet is shown below.



A range of thermoplastics have been used in the manufacture of the safety helmet.

- (a) Identify **one** thermoplastic that may have been used in the manufacture of the safety helmet **and** explain why it is suitable.

3

The needs of the target market must be considered when designing products such as the child's safety helmet.

- (b) Explain how the needs of the target market may have influenced the design of products such as the child's safety helmet.

4

The manufacturer must ensure the safety helmet is fit for purpose.

- (c) Describe an evaluation technique that could be used to ensure the safety helmet is fit for purpose.

2

3. Clients can provide designers with an open brief.
- (a) Describe **one** advantage and **one** disadvantage of an open brief. 2
- A product design specification is produced after analysis of the brief.
- (b) Describe the purpose of the product design specification **and** outline the types of information it may contain. 3
- Designers may use idea generation techniques to produce initial ideas.
- (c) Outline the key stages of an idea generation technique and explain why it would be used to help produce initial ideas. 3
- Designers use a variety of graphic techniques during the design process.
- (d) Describe how graphic techniques are used during the design process. 4
(*You should refer to a variety of graphic techniques in your answer.*)
4. The successful launch of a product requires effective marketing techniques to be used.
- (a) Describe marketing techniques that could be used to ensure the successful launch of a product. 4
- Towards the end of a product's life cycle, sales will start to decline.
- (b) Describe the steps a company may take to delay the decline in product sales. 2

[Turn over

5. An air fryer is shown below.



- (a) Describe how ergonomics has influenced the design of the air fryer. 6
 (You should cover all **three** areas of ergonomics in your answer.)

Products such as air fryers were developed in response to market pull, to ensure consumer demand was met.

- (b) Describe how the design of products has been influenced by market pull. 2
 (You should refer to products you are familiar with in your answer.)

Trademarks and patents are examples of Intellectual Property Rights (IPR).

- (c) Outline the advantages of using Intellectual Property Rights (IPR) to protect products. 2

6. A variety of methods can be used to identify materials such as woods, metals and plastics.

- (a) Describe methods that could be used to help identify different types of materials.

4

Manufacturing processes have a number of identifying features.

- (b) Outline **two** identifying features of blow moulding.

2

Production and planning systems are used in the development and manufacture of products.

- (c) Describe how the following production and planning systems can be used in the development and manufacture of products:

- Gantt charts
- Just-in-Time (JIT) production.

4

(You should refer to both Gantt charts and Just-in-Time (JIT) production to attract full marks.)

7. Design teams have a responsibility to consider the environmental impact of their products.

Describe how consideration for the environment has influenced the design, manufacture, use and disposal of products.

8

[END OF QUESTION PAPER]

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