



National
Qualifications
2017

X719/76/11

Design and Manufacture

TUESDAY, 2 MAY

1:00 PM – 3:00 PM

Total marks — 70

SECTION 1 — 25 marks

Attempt ALL questions.

SECTION 2 — 45 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.



SECTION 1 — 25 marks

Attempt ALL questions

1. Two cross trainers are shown with product information.

Outdoor Cross Trainer

Materials

- Steel frame with plastic coating
- Rubber handles
- ABS foot rests
- Stainless steel fixings/brackets
- Nylon bearings



Indoor Cross Trainer

Materials

- Steel frame with plastic coating
- Foam handles
- ABS foot rests and covers
- Acrylic screen
- Stainless steel fixings/brackets



1. (continued)

- | | |
|--|---|
| (a) Explain why the materials chosen for these products are suitable.
<i>(You should make six valid points.)</i> | 6 |
| (b) Name three appropriate manufacturing processes used in the production of these cross trainers and explain why they are suitable. | 6 |
| (c) Describe how the design of these products has been influenced by safety issues. | 4 |
| (d) Describe how ergonomics has influenced the design of these products.
<i>(To attract full marks you must include the influence of all three areas of ergonomics in your answer.)</i> | 5 |
| (e) Explain the benefits of using computer aided design in the development of products such as these cross trainers. | 4 |

[Turn over

SECTION 2 — 45 marks

Attempt ALL questions

2. A designer has been given an **open** brief by a client.

(a) Describe **one** advantage and **one** disadvantage of an open brief.

2

A designer would carry out research in order to analyse the brief.

(b) Describe appropriate methods of carrying out research into each of the following:

- The needs of the target market
- The performance of an existing product.

4

There are a number of different specifications associated with products.

(c) Give an example of the type of information found in the following specifications.

- Product design specification
- Marketing specification
- Technical specification

3

3. The stool shown below is made from a thermoplastic.



Describe how consideration for the environment may have impacted on this product.

4

4. **Sketch models**, **test models** and **prototypes** may be used at different stages of the design process.

Explain the purpose of each model type and how the information gained may advance the design of a product.

6

[Turn over

5. A digital clock radio is shown below.



The casing is injection moulded from a thermoplastic.

- (a) State the name of a suitable material for injection moulding the casing and explain why it is appropriate for this component. 2
- (b) Explain why draft angles and ribs/webs would be incorporated in the design of the casing.
(You may use sketches to illustrate your answer.) 2

The manufacturer has used standard components in the production of the clock radio.

- (c) Explain why standard components were used in the production of the clock radio. 2
- (d) Discuss the aesthetics of the clock radio.
(You should refer to **four** different aesthetic aspects.) 4
- (e) Describe the steps that the company could take to maintain or improve the product's market share throughout its life. 4

6. Composite materials are used in a wide range of products.
Explain, with reference to products, the advantages of using composite materials. 4
7. Manufacturers frequently consider production methods and planning systems in the development and manufacture of new products.
Describe how production methods and planning systems are used to improve efficiency.
You may refer to products to exemplify your answer and/or use sketches to illustrate your answer. 8

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Question 1 – 3DMI/shutterstock.com

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Question 3 – showcase/shutterstock.com

Question 5 – PERLA BERANT WILDER/shutterstock.com