



National  
Qualifications  
2017

**X719/76/11**

**Design and Manufacture**

TUESDAY, 2 MAY  
1:00 PM – 3:00 PM

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**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.  
(*You should make six valid points.*) 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.  
(*To attract full marks you must include the influence of all three areas of ergonomics in your answer.*) 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

Ramon Espelt Photography/shutterstock.com

Question 3 – showcake/shutterstock.com

Question 5 – PERLA BERANT WILDER/shutterstock.com