



National
Qualifications
2018

X719/76/11

Design and Manufacture

FRIDAY, 18 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.



* X 7 1 9 7 6 1 1 *

SECTION 1 — 25 marks

Attempt ALL questions

1. Two infant high chairs are shown with product information.

Restaurant style high chair



Materials

- Classic wooden construction made from stained solid beech
- Nylon adjustable retaining belt
- Polypropylene buckle on retaining belt

Additional details

- Ideal for commercial or domestic use
- Weight – 7 kg

Chicco high chair

Materials

- Polypropylene tray
- Tubular mild steel frame
- ABS fittings
- Nylon adjustable retaining straps
- PVC padded cushion

Additional details

- Ideal for domestic use
- Weight – 4 kg



1. (continued)

- | | |
|--|---|
| (a) Explain why the materials chosen for these products are suitable.
(You should make <i>six valid points</i> .) | 6 |
| (b) Name three appropriate manufacturing processes used in the production of these high chairs and explain why they are suitable. | 6 |
| (c) Discuss the aesthetics of the high chairs.
(You should refer to <i>four different aesthetic aspects</i> .) | 4 |
| (d) Describe how function and safety have influenced the design of these products. | 5 |
| (e) Describe how production and planning systems could be used to improve efficiency during the manufacture of these products. | 4 |

[Turn over

SECTION 2 — 45 marks

MARKS

Attempt ALL questions

2. The casings for the plug and socket shown below have been manufactured using a thermosetting plastic.



- (a) State the name of a suitable thermosetting plastic and explain why thermosetting plastic is appropriate for the manufacture of these components. 3
- (b) Identify a suitable manufacturing process for the casings and explain why this process is appropriate. 3

3. A kettle is shown below.



The designer used idea generation techniques to produce initial ideas for the kettle.

(a) Describe two idea generation techniques that could have been used.

(You may use sketches/diagrams to illustrate your answer.)

4

Anthropometrics is an important factor to consider in the design of the kettle.

(b) Describe how anthropometrics has influenced the design of the kettle.

2

Physiology is a key issue that would need to be considered by the designer.

(c) Describe how physiology has influenced the design of the kettle.

2

[Turn over

4. A range of kitchen utensils is shown below.



The utensils have been manufactured using stainless steel.

(a) Explain why stainless steel is suitable for these utensils. 3

Press forming has been used during the manufacture of the utensils.

(b) Explain why press forming is a suitable manufacturing process for these utensils. 2

The utensils were produced using fully automated manufacturing technology.

(c) Describe the impact of fully automated manufacturing technology on people and society. 2

Design teams have a responsibility to consider environmental issues when developing products.

(d) Describe how consideration for environmental issues has impacted on the design and manufacture of products. 3

5. The opportunity for new or improved products can arise from technology push or market pull.

- (a) Describe technology push and market pull and give an example of how each has influenced the design of products. 4

Market research plays an important part in the development of every new product.

- (b) Describe the information that could be gained through the use of market research. 2

Rapid prototyping is commonly used during the development of new products.

- (c) Describe **two** benefits of using rapid prototyping. 2

A variety of methods can be used to test the performance of a product.

- (d) Describe a method that could be used to test the performance of a product and identify the type of information that could be gained. 3

Planned obsolescence is often incorporated into new products.

- (e) Describe what is meant by planned obsolescence and give an example of how this has influenced the design of a product. 2

6. A designer will work with a range of people when developing products.

These include:

- accountants
- material technologists
- production specialists
- marketing teams.

Describe the role of these people and how they influence each other's decisions during the development of products. 8

[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Question 1 Mountain Light Studios/Shutterstock.com
Question 1 BalancePhoto/Shutterstock.com
Question 2 Innershadows Photography & exopixel/Shutterstock.com
Question 3 Sergiy Zavgorodny/Shutterstock.com
Question 4 Ambelrip/Shutterstock.com