



National
Qualifications
2015

X719/76/11

Design and Manufacture

MONDAY, 25 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 wheelbarrows for domestic use are shown with product information.

Wheeleasey collapsible wheelbarrow**Materials**

- Tubular mild steel frame
- UV-protected waterproof cloth
- Nylon wheel
- Rubber, pneumatic tyre

Assembly required

Retail price – £99.00

Endurance wheelbarrow**Materials**

- Galvanised mild steel tray and struts
- Tubular mild steel frame
- Polypropylene handles
- Nylon wheel
- Rubber, pneumatic tyre

Retail price – £55.00

- (a) Explain why the materials chosen for each of these products are suitable.
(You should make six valid points. You do not need to cover all materials but should cover both products in your answer.) 6
- (b) Name **three** appropriate mass manufacturing processes used in the production of these wheelbarrows **and** explain why they are suitable. 6
- (c) Describe how physiology and psychology have influenced the design of the wheelbarrows. 4
- (d) Describe **five** functional needs that will have influenced the design of these wheelbarrows. 5
- (e) Explain the benefits for the manufacturer of using standard components in the production process. 4

SECTION 2 – 45 marks

Attempt ALL questions

2. A lounge chair and footstool are shown.



Parts of the chair and footstool are made from laminated wood.

- (a) Explain **three** benefits of using laminated wood for these parts. 3

The base of the chair was manufactured in aluminium using the process of die casting.

- (b) Explain **two** reasons why die-casting was used to manufacture the base. 2

Many different processes were carried out during the manufacture of this product.

- (c) Explain how production and planning systems could be used to ensure the efficient manufacture of the product. 3

[Turn over

3. A play seat for children is shown.



The play seat was manufactured using the process of rotational moulding.

- (a) Explain **three** benefits of using rotational moulding to make the play seat. 3
- (b) Select a suitable plastic that could be used for the play seat and give **two** reasons for your choice. 3

Products designed for children need to comply with strict safety guidelines.

- (c) Describe **two** safety issues that would need to be considered during the design of the play seat. 2

Many manufacturers try to ensure that their products are environmentally friendly.

- (d) Describe the methods that manufacturers could use to minimise the negative impact of their products on the environment. 4

4. The DeWalt site radio charger shown is designed for use by professional builders. It can also be used for charging power tool batteries.



Rear view (with battery charger)

- (a) Describe how the needs of the target market have influenced the design of the site radio charger. 3

Anthropometrics is an important factor in the design of the site radio charger.

- (b) Explain how anthropometrics has been considered in the design of the site radio charger. 2

- (c) Describe a method the designer could use to evaluate the fitness for purpose of the site radio charger.

DeWalt has a strong brand image. 2

- (d) Explain two benefits of a strong brand image. 2

[Turn over for Questions 5 and 6 on *Page six*

5. A game from a well-known toy manufacturer is shown below.



Market research was carried out on the target market before the brief for the game was finalised.

- (a) Describe **two** methods that could be used to gather market research information for the game. 2

The toy manufacturer employed an external designer to produce concept ideas.

- (b) Explain **one** advantage and **one** disadvantage of using an external designer. 2

The external designer used idea generation techniques to develop initial ideas for the game.

- (c) Describe **two** idea generation techniques that could be used.
(You may use sketches/diagrams to illustrate your answer.) 4

6. Designers frequently consider aesthetics as an important factor in the development of new products.

Explain how aspects of aesthetics have influenced the design of products that you are familiar with.

- (You may refer to more than one product in your answer.) 8

[END OF QUESTION PAPER]

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ACKNOWLEDGEMENTS

Question 1 (Top image) – Image of “Trueshopping folding lightweight wheelbarrow” is taken from <http://trueshopping.co.uk>. Reproduced by kind permission of Trueshopping Ltd.

Question 1 (Bottom image) – Image of Wheelbarrow.

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Question 3 – Images of Child’s Play Seat.

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