



National
Qualifications
2016

X719/76/11

Design and Manufacture

THURSDAY, 2 JUNE

9:00 AM – 11:00 AM

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 children's scooters are shown with product information.

Traditional 3 Wheel "Skate" Scooter

Materials

- Beech faced plywood body
- Solid Beech handle
- HDPE wheel with rubber tyre
- Stainless Steel fixings/brackets

Retail price £24.99



Folding 3 Wheel "Kick" Scooter

Materials

- Aluminium body
- Nylon wheels
- Foam grips
- Stainless Steel fixings

Retail price £29.99



1. (continued)

- (a) Explain why the materials chosen for **both** scooters 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 manufacturing processes used in the production of these scooters and explain why they are suitable.
(You should cover both products in your answer.) 6
- (c) Describe the aesthetics of the scooters.
*(You should refer to **four** different aesthetic aspects.)* 4
- (d) Describe how consideration of the environment has impacted on the design, manufacture and use of these scooters. 4
- (e) Describe how function has influenced the design of both scooters. 5

[Turn over

SECTION 2 — 45 marks

Attempt ALL questions

2. A range of kitchen utensils is shown below.



The utensils have been manufactured using a thermo-setting plastic.

- (a) Explain why this type of plastic is suitable for these utensils. 2
- (b) Describe **three** research techniques a designer could use to identify the needs of the user group before the development of this product range. 3
- (c) Describe how presentation methods could be used by a designer to communicate the design proposal to the client. 4
(You should refer to at least *two* different presentation methods.)

3. The set of plastic tableware shown below has been injection moulded as part of a fully automated manufacturing system.



- (a) Explain **two** benefits to the manufacturer of using injection moulding. 2
- (b) Explain the impact on society of fully automated manufacturing. 4

[Turn over

4. Parts of the mild steel shelving system shown have been manufactured by the processes of piercing and blanking then pressed into shape.



(a) Explain why piercing, blanking and pressing are suitable manufacturing processes for this product. 3

Nuts and bolts have been used to assemble the shelving system.

(b) Explain the benefits of assembling the shelving system using nuts and bolts. 3

Nuts and bolts are examples of standard components.

(c) Explain **two** drawbacks to the manufacturer of using standard components. 2

5. A range of people who influence the design of products is listed below.

- Accountants
- Lawyers
- Materials technologists
- Production specialists
- Market researchers
- Retailers

Describe the influence **three** people from the list have on the design of products. 6

6. Designers often use idea generation techniques.

(a) Explain why idea generation techniques are effective.

3

Modelling is an important part of the design process.

(b) Identify **two** different types of model and describe how they could be used in the design process.

5

7. Successful products require careful consideration of ergonomics.

Explain why ergonomics has influenced the design of products that you are familiar with.

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

(To attract full marks you must include the influence of all three areas of ergonomics in your answer.)

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[END OF QUESTION PAPER]

ACKNOWLEDGEMENTS

Question 1 (Top image) – Image, ‘Traditional 3 Wheel Scooter’ (510401 – Scooter Beech 3 Wheels).

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