



National
Qualifications
2021 ASSESSMENT RESOURCE

X819/76/11

Design and Manufacture

Duration — 2 hours 15 minutes

Total marks — 80

SECTION 1 — 25 marks

Attempt ALL questions.

SECTION 2 — 55 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 8 1 9 7 6 1 1 *

SECTION 1 — 25 marks

Attempt ALL questions

1. Two barbecues are shown with product information.



Round kettle charcoal barbecue

Materials

mild steel body and lid
chrome plated tubular mild steel frame
ABS wheels
melamine formaldehyde handle
stainless steel grill

Additional details

self-assembly

Price – £69.99

3 burner gas barbecue

Materials

stainless steel housing and lid
stained beech trolley frame
ABS wheels
cast iron main grill
stainless steel warming rack

Additional details

foldable side shelves
hinged lid
electronic ignition

Price – £279.99



Barbecue with lid open

1. (continued)

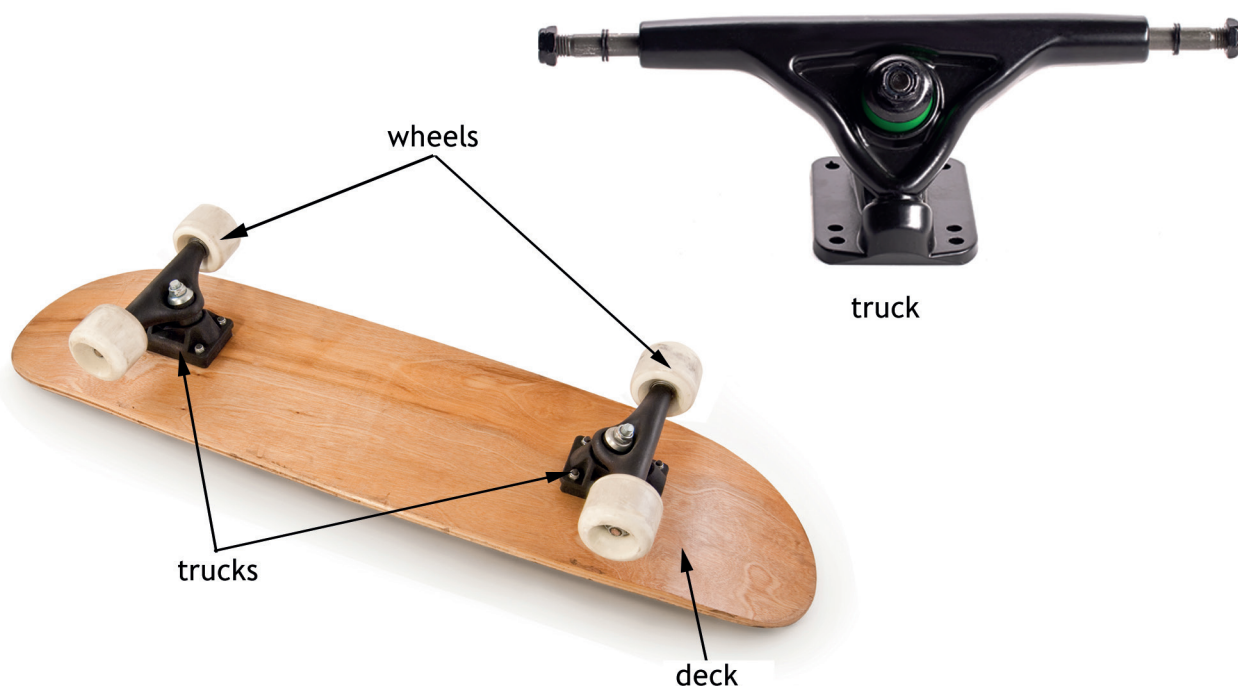
- (a) Explain why the materials chosen are suitable for these products. 6
(You must give six different explanations.)
- (b) Name **three** appropriate manufacturing processes used in the production of these barbecues and explain why each one is suitable. 6
- (c) Describe how aesthetics has influenced the design of these barbecues. 4
(You should refer to a range of aesthetic aspects.)
- (d) Explain the benefits of using computer aided design in the manufacture of products such as these barbecues. 4
- (e) Describe how the following have influenced the design of the barbecues 5
- function
 - safety.
- (To attract full marks, you must reference both function and safety in your answer.)*

[Turn over

SECTION 2 — 55 marks

Attempt ALL questions

2. A wooden skateboard is shown below.



- (a) Identify a suitable metal that could be used for the trucks of the skateboard and explain why it is appropriate. 3
- (b) Identify a suitable process for the manufacture of the trucks of the skateboard and explain why it is appropriate. 3

The deck of the skateboard has been made from plywood. The deck could also have been made using a plastic composite material.

- (c) Explain the benefits plastic composite materials have over plywood. 2

3. Ergonomics is an important factor to consider during the design of the vacuum cleaners, shown below.



Describe how ergonomics has influenced the design of these vacuum cleaners.
 (To attract full marks, you must cover all **three** areas of ergonomics in your answer.)

6

[Turn over

4. A designer will work with a range of people when developing products.
- (a) Describe the roles the following people have in the development of products
- (i) materials technologists 2
 - (ii) market researchers. 2
- A designer can be given an open or closed design brief.
- (b) Explain why a designer may prefer an open design brief. 2
- A designer may use idea generation techniques during the design process.
- (c) Explain the benefits of using idea generation techniques. 2
- A designer may produce physical models during the design process.
- (d) Describe how **two** different types of physical models could be used to advance the design of a product. 4
5. The development of products may be influenced by
- technology push
 - market pull.
- (a) Describe how each of these factors have influenced products with which you are familiar. 4
- Planned obsolescence influences the design of many products.
- (b) Describe the impact planned obsolescence may have on the **consumer**. 2
- Branding can influence the success of a product.
- (c) Describe the economic benefits of a strong brand image. 2
- After a period of time, the sales of a product will begin to decline.
- (d) Describe the steps a company could take to delay this decline. 3

6. The internal components of a glue gun are shown below.



The glue gun is manufactured using a variety of materials.

(a) Describe two ways that the materials used in the glue gun could be identified. 2

The casing for the glue gun is manufactured using injection moulding.

(b) Describe how the features created during injection moulding aid assembly. 4

Production and planning systems are used to improve efficiency when manufacturing products.

(c) Describe how production and planning systems could be used to improve efficiency during the manufacture of products such as the glue gun. 4

7. Design teams have a responsibility to consider the environmental impact of their products.

Describe how consideration for the environment has influenced the design, manufacture, use and disposal of products. 8

(You should refer to all stages in your response.)

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