National
Qualifications
2023 MODIFIED

# X819/76/11 Design and Manufacture

TUESDAY, 30 MAY
1:30 PM – 3:45 PM

**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.



*X8197611*

**SECTION 1 — 25 marks**

**Attempt ALL questions**

**1.** Two pedal go-karts are shown below with product information.

**Commercial go-kart**

**Materials**

plastic coated tubular mild steel frame
galvanised mild steel wheels
solid textured polypropylene seat
PVC steering wheel


**Additional details**

hand operated lockable brake
air filled tyres
front and rear reflectors
adjustable seat position
**Price - £549.99**


**Domestic toy go-kart**

**Materials**

tubular mild steel frame (painted)
hollow ABS wheels
solid polypropylene seat
PVC steering wheel
polystyrene mudguards and front panel

**Additional details**

hand operated brake
self-assembly required
**Price - £89.99**

MARKS

**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 the go-karts **and** explain why each one is suitable. **6**

(c) Describe how the following have influenced the design of the go-karts

- function
- safety. **5**

(*To attract full marks, you must reference both function and safety in your answer.*)

(d) Describe how aesthetics has influenced the design of the go-karts. **4**

(*You must refer to a **range** of aesthetic aspects*.)

(e) Explain the benefits and drawbacks for the **manufacturer** of using standard components during the production of the go-karts. **4**

**[Turn over**

MARKS

## SECTION 2 — 55 marks

**Attempt ALL questions**

**2.** A carabiner used in mountaineering and adventure sports is shown below.

(a) Identify a suitable material that could be used for the carabiner **and** explain why it is appropriate. **3**

The carabiner has been manufactured using the process of drop forging.

(b) Explain why drop forging is a suitable process for the production of products such as the carabiner. **2**

CAD modelling was used during the design of the carabiner.

(c) Explain the benefits of using CAD modelling during the design of the carabiner. **2**

MARKS

**3.** A car interior is shown below.

(a) Describe how ergonomics has influenced the design of the car interior. **6**

(*To attract full marks, you must cover all **three** aspects of ergonomics in your answer.*)

Ergonomists play a lead role in the design of products.

(b) Describe the role of **two other** members of a design team. **4**

Sub-contractors can be used in the development of products.

(c) Explain one benefit **and** one drawback of using sub-contractors. **2**

**[Turn over**

MARKS

**4.** Technology push and market pull often influence products.

(a) Describe how products with which you are familiar have been influenced by:

(i) Technology push. **2**

(ii) Market pull. **2**

Market research is carried out as part of the design process.

(b) Describe **two** appropriate methods of carrying out research into the needs of the target market. **4**

Planned obsolescence is often incorporated into products.

(c) Describe what is meant by planned obsolescence **and** give an example of how this may have influenced the design of products. **2**

**5.** Swimming goggles are shown below.


The seal and the strap are manufactured from elastomers.

(a) Explain why elastomers are suitable for these parts. **2**

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

(b) Describe how production and planning systems are used to improve efficiency during the manufacture of products. **4**

Companies use a variety of marketing techniques to maintain or improve their market share.

(c) Describe the marketing techniques that companies could use to maintain or improve their market share. **2**

MARKS

**6.** Different methods can be used to identify materials in products.

(a) Describe methods that could be used to identify materials. **3**

Different assembly methods are used in the commercial manufacture of products.

(b) Outline the factors that would influence the choice of assembly method used. **3**

Manufacturers can use recycled or recyclable materials to reduce the impact of their products on the environment.

(c) Describe **other** ways in which designers and manufacturers can reduce the environmental impact of their products. **4**

**7.** Designers use a variety of graphic techniques throughout the design process.

Explain why a variety of graphic techniques are used at different stages of the design process. **8**

*(You should reference different types of graphic techniques and where they are used in the design process.)*

**[END OF QUESTION PAPER]**

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Question 1 Image of commercial go-kart is taken from https://mytoys.scene7.com/is/image/myToys/ext/11204940-02.jpg?$rtf_mt_prod-mainzoom_xl$

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