



Oxford Cambridge and RSA

A Level in Design and Technology: Product Design

H406/02 Problem Solving in Product Design

Practice Paper – Set 1

Time allowed: 1 hour 45 minutes

You must have:

- Resource Booklet

You may use:

- a scientific calculator
- a ruler
- geometrical instruments

First name										
Last name										
Centre number						Candidate number				

INSTRUCTIONS

- Use black ink.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- The recommended reading time for the Resource Booklet is **35 minutes**.
- Write your answer to each question in the space provided. Additional paper may be used if necessary, but you must clearly show your candidate number, centre number and question number(s).
- Where appropriate, your answers should be supported by workings. Marks may be given for the correct method even if the answer is incorrect.
- Do **not** write in the barcodes.

INFORMATION

- The total mark for this paper is **70**.
- The marks for each question are shown in brackets [].
- Quality of extended responses will be assessed in questions marked with an asterisk (*).
- This document consists of **12** pages.

3 The Council will use an independent delivery company called 'Move-It' to deliver the shovels to residents. In order to consider the viability of project 'Snow-Go', the Council Finance Department requires the cost of the delivery operation.

A survey undertaken by the Council indicates that on average only 20% of the residents would qualify to loan the more expensive wheeled snow shovel.

Calculate the total cost of delivery to 1000 homes.

In your calculations you should use the data provided on **pages 3 and 4** of the Resource Booklet.

Key requirements:

- avoid mixing types of shovel in the same carton;
- fill each carton as economically as possible;
- aim to include as close as possible to, and no less than, **20% wheeled snow shovels**;
- **avoid stacking cartons** to allow delivery operatives ease of access to the top of the cartons.

Total cost £

A series of 25 horizontal dotted lines spanning the width of the page, providing a guide for handwriting practice.

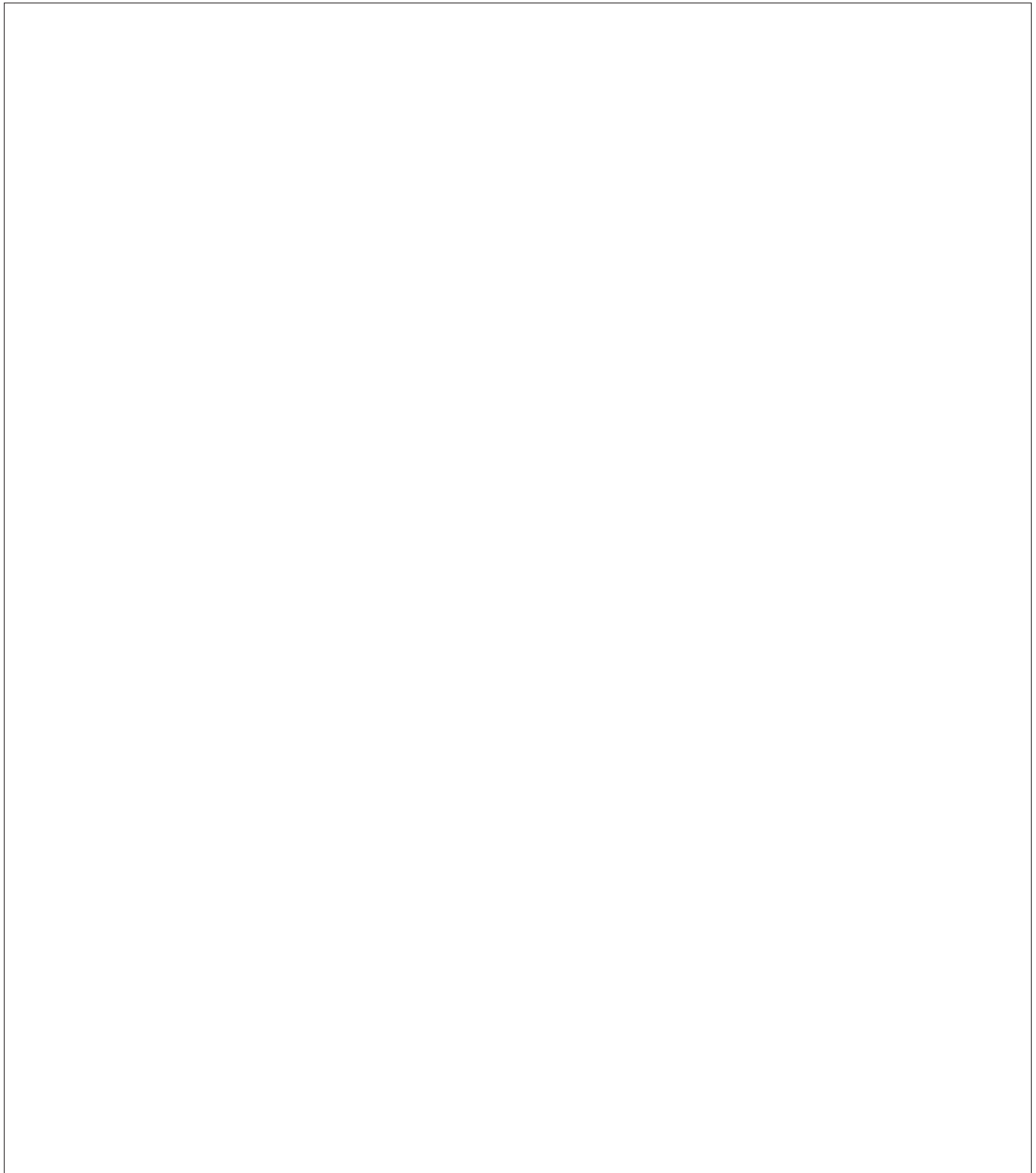
- 5 A concept product has been prototyped by the designer for elderly residents living in rural areas as outlined on **page 6** of the Resource Booklet.

Use sketches and/or notes to determine suitable methods of manufacture and assembly for the features of the concept design.

In your response you must include details of:

- materials;
- manufacturing processes;
- finishes;
- standardised components.

[12]





- 6 The designer is now exploring the possibility of a multi-purpose product that not only resolves issues with shovelling snow and spreading salt for elderly users, but also with their wider gardening requirements throughout the year.

A prototype called 'Ergo Kit' has been designed to enable elderly users and users with back injuries to undertake these activities with greater levels of comfort.

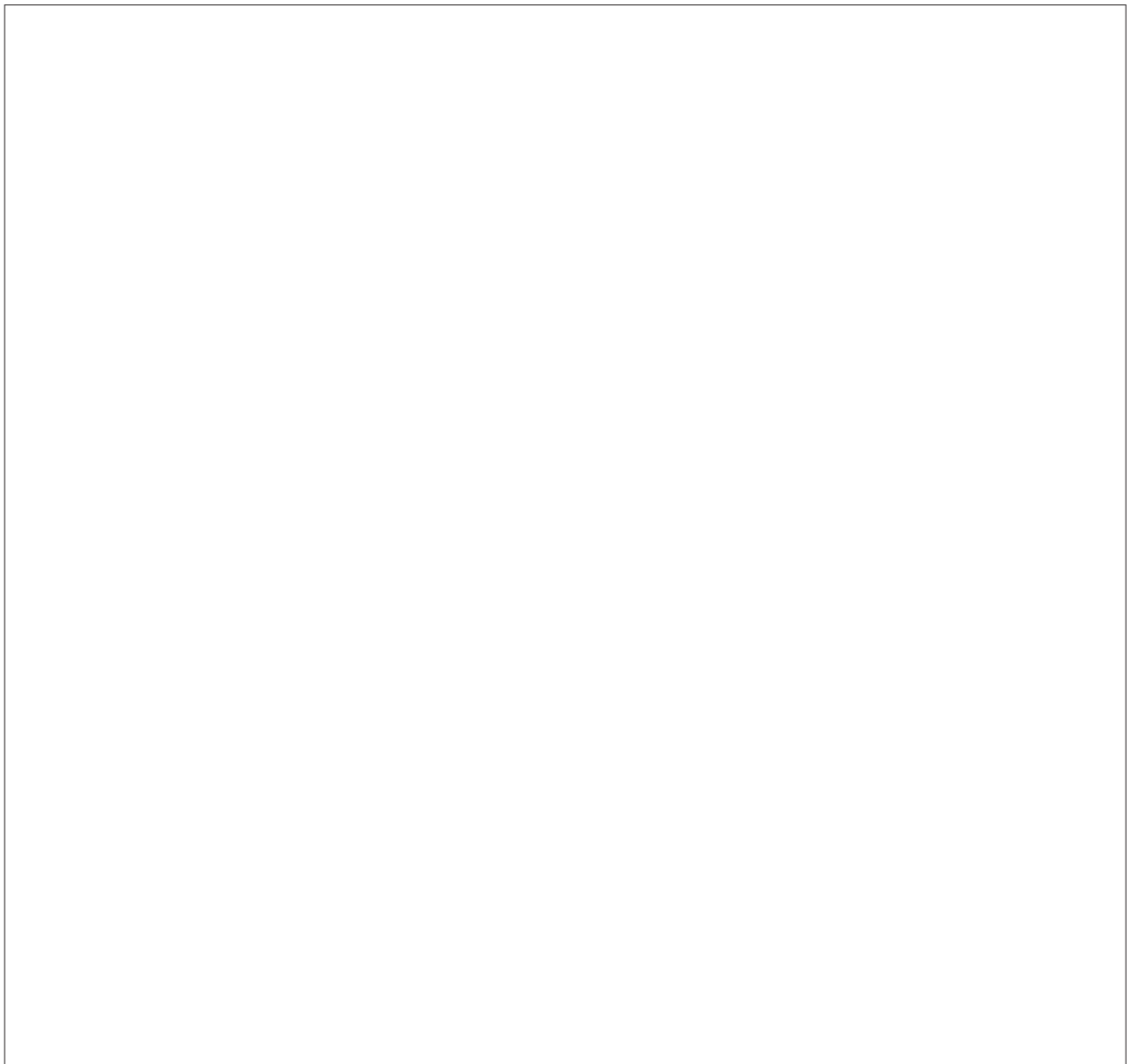
The Council would like to order an initial batch of 50 'Ergo Kits'. Each kit comprises a front handle assembly and a rear handle assembly.

Use sketches and/or notes to show how the 'Ergo Kits' could be manufactured. Refer to the information provided on **page 8** of the Resource Booklet.

In your response you must include:

- suggested materials;
- technical details of methods of manufacture;
- how the suggested materials and methods of manufacture consider the ergonomic requirements of elderly users.

[12]





END OF QUESTION PAPER

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