

DESIGN AND TECHNOLOGY

9705/33

Paper 3

October/November 2018

3 hours

Additional Materials: Answer Booklet/Paper
 A range of design drawing equipment
 A3 Drawing Paper (5 sheets)



READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, glue or correction fluid.
DO NOT WRITE IN ANY BARCODES.

Section A

Answer **two** questions from **one** of the Parts **A**, **B** or **C**.

Section B

Answer **one** question.

All dimensions are in millimetres.

The instruction 'discuss' denotes that you should:

- examine critically the issues raised by the question;
- explain and interpret these issues as appropriate;
- introduce evidence wherever possible to support conclusions of arguments.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **11** printed pages and **1** blank page.

Section A

Answer **two** questions from **one** of the Parts **A**, **B** or **C**.

Part A – Product Design

- 1 Fig. 1 shows details of a candle holder which will be used in a garden.

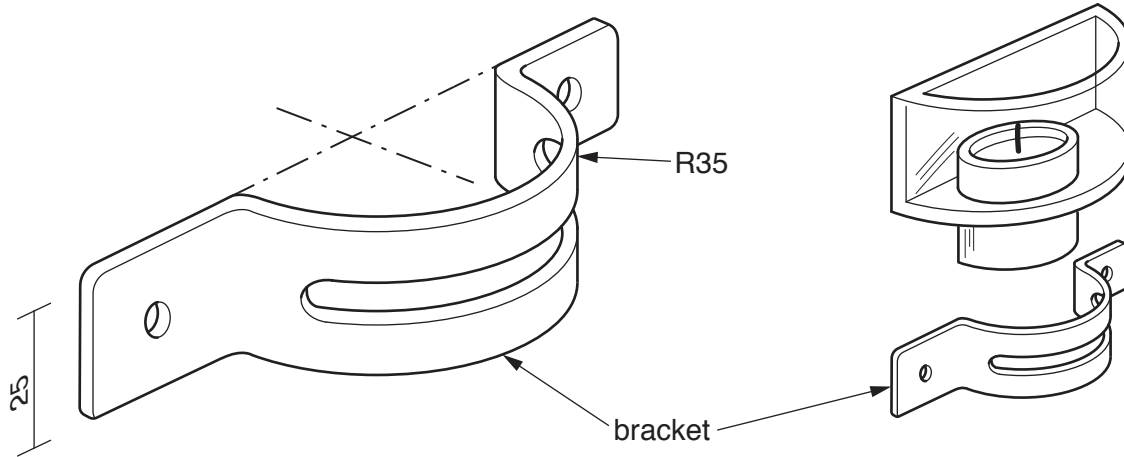


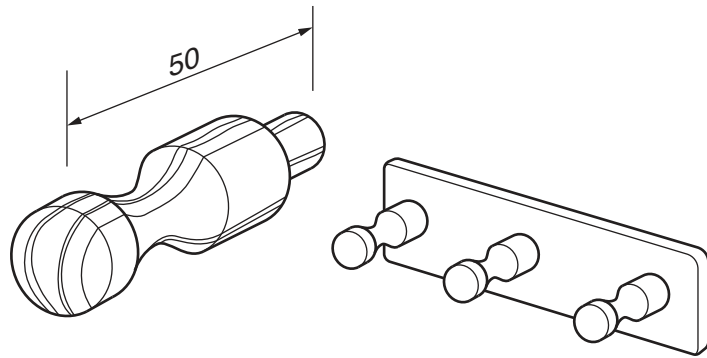
Fig. 1

- (a) State a suitable material for a bracket of the type shown in Fig. 1. Give **two** reasons for your choice. [3]
- (b) Use notes and sketches to describe how you would make the bracket. [9]
- (c) Explain what changes may be necessary to the design, the manufacturing method used and the material selected, if 50 brackets were required. Use notes and sketches to support your answer. [8]

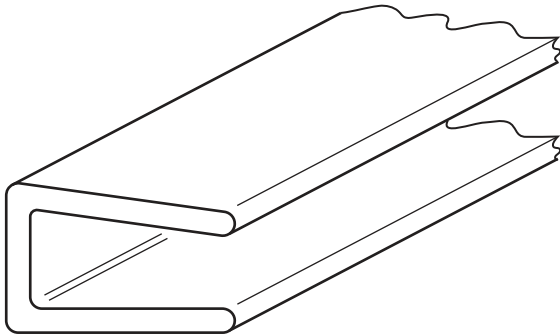
- 2 Discuss the importance of unit production methods to:

- product designers;
- designer-makers. [20]

item: peg for a clothes rail
process: wood turning



item: paper binder
process: extrusion



item: cast iron griddle
process: sand casting

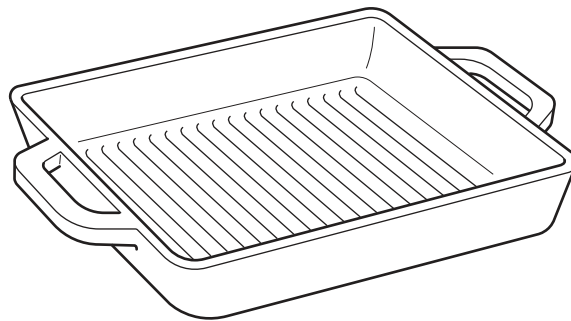


Fig. 2

Choose **two** of the items shown in Fig. 2. For **each**:

- (a) use notes and sketches to describe how the process has been used in the manufacture of the item; [14]
- (b) explain why the process is particularly suitable in the production of the item. [6]

Part B – Practical Technology

- 4 Fig. 3 shows a potential divider arrangement in an incomplete circuit for a temperature alarm.

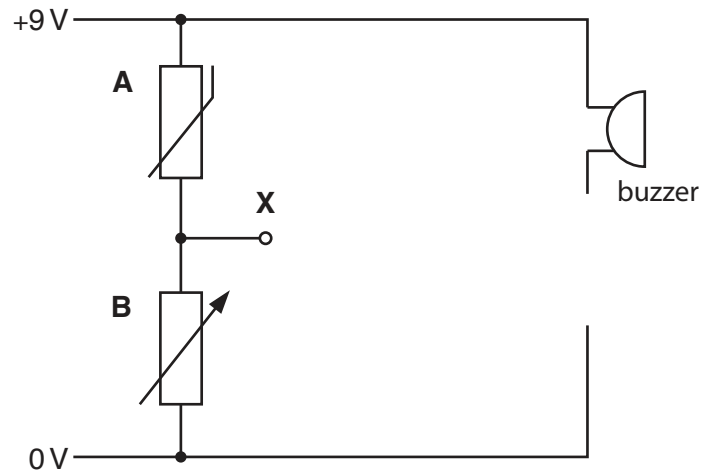


Fig. 3

- (a) (i) Identify **and** describe the function in the circuit of components **A** and **B**. [4]
 (ii) Describe the action of the potential divider with reference to the output voltage at **X**. [3]
 (iii) Draw a completed circuit that shows a suitable method of driving the buzzer. [3]
- (b) Discuss the impact of the rapid development of technologies on manufacturers of electronic products. [10]

5 Fig. 4 shows the design for a phone case that is to be mass produced.

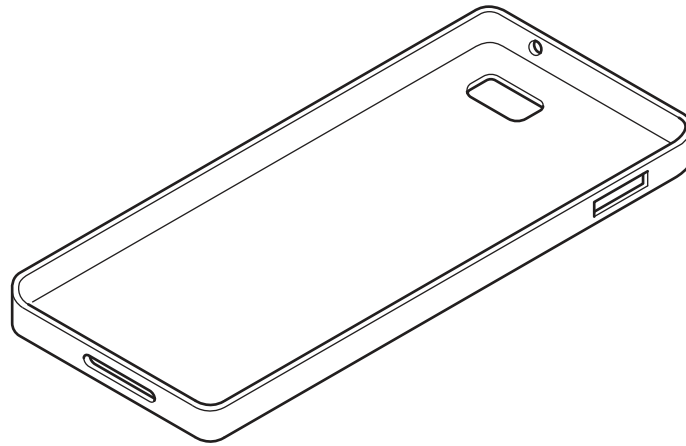


Fig. 4

- (a) (i) Name a specific metal **and** a specific plastic that could be used to manufacture the phone case. [2]
- (ii) Select **one** of the materials from part (i). Use notes and sketches to describe how the phone case would be mass produced using this material. [8]
- (b) Discuss the considerations that would be taken by a manufacturer when deciding on the material for the phone case. [10]
- 6 (a) An increasing number of alloys are used in the manufacture of components and products.
- (i) Name **two** alloys **and** state the specific materials used in each alloy. [6]
- (ii) Identify a specific application for **each** of the alloys that you have given in part (i) and explain why the alloys are particularly suitable for that application. [6]
- (b) (i) Define what is meant by the term **tensile strength**. [2]
- (ii) Name **two** products or applications that require the property of high tensile strength. [2]
- (iii) Use notes and sketches to describe a simple test to measure the hardness of a material. [4]

Part C – Graphic Products

7 Fig. 5 shows a design of a house for student accommodation on a university campus.



Fig. 5

A high quality rendered presentation drawing is required.

- (a) Draw a presentation view of the house. Use estimated two-point perspective that will show most detail. [14]
- (b) Render the drawing to show the different materials from which the building would be made. [6]

- 8 Fig. 6 shows an idea for the packaging of footballs.

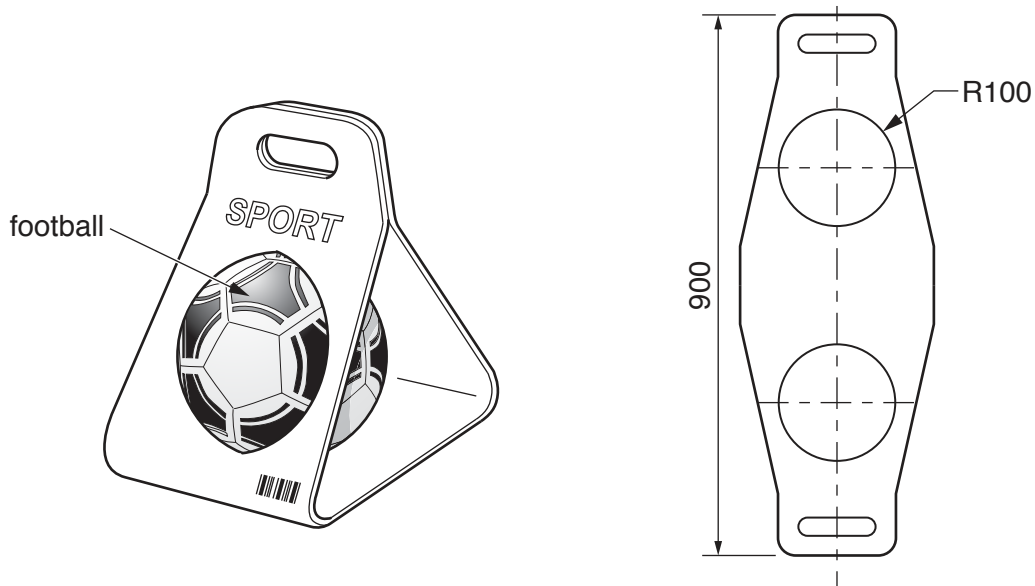


Fig. 6

- (a) State a suitable material for the packaging shown in Fig. 6. Give **two** reasons for your choice. [3]
- (b) Use notes and sketches to describe how you would make a prototype of the package to show to a client. [9]
- (c) Explain what changes may be necessary to the design, the manufacturing method used and the material selected, if 5 000 packages were required. Use notes and sketches to support your answer. [8]

- 9 An effective marketing strategy can have a significant impact on the success of a product.

Discuss the importance of marketing in terms of:

- assessing market needs;
- product promotion;
- economic considerations.

[20]

Section B

Answer **one** question on the A3 paper provided.

You should approach the design question of your choice in the following manner:

Analysis

Produce an analysis of the given situation/problem, which may be in written or graphical form. [5]

Specification

Produce a detailed written specification of the design requirements from the analysis. Include at least five specification points other than those given in the question. [5]

Exploration

Use bold sketches and brief notes to show your exploration of ideas for a design solution, with reasons for selection. [25]

Development

Use bold sketches and notes to show the development, reasoning and composition of ideas into a single design proposal. Give details of materials, constructional and other relevant technical details. [25]

Proposed solution

Produce drawings of an appropriate kind to show the complete solution. [15]

Evaluation

Give a written evaluation of the final design solution. [5]

[Total: 80]

- 10 Fig. 7 shows a study area in a secondary school where the roof is supported by a large cylindrical column.

There is a requirement for more seating in the study area.

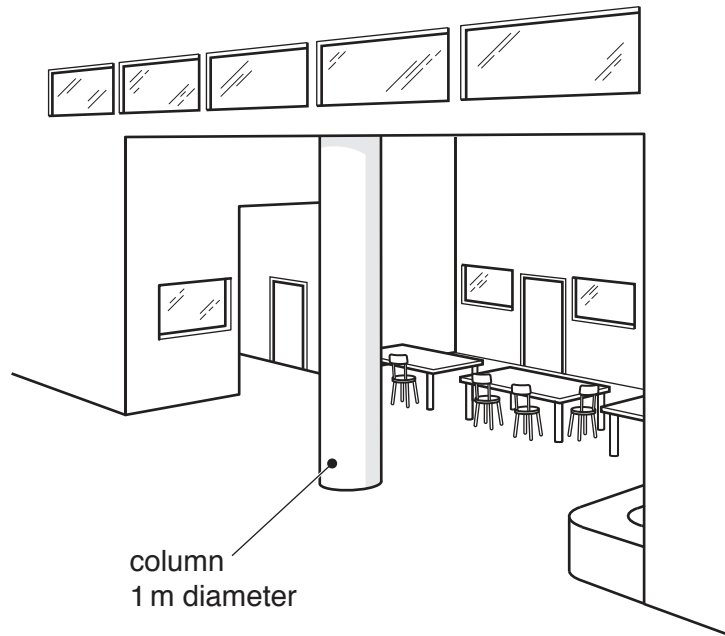


Fig. 7

Design seating that can be positioned around the cylindrical column.

The seating must:

- seat 6 students;
- not be permanently attached to the column.

- 11 A school erects a platform in the main hall for speech day. On this day, students receive awards.

The platform can be erected at 2 different heights, 500 and 750. It has steps on the front left and requires a ramp for students in wheelchairs to access from the right of the platform. Details of the platform are shown in Fig. 8.

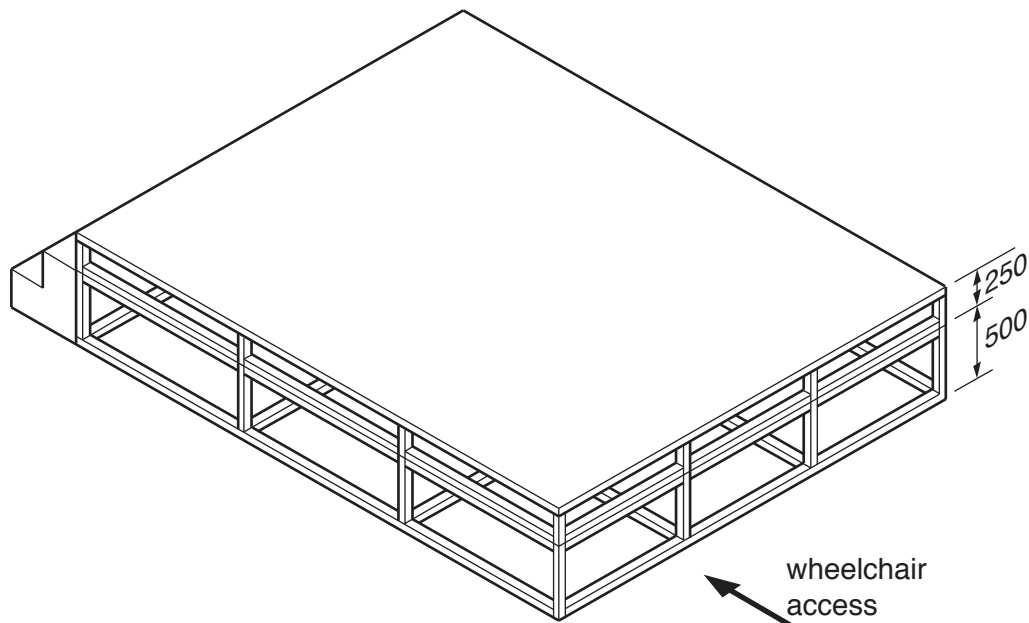


Fig. 8

Design a ramp that will allow wheelchair users to access the platform.

The ramp must be:

- quickly and securely attached to and removed from the platform stage;
- adjustable in height between 500 and 750.

- 12 A company wishes to produce family packs of sun protection products. The pack will consist of one bottle of cream and four sprays.

Each product will have a different Sun Protection Factor (SPF). The higher the factor, the higher the level of protection.

The sun cream is SPF 15.

Two of the sprays are SPF 30.

Two of the sprays are SPF 50.

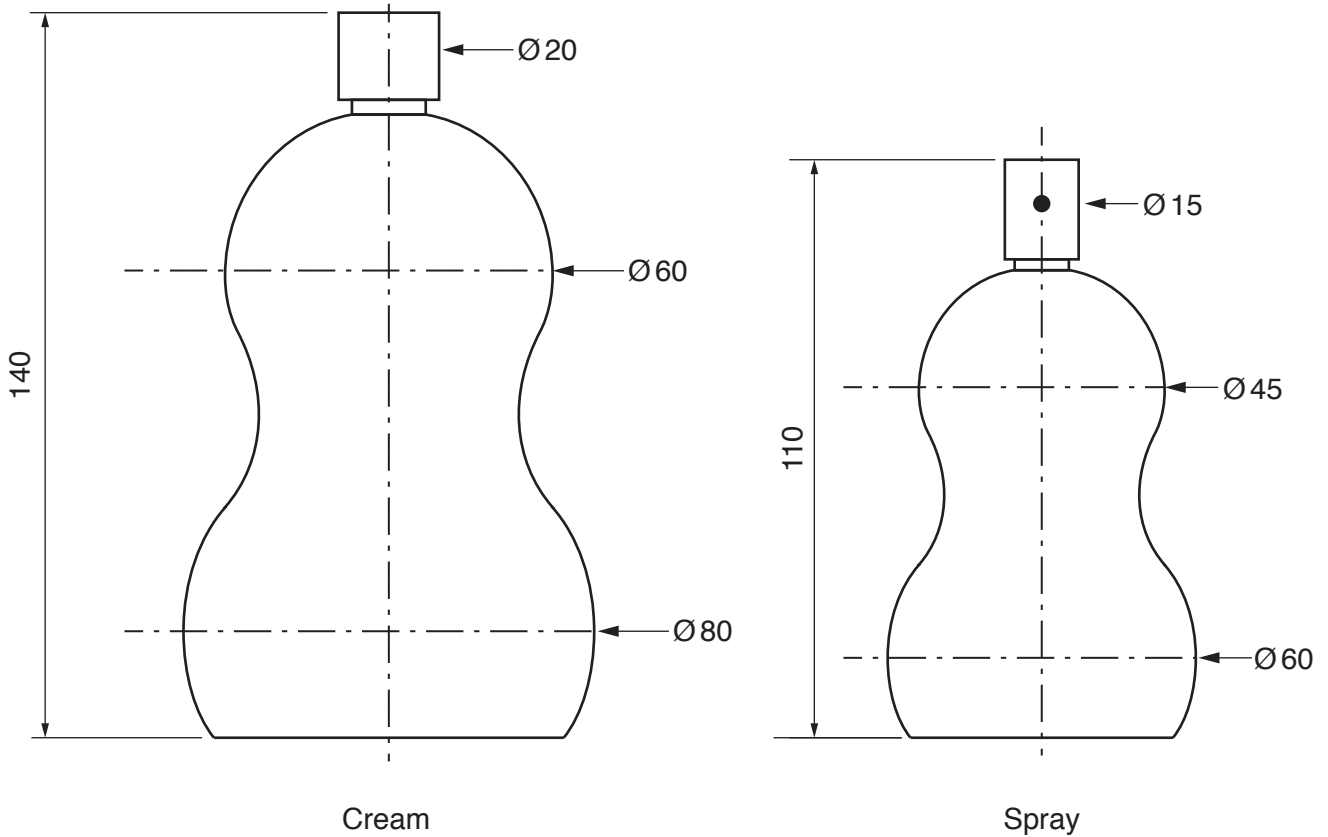


Fig. 9

Design:

- the name and a logo for the sun cream and spray products;
- the packaging to hold one bottle of sun cream and four sprays.

Details of the products are given in Fig. 9.

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