

DESIGN AND TECHNOLOGY

9705/33

Paper 3

October/November 2019

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 **10** printed pages and **2** blank pages.

Section A

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

Part A – Product Design

- 1 Discuss how designers take into consideration physical and aesthetic needs when designing furniture for schools and colleges.

Use notes and sketches to support your answer.

[20]

- 2 Fig. 2.1 shows a dish to hold paper clips.

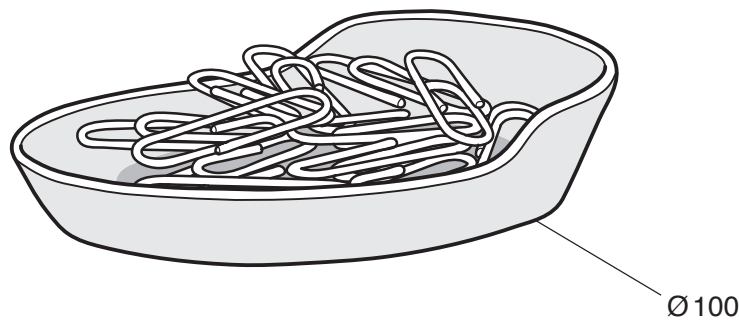
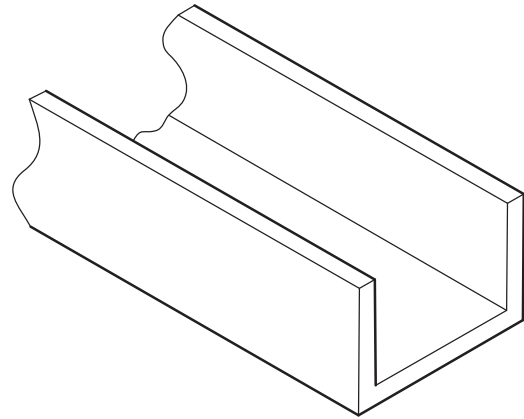


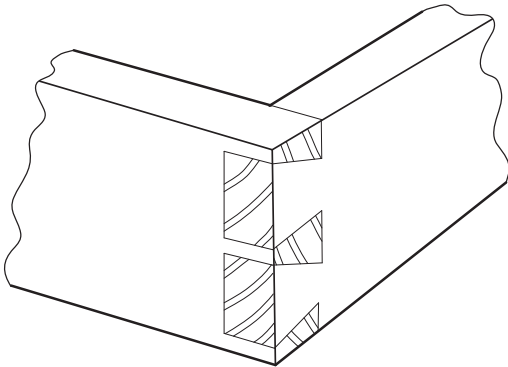
Fig. 2.1

- (a) State a suitable material for a dish of the type shown in Fig. 2.1 and give **two** reasons for your choice. [3]
- (b) Describe, using notes and sketches, how you would make one dish. [9]
- (c) Explain the changes which may be necessary to the design, the manufacturing method used and the material selected, if 100 identical dishes were required. Use notes and sketches to support your answer. [8]

item: U section steel channel
process: rolling



item: corner of a wooden jewellery box
process: dovetail joint



item: plastic gear wheel
process: injection moulding

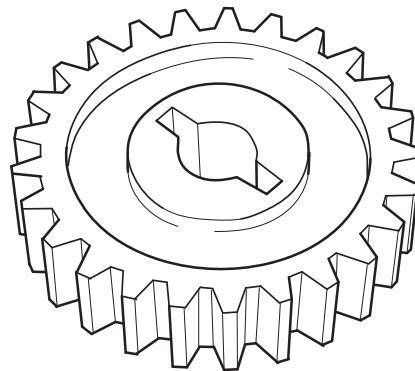


Fig. 3.1

Choose **two** of the items shown in Fig. 3.1. 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. 4.1 shows a luggage shelf for a train with one item of luggage.

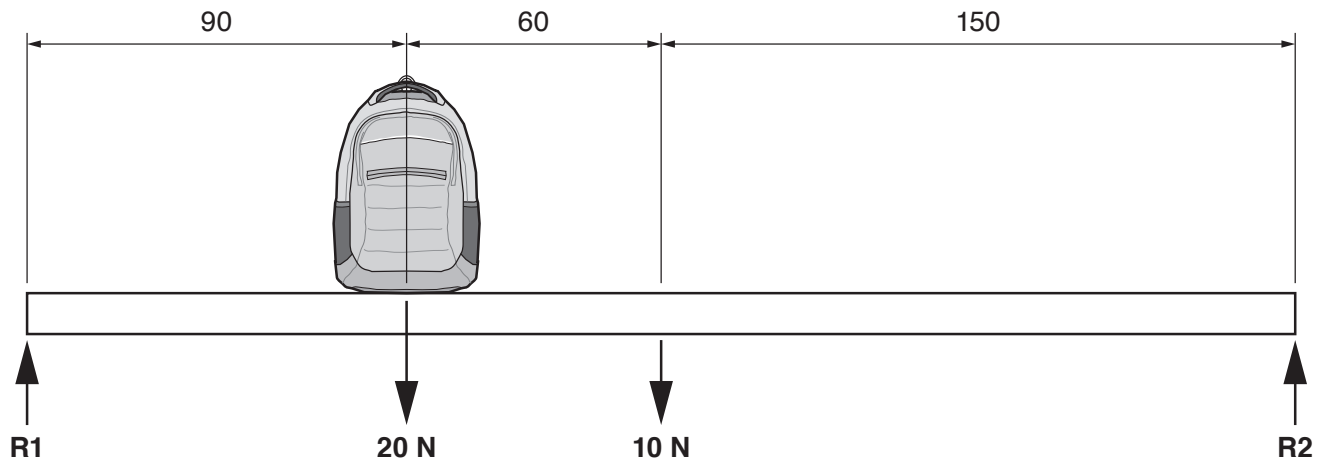


Fig. 4.1

(a) Calculate the reactions at **R1** and **R2**. [4]

(b) Explain the following terms with reference to mechanisms:

- mechanical advantage
- efficiency. [4]

(c) Use notes and sketches to explain how each of the following can be used to reinforce a structure.

- gussets
- ribs
- lamination
- braces [12]

- 5 Designers and makers have a wide choice of methods available to join materials when creating products.

(a) The following adhesives can be applied to make a successful joint.

- solvent cement
- Polyvinyl Acetate (PVA)
- contact adhesive

For each adhesive:

- give a suitable example of the use of the adhesive
- state the specific materials to be joined
- describe how the surfaces would be prepared and how the adhesive is applied. [12]

(b) Explain the differences between brazing and welding.

Give **one** example of a suitable application of each method. [8]

- 6 Computers are increasingly used in the designing and making of products. Discuss the impact this has on the commercial aspects of using computers such as the management of resources, costs and marketing. [20]

Part C – Graphic Products

7 Fig. 7.1 shows details of a tape measure.

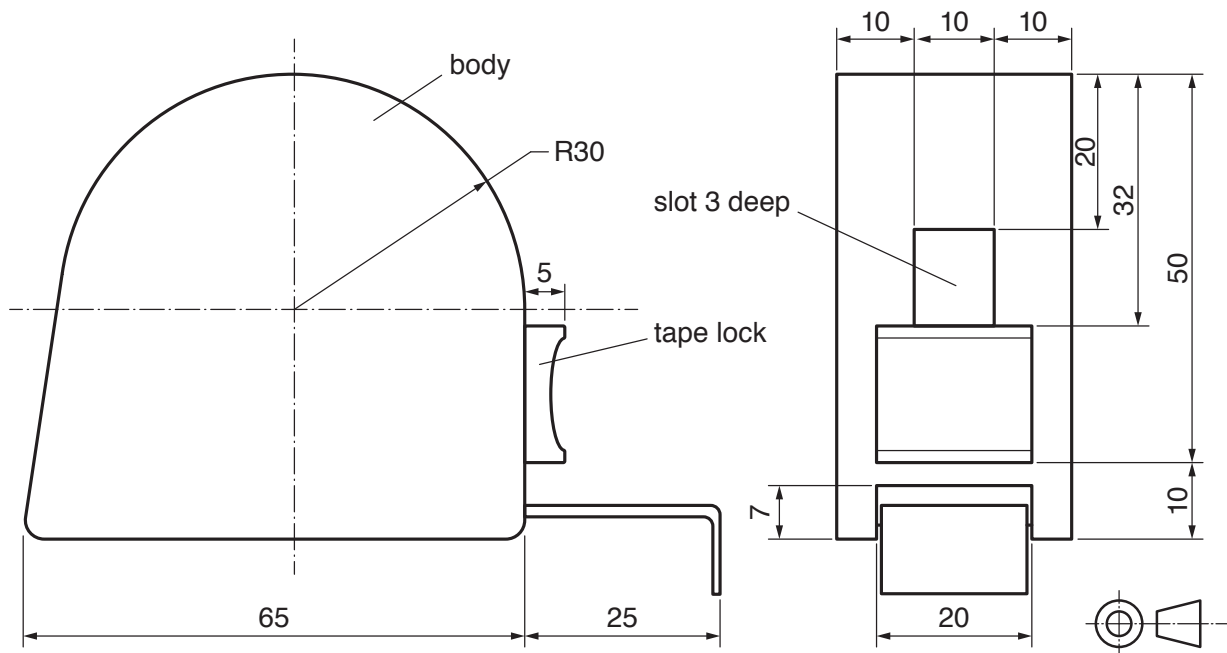


Fig. 7.1

(a) Draw to a scale of 2:1 an isometric drawing of the tape measure that shows maximum details. Estimate any missing dimensions. [16]

(b) Render the drawing to show that the body is made from shiny plastic and that the tape lock is made from rubber. [4]

8 Discuss the influence of style, fashion and trends on the commercial success of products. [20]

9 Fig. 9.1 shows a prototype model for a toy tractor and details of the main body.

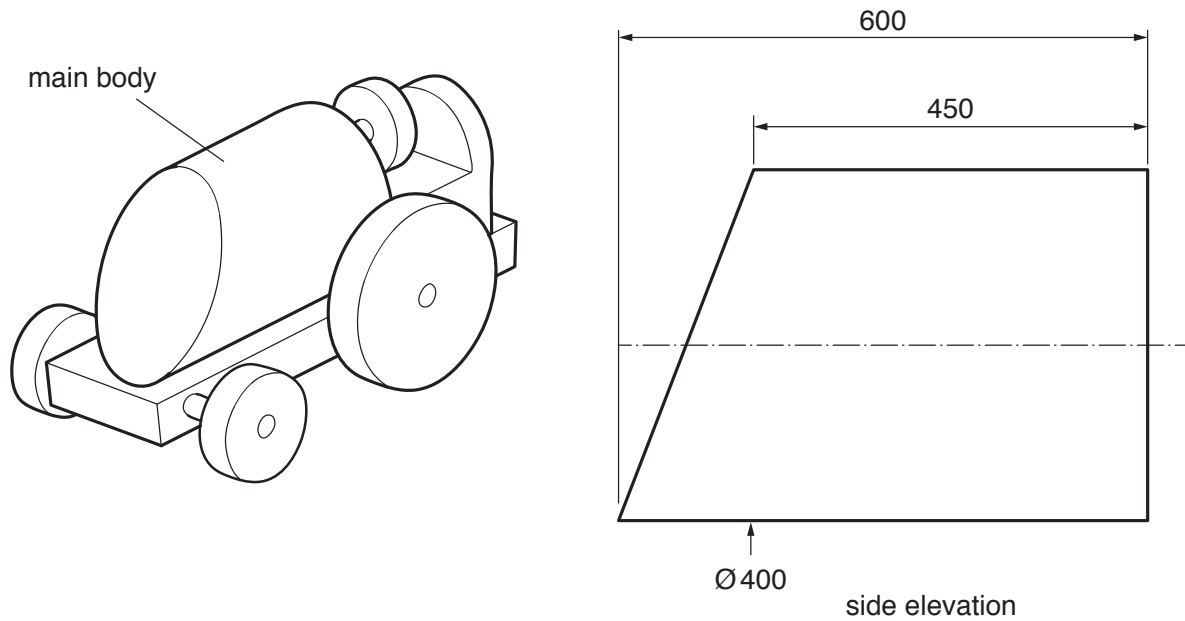


Fig. 9.1

- (a) To an appropriate scale, draw:
- (i) the given side elevation [3]
 - (ii) a plan view. [5]
- (b) Indicate your choice of projection. [2]
- (c) Construct a development (net) of the main body. Include the front face of the main body. [10]

Section B

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

Each question is worth 80 marks.

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

From the analysis produce a detailed written specification of the design requirements.
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]

10 A senior school requires additional examination desks.

There is a need for a design for a combined examination desk and seat.

Each combined examination desk and seat must:

- fold for ease of storage
- be stable when in use.

[80]

11 A school is encouraging students to be more environmentally responsible and wishes to increase opportunities to recycle cans and plastic bottles.

A device to crush the cans and plastic bottles to make them easier to collect and transport is required.

The device must:

- be easy to operate by students
- include a method of collecting and storing the crushed cans and plastic bottles.

Details of a can and plastic bottle are given in Fig. 11.1.

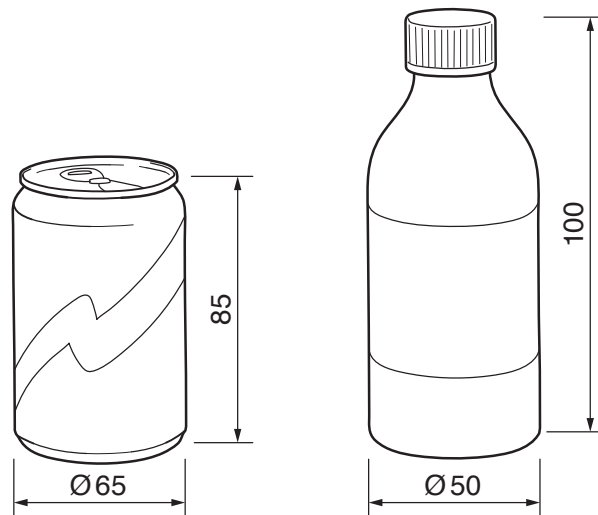


Fig. 11.1

[80]

12 The Fruit Tree Hotel wishes to produce a welcome pack for guests.

Design a welcome pack that will:

- contain and protect one glass bottle of fruit flavoured water and two glasses
- show appropriate graphics relating to the Fruit Tree Hotel.

Details of the glass bottle and a glass are given in Fig. 12.1.

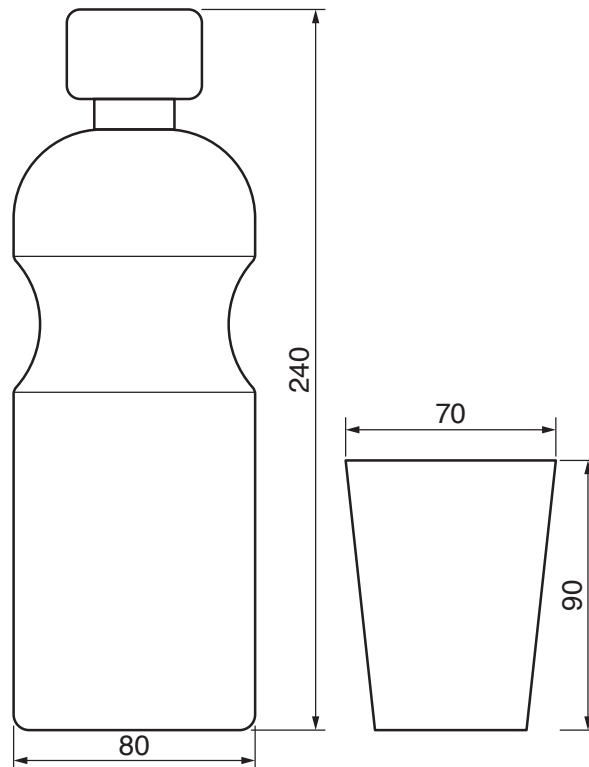


Fig. 12.1

[80]

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