Cambridge Assessment International Education

Cambridge International AS & A Level

DESIGN & TECHNOLOGY **9705/33**

Paper 3 **October/November 2023**

3 hours

3469996999O

You must answer on the answer booklet/paper.

You will need: Answer booklet/paper Coloured pencils
A3 drawing paper (5 sheets)
A range of design drawing equipment

INSTRUCTIONS

- Answer **three** questions in total:
  - Section A: answer **two** questions from **one** of the Parts A, B or C.
  - Section B: answer **one** question.
- If you have been given an answer booklet, follow the instructions on the front cover of the answer booklet.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number on all the work you hand in.
- Do **not** use an erasable pen or correction fluid.
- You may use an HB pencil, or coloured pencils as appropriate, for any diagrams, graphs or rough working.
- At the end of the examination, fasten all your work together. Do **not** use staples, paper clips or glue.

INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [ ].
- All dimensions are in millimetres.

This document has **12** pages. Any blank pages are indicated.

Section A

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

Part A – **Product Design**

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.

1 Fig. 1.1 shows a small garden table.

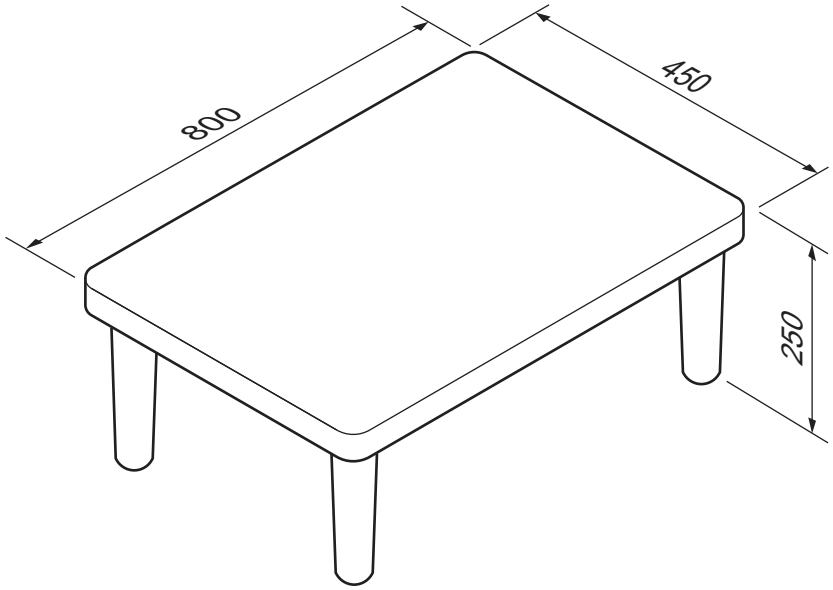


Fig. 1.1

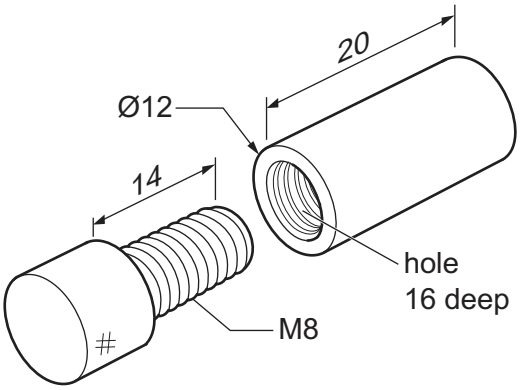
(a) State a suitable material for a garden table of the type shown in Fig. 1.1 and give **two** reasons for your choice. [3]

(b) Use sketches and notes to describe how you would make a garden table of the type shown in Fig. 1.1 in a school workshop. [9]

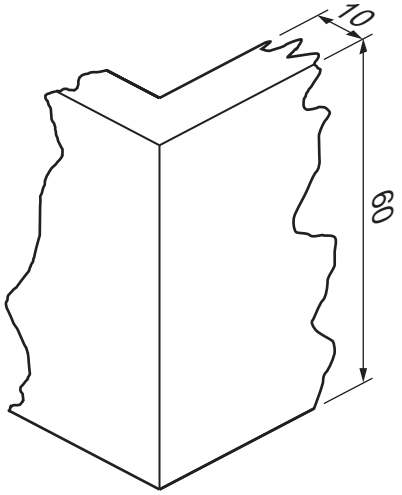
(c) Explain the changes which may be necessary to the design, the manufacturing method used and the material selected if 1000 identical garden tables were required.
Use sketches and notes to support your answer. [8]

2 Discuss the issues to be considered when selecting an appropriate quantity production system for a new product. [20]

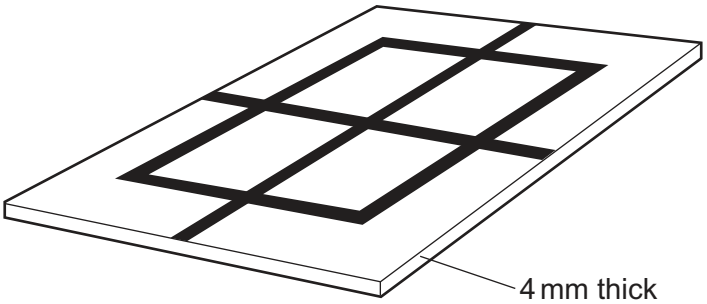
3



item: threaded fixing
material: mild steel
process: internal and external threading



item: storage box
material: hardwood
process: comb (finger) joint



item: floor tile
material: PVC
process: calendering

Fig. 3.1

Choose **two** of the items shown in Fig. 3.1. For **each**:

(a) use sketches and notes to describe how the process has been used in the manufacture of the item [14]

(b) explain why the process is particularly suitable for the production of the item. [6]

Part B – **Practical Technology**

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.

4 **(a)** Use sketches and notes to explain the difference between frame and monocoque structures. Give an example of each type of structure. [8]

(b) Use sketches and notes to explain how each of the following can be used to reinforce structures.
Give a specific application of use for each.

(i) ribs

(ii) braces

(iii) gussets [12]

5 Fig. 5.1 shows forces acting on a beam.

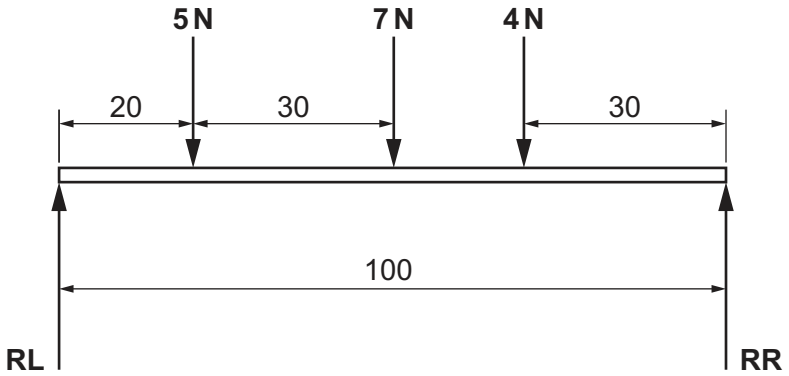


Fig. 5.1

(a) Use graphical means to calculate the reactions at **RL** and **RR**. [6]

(b) Use sketches and notes to describe **two** examples of structures found in nature that have been utilised in the design of products. [6]

(c) Draw a stress strain graph for a material of your choice and describe the key features of the graph. [8]

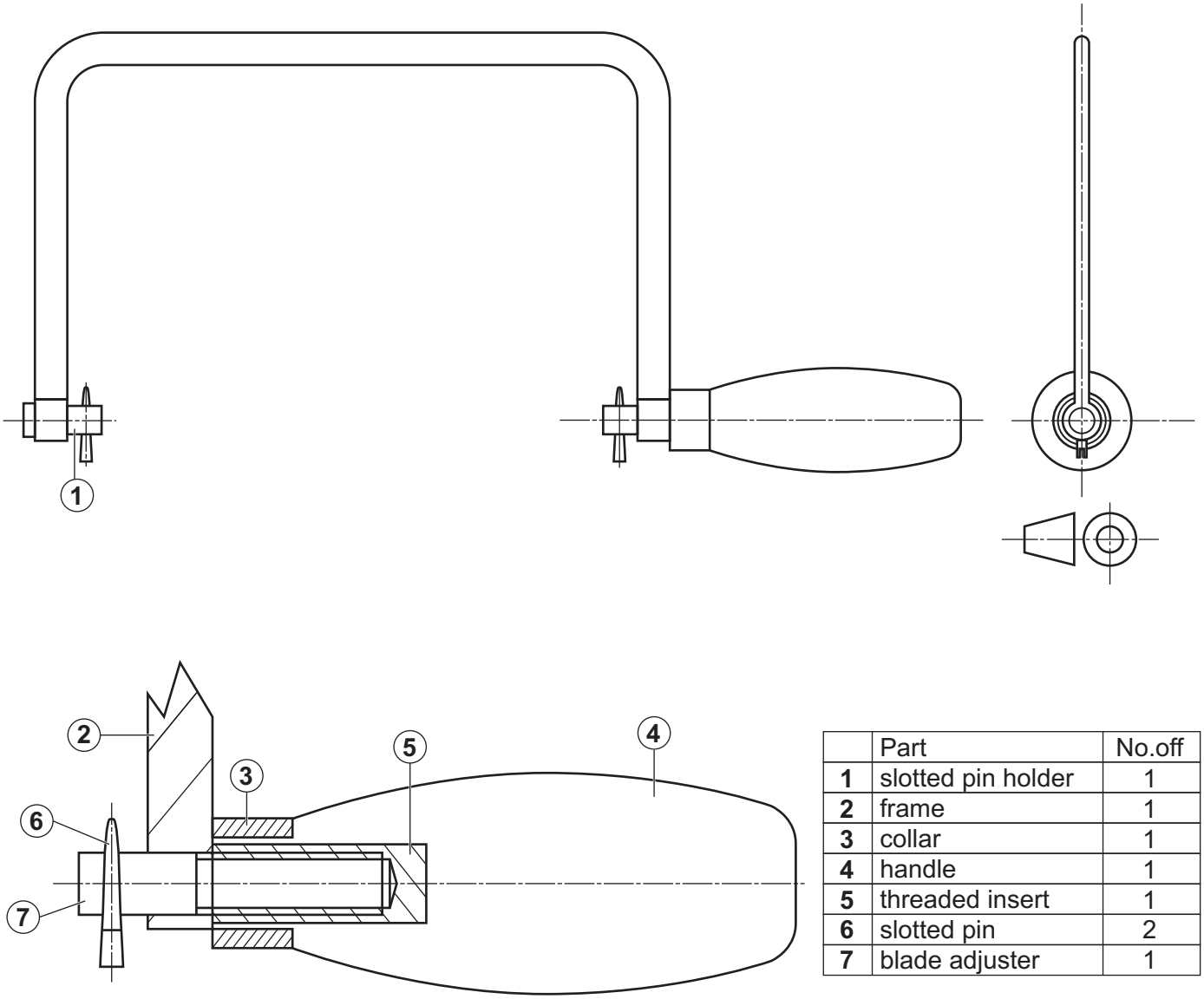
6 Discuss the impact of CAM (computer aided manufacture) on the manufacturer and the consumer. [20]

Part C – **Graphic Products**

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.

7 Fig. 7.1 shows orthographic views of a coping saw, a sectional view through the handle end of the coping saw and a parts list.



	Part	No.off
1	slotted pin holder	1
2	frame	1
3	collar	1
4	handle	1
5	threaded insert	1
6	slotted pin	2
7	blade adjuster	1

Fig. 7.1

Sketch an exploded isometric view of the coping saw. Use thick and thin line technique to enhance your sketch. [20]

8 Discuss the factors a design company would consider when setting up an exhibition for a new range of mobile phones and tablet computers. Include in your discussion:

- focal points
- the circulation of visitors. [20]

9 Fig. 9.1 shows incomplete elevations of a Ø60 pipe joining a Ø80 pipe.

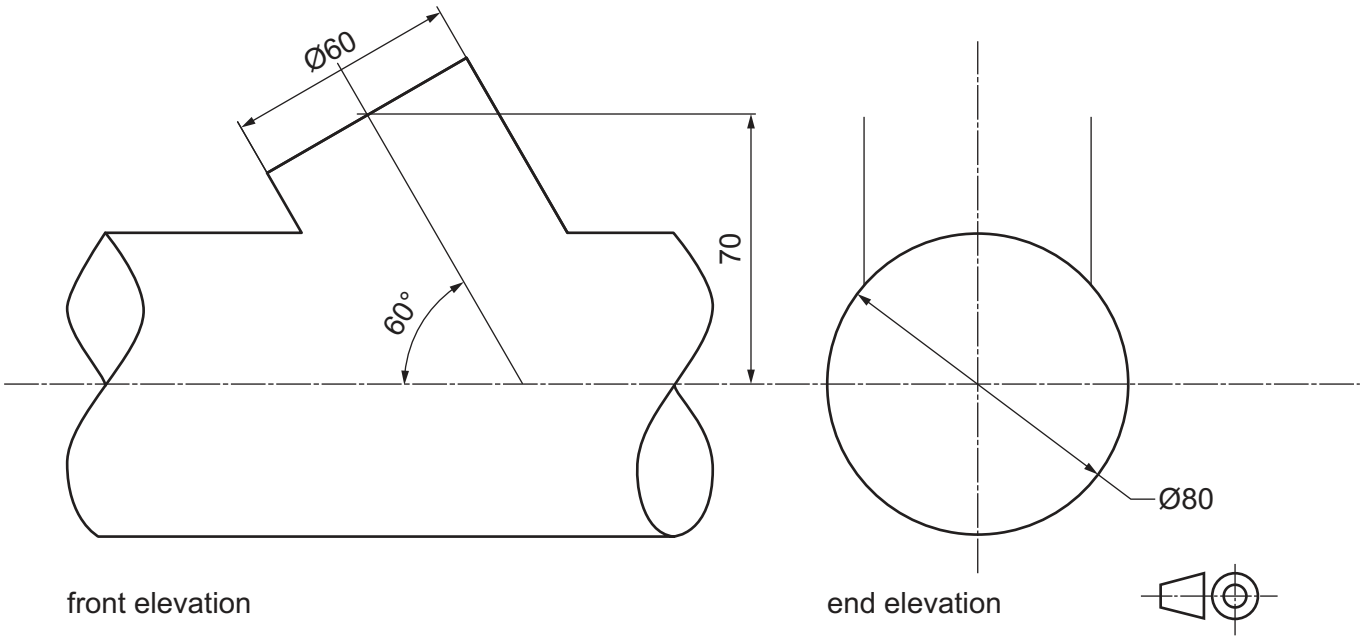


Fig. 9.1

Draw to a scale of 1:2:

- the complete front and end elevations
- a plan.

[20]

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

Show using bold sketches and notes, 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]

[Turn over

10 A school wants to display a range of 3D work made by Design and Technology students.

You are to design a system to display 3D work made by Design and Technology students.

The system must:

- be adaptable to be arranged in different configurations
- not exceed a maximum of 500 × 2000 floor space with a maximum height of 1500
- display items up to 400 × 400 × 600 in size.

Details of the floor space for the display system are shown in Fig. 10.1.

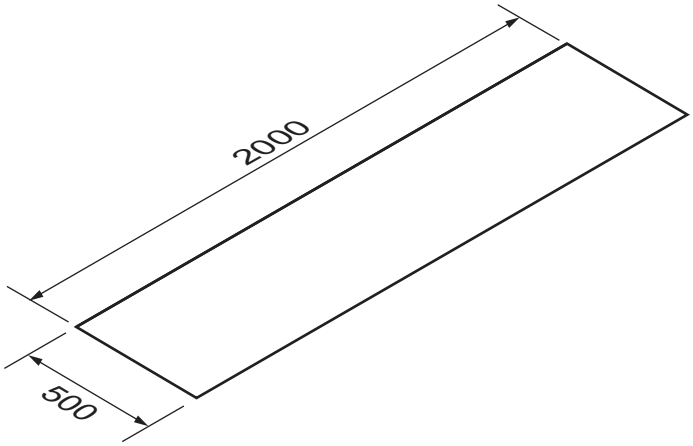


Fig. 10.1

[80]

11 A shopping centre has several large and heavy potted plants positioned around the centre. They occasionally need to be repositioned.

You are to design a product that would enable one person to move a potted plant when required.

The product must be able to:

- securely lift one potted plant at a time
- be stored easily.

Details of plant pots are given in Fig. 11.1.

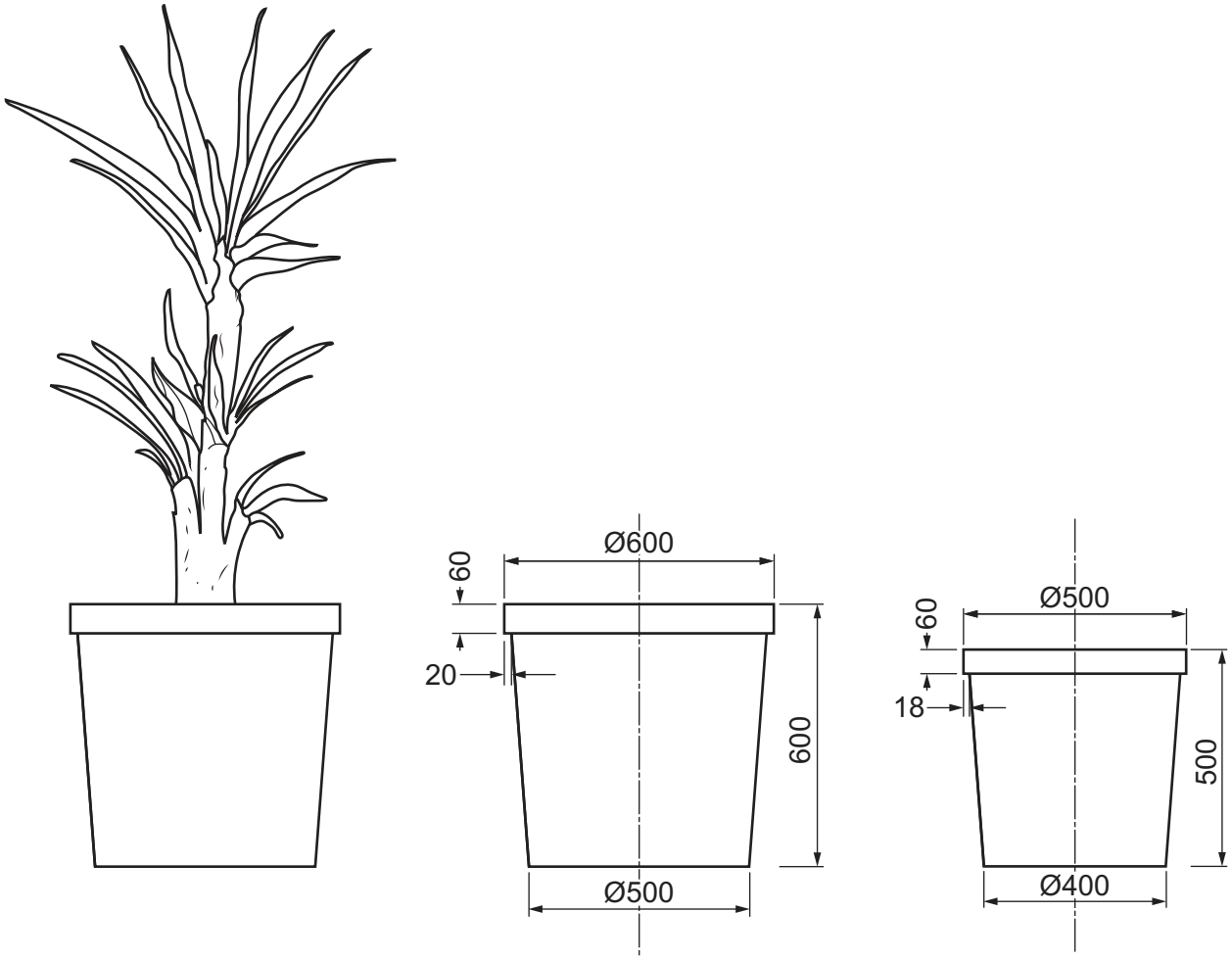


Fig. 11.1

[80]

12 The Olympic Games are scheduled to take place in 2024 in Paris.

You are to produce a freestanding model of a mascot that will be used for promotional purposes.

The freestanding model will:

- include a name that represents the country of your choice
- be based on a sport of your choice
- be printed onto A3 card to be cut out and assembled without the use of adhesives.

[80]

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