

## Cambridge International AS & A Level

## DESIGN & TECHNOLOGY

9705/32

Paper 3

October/November 2024

3 hours

A standard 1D barcode is positioned vertically on the left side of the page. It consists of vertical black bars of varying widths on a white background. To the left of the barcode, the number '57447567777' is printed in a small, black, sans-serif font. To the right of the barcode, there is a small, thin black asterisk (\*).

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.

## 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 hole marked out on a flat sheet.

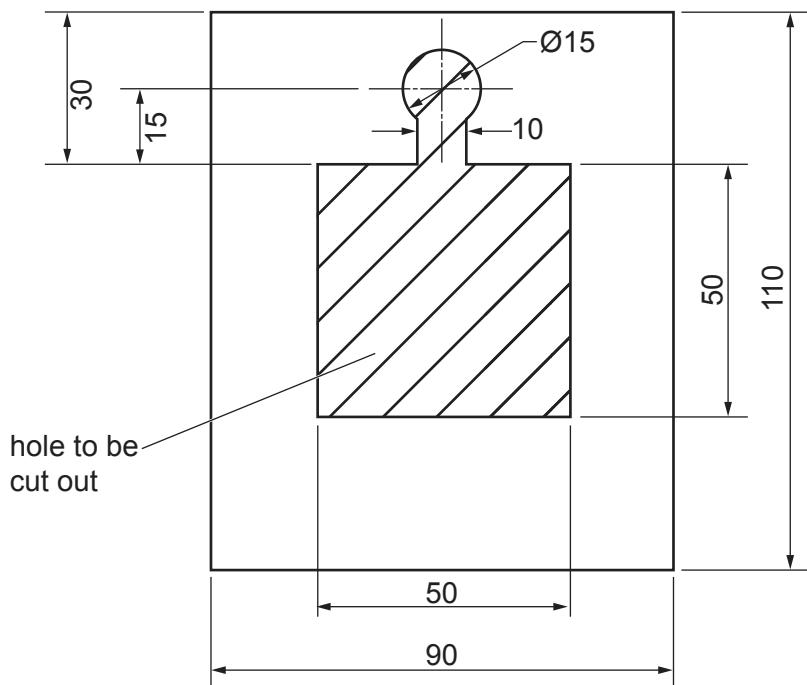


Fig. 1.1

(a) Use sketches and notes to describe how the hole could be cut out and the internal cut edges finished in a school workshop, for **one** of the following:

- a sheet of 12 mm pine
- a sheet of 3 mm acrylic
- a sheet of 3 mm mild steel.

[12]

(b) (i) Compare the types of finish that would be required for the pine and the mild steel flat sheet if they were to be used in an outdoor environment. [4]

(ii) Describe the method of applying your choice of finish for **either** the pine **or** the mild steel flat sheet. [4]

2 Discuss how aesthetic qualities, manufacturing costs and environmental considerations influence a designer when designing **one** of the following:

- a dining table
- a sports car
- a hair dryer.

[20]

3

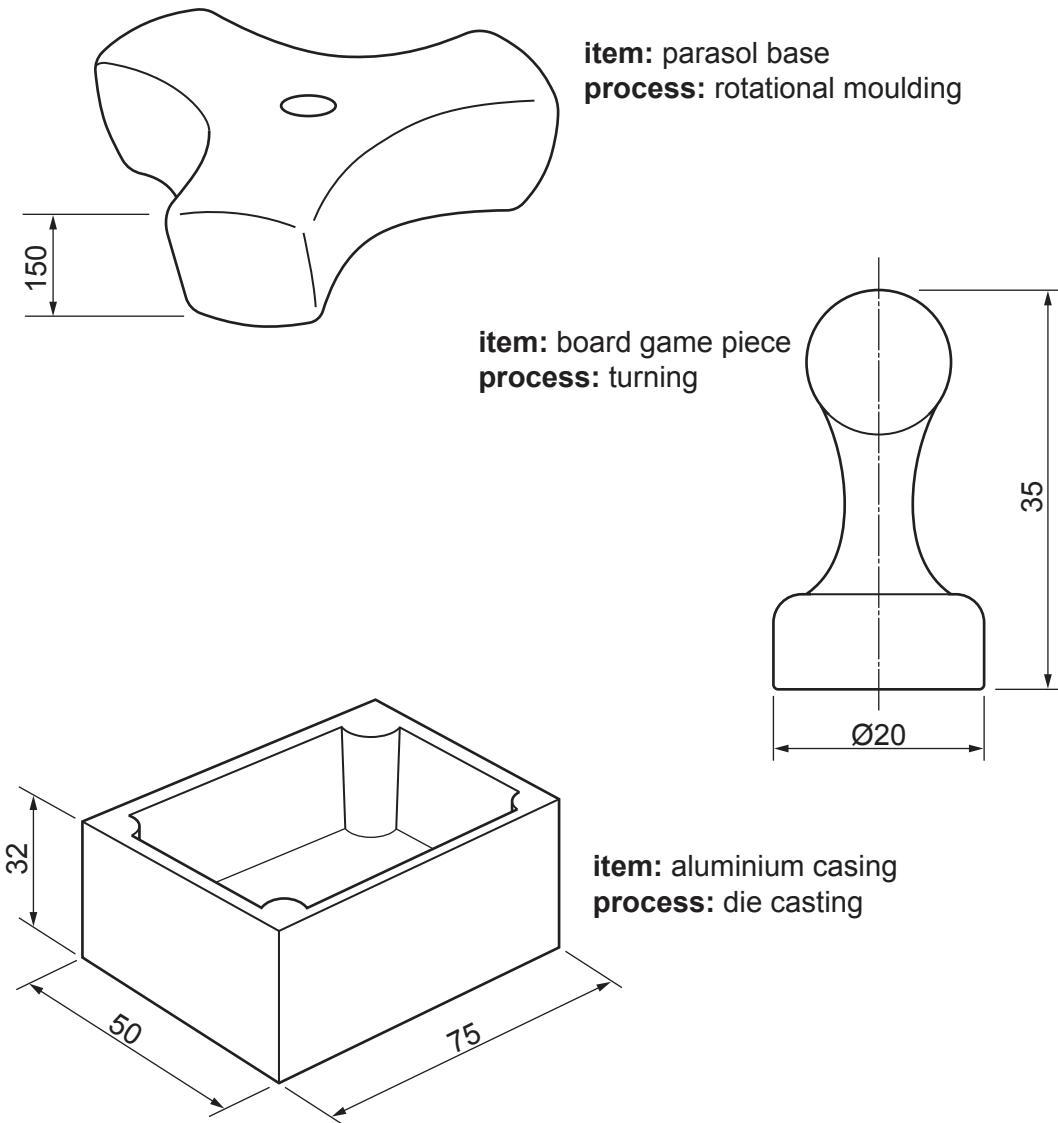


Fig. 3.1

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 Fig. 4.1 shows a cylindrical gift box.



**Fig. 4.1**

(a) (i) Name a specific metal that could be used to manufacture the gift box. [1]

(ii) Use sketches and notes to describe how the gift box would be manufactured in a school workshop from the material named in part (a)(i). [9]

(b) (i) Name a specific plastic that could be used to manufacture the gift box. [1]

(ii) Use sketches and notes to describe how the gift box would be manufactured as a batch of 5000 from the material named in part (b)(i). [9]

5 Discuss the importance of product testing to the manufacturer and the consumer. [20]

6 (a) The properties of materials determine their suitability for application in products or components.  
For **each** of the following properties, give an example of a specific material used in a product or component to explain the significance of the property:

- brittleness
- corrosion resistance
- electrical conductivity
- plasticity.

[16]

(b) Use sketches and notes to describe how a structure of your choice can be reinforced. [4]

## 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 the base and drill guide of a drilling jig.

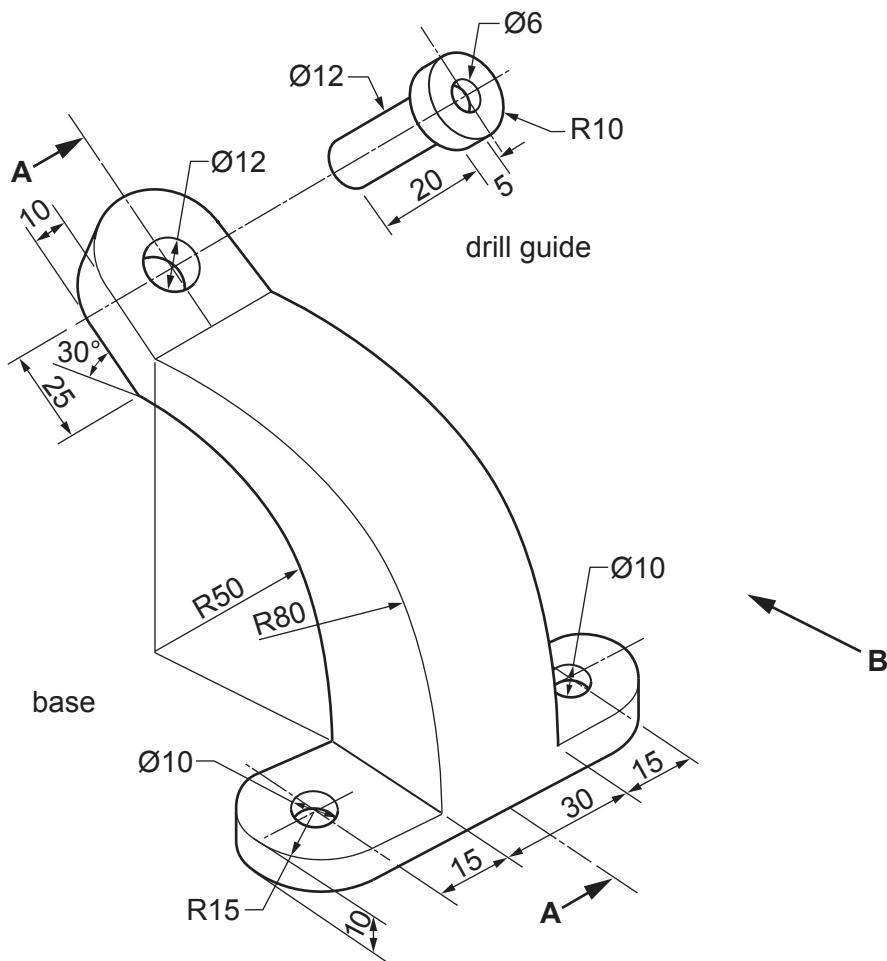


Fig. 7.1

(a) Draw, with the drill guide inserted, a full-size:

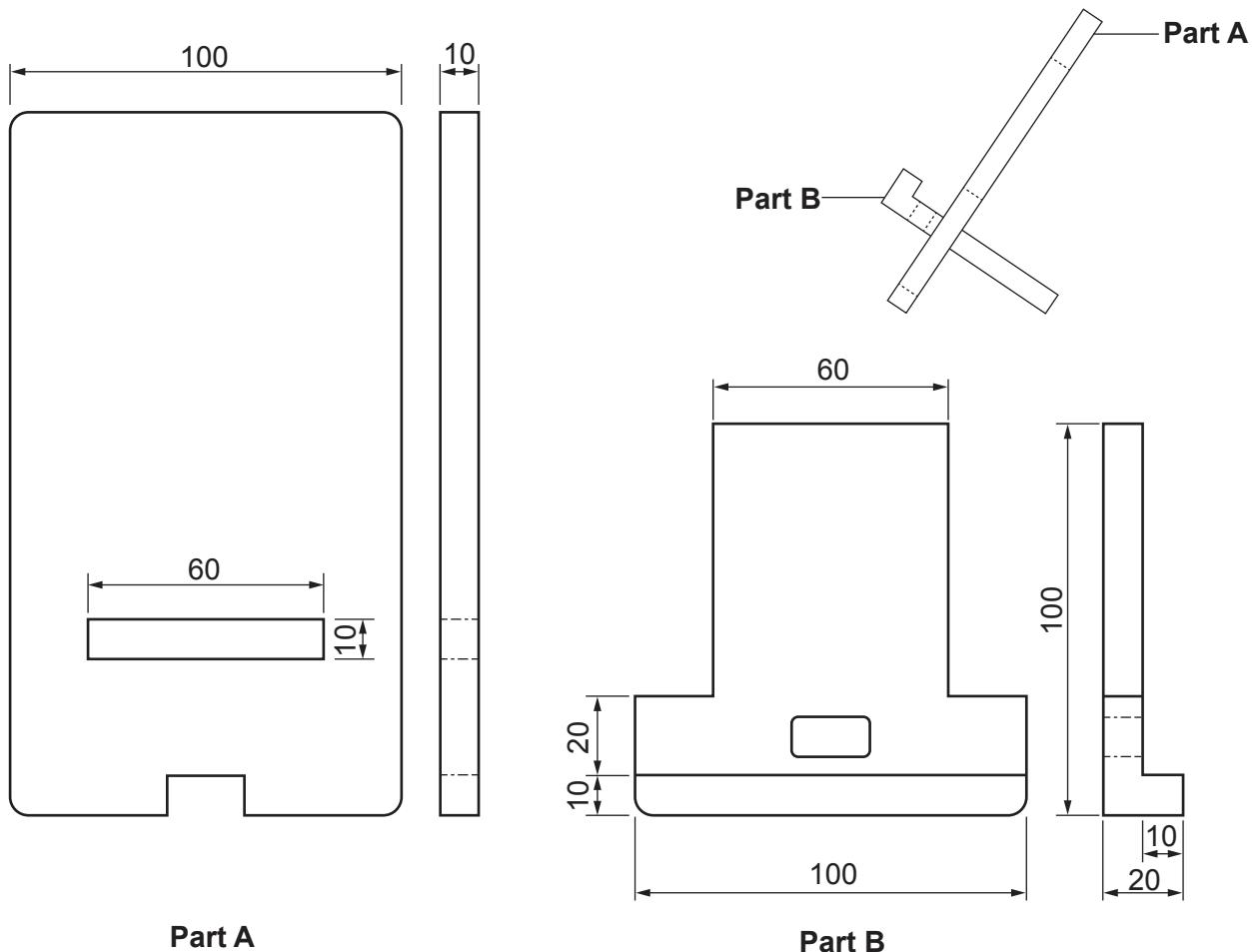
- orthographic sectional elevation on **AA**
- an elevation from the direction of arrow **B**.

[16]

(b) Add **four** dimensions to the sectional elevation and draw the correct projection symbol. [4]

8 Discuss the ways in which the manufacture of a product can be made more cost-effective. Consider the impact to the manufacturer and to the customer. [20]

9 Fig. 9.1 shows details of a mobile phone holder.



**Fig. 9.1**

(a) Draw a full-size two-point perspective drawing of the mobile phone holder below the horizon line. Use thick and thin line technique to enhance the drawing. Render the drawing to show that the mobile phone holder is made from wood. [12]

(b) Use sketches and notes to explain why designers would use two-point perspective drawings above, on or below the horizon line. [8]

**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]

10 Many schools for children aged 5 to 11 years teach some lessons outdoors. The children require a unit to enable them to write and draw during outdoor lessons.

You are to design a unit to allow two children to work at when having outdoor lessons.

The unit must be:

- portable
- stable in use.

[80]

11 A school for children aged 5 to 7 years requires new toys for use in the playground. Toy vehicles are very popular.

You are to design a ride-on toy vehicle.

The ride-on toy vehicle must be:

- easy to steer
- propelled by the rider.

[80]

12 A company is to introduce solar-powered garden light kits. There are three components in the kit; a solar charger, a 5m string of lights which plug into the back of the solar charger and a tubular stand.

You are to design:

- a name and logo for the solar-powered light kit
- packaging for the solar-powered light kit that would be reusable to allow the user to store the kit when not in use.

Details of the solar-powered light kit are given in Fig. 12.1.

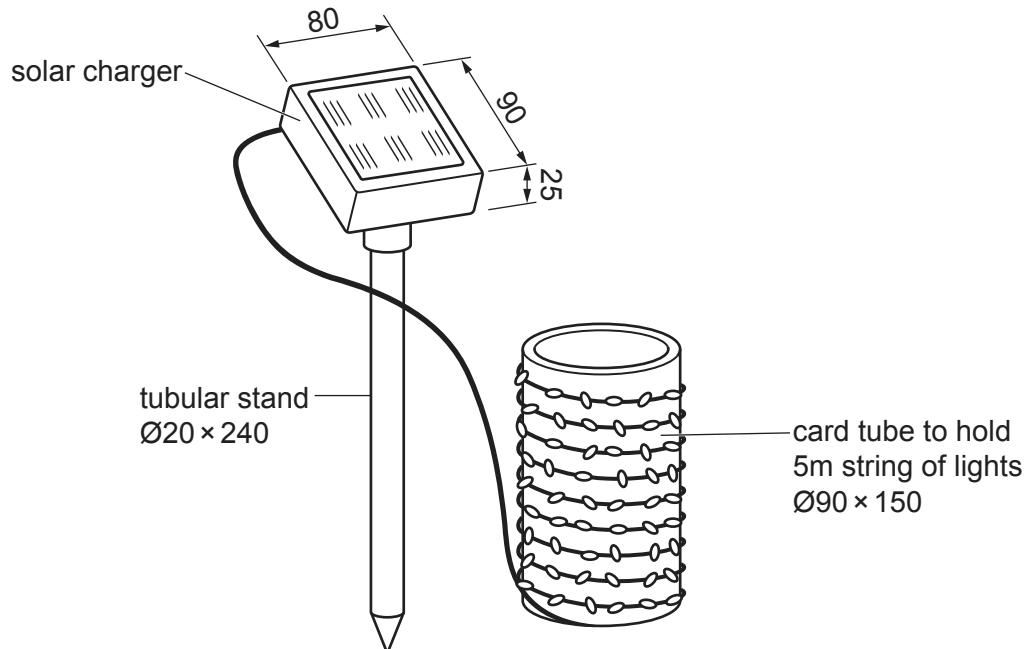


Fig. 12.1

[80]





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