

## Cambridge International AS & A Level

## DESIGN & TECHNOLOGY

9705/33

### Paper 3

October/November 2024

3 hours

A barcode graphic with the number 043811142666\* printed vertically next to it.

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 details of an egg holder.

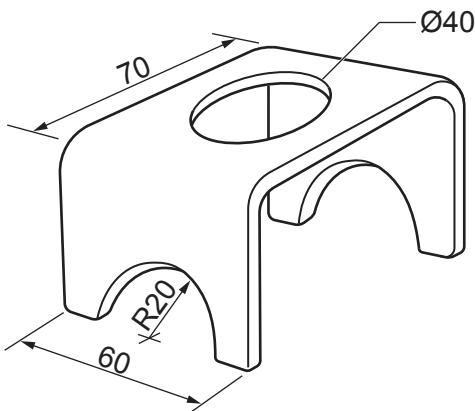
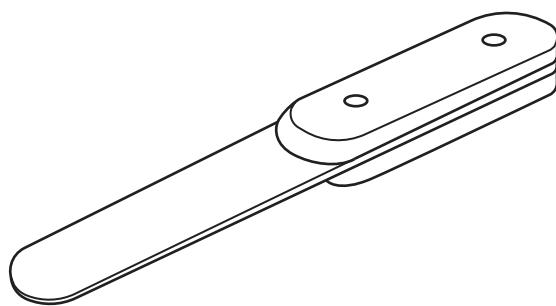


Fig. 1.1

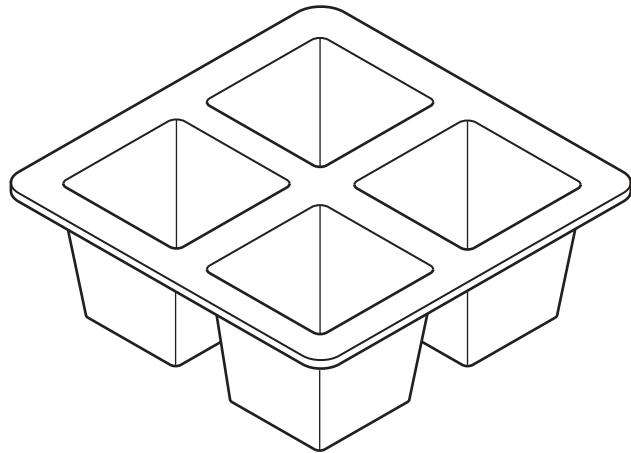
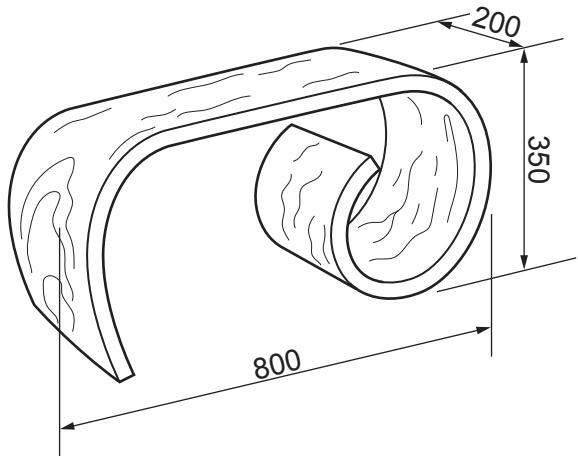
- (a) State a suitable material for an egg holder of the type shown in Fig. 1.1 and give **two** reasons for your choice. [3]
- (b) Use sketches and notes to describe how the egg holder would be manufactured in a school workshop. [9]
- (c) Explain the changes which may be necessary to the design, the manufacturing method used and the material selected, if 50 identical egg holders were required.  
Use sketches and notes to support your answer. [8]
- 2 Discuss the importance of having a detailed understanding of ergonomics when designing products. [20]

3



**item:** spatula  
**process:** riveting

**item:** hardwood side table  
**process:** laminating



**item:** packaging for yoghurt  
**process:** vacuum forming

**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]

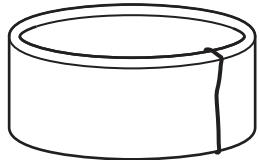
## Part B – Practical Technology

The instruction 'discuss' denotes that you should:

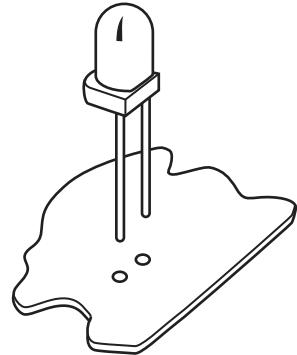
- examine critically the issues raised by the question
- explain and interpret these issues as appropriate
- introduce evidence wherever possible to support conclusions of arguments.

4 Discuss the importance of an understanding of the modes of potential failure when designing structures or machines. [20]

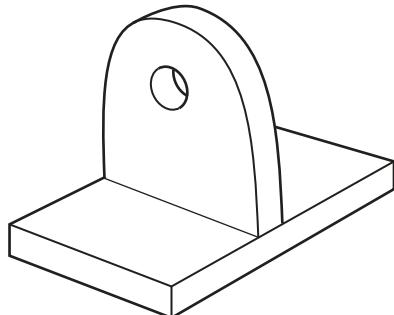
5 (a) Use sketches and notes to describe **two** of the following joining processes:



hard soldering a silver jewellery ring



soldering an LED onto a printed circuit board



gas welding 6 mm mild steel

[12]

(b) Compare and contrast the processes of extruding and drawing metals. [8]

6 (a) Explain the following terms with reference to mechanisms:

- efficiency
- velocity ratio.

[4]

(b) Use sketches and notes to describe the following mechanisms. Give an example of the use of each mechanism in a product.

- cam
- compound gear train
- ratchet

[12]

(c) Explain the importance of lubrication with reference to mechanisms.

[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 plan of a hotel washroom.

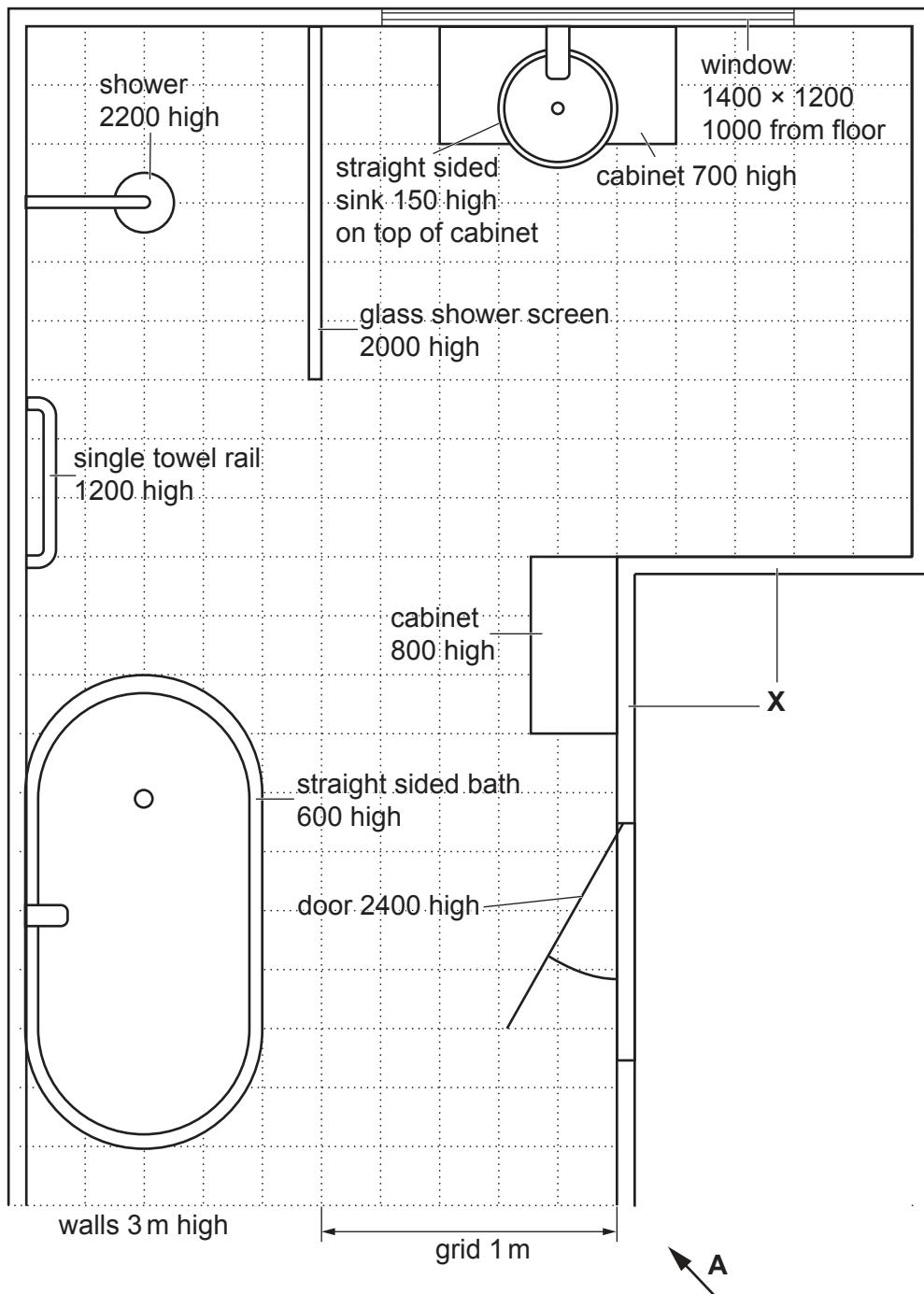


Fig. 7.1

Draw to an appropriate scale a planometric drawing of the hotel washroom viewed from arrow A. Estimate any dimensions not given. Remove parts of walls X from your drawing to show details of the interior of the hotel washroom. [20]

- 8 Designers, including architects, craftspeople and engineers, play a very important role in shaping aspects of the man-made environment. Discuss the responsibilities that these designers have to society. [20]

- 9 Fig. 9.1 shows a development (net) of a scoop for sweets. The scoop is made of 160 gsm card.

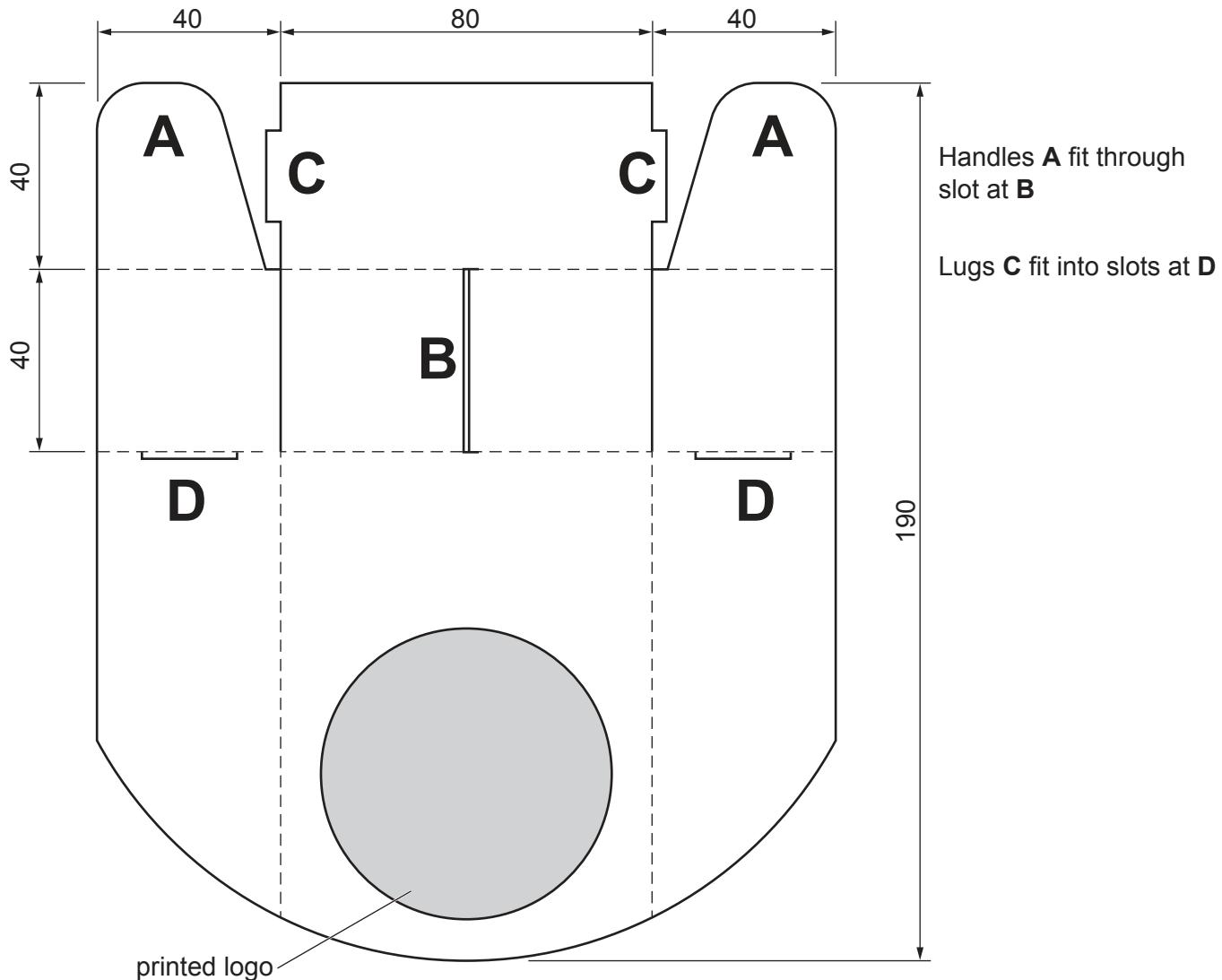


Fig. 9.1

- (a) Draw a full-size isometric drawing of the assembled scoop. [10]
- (b) Use sketches and notes to describe how a batch of 50 000 scoops with logos would be manufactured. [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**

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 A new school has a large hall and stage where teachers and guest speakers can address the assembled school. A lectern for speakers to stand at and access their speech notes is required.

You are to design a lectern suitable for use by a range of speakers.

The lectern must be:

- adjustable in height
- easily folded or disassembled for storage.

[80]

- 11 A shop selling computers is to open in the community. A security system to protect the shop when it is closed is needed.

You are to design a security system to alert of possible intruder entry into the shop.

The security system should:

- focus on possible intruder entry at the door and the window
- use light and noise as alarm warnings.

Your response should show full details of electronic circuits and designs for casings and fixings.

Details of the shop front are given in Fig. 11.1.

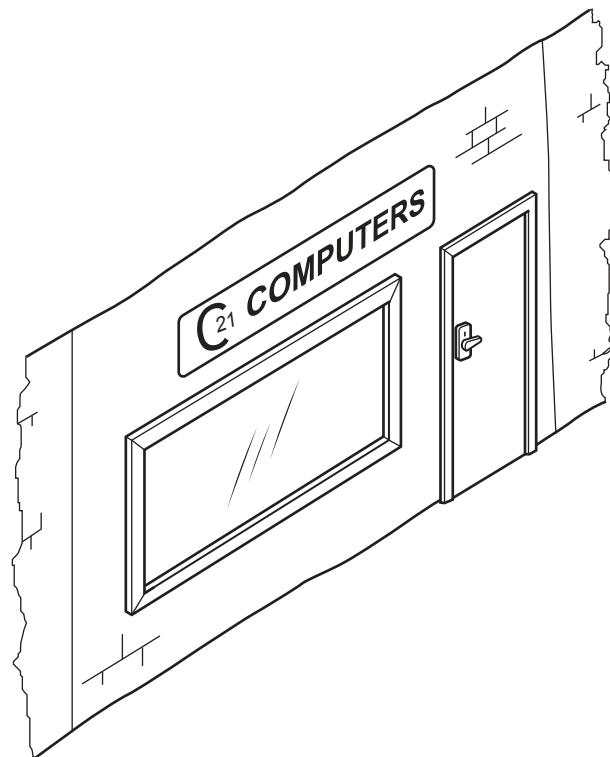


Fig. 11.1

[80]

- 12 A TV company is to introduce a new music quiz show. A regular feature of the show will be a performance by up to two live artists.

You are to design a name and logo for the music quiz show and a model of a music-themed TV stage set.

The TV stage set will:

- clearly display the name and logo
- accommodate two teams of four contestants and the quiz show presenter
- include an area for the live artists to perform and a large screen to show video clips.

[80]

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