

## Cambridge International AS & A Level

## DESIGN & TECHNOLOGY

9705/32

## Paper 3

October/November 2023

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 '4808472862' is printed in a small, black, sans-serif font. To the right of the barcode, a single asterisk (\*) is printed.

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

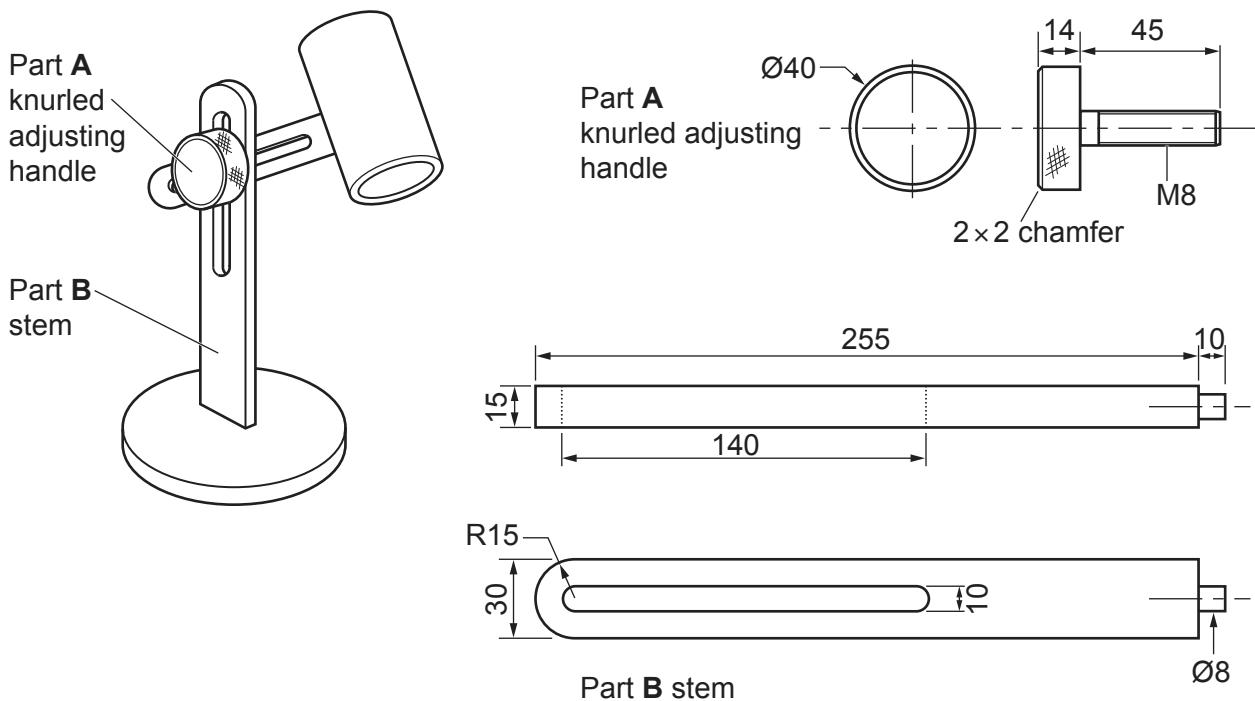
Answer **two** questions from **one** of the Parts **A**, **B** or **C**.

### 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 Discuss the issues involved when designing products for specific clients or target markets. [20]
- 2 Fig. 2.1 shows details of an adjustable desk lamp.

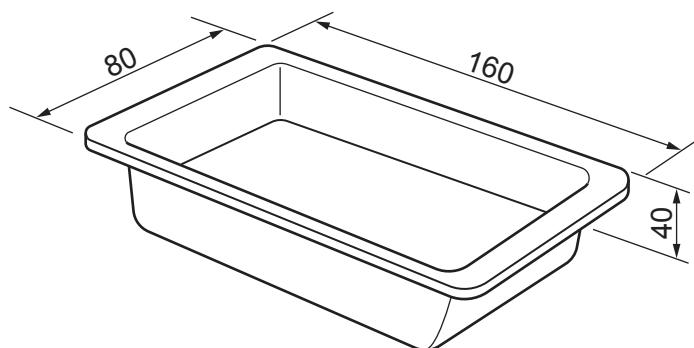


**Fig. 2.1**

Select **one** of the lamp components, **either** Part **A** knurled adjusting handle or Part **B** stem.

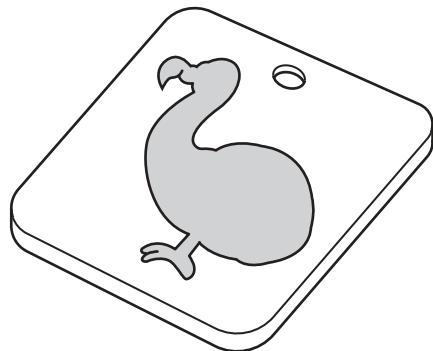
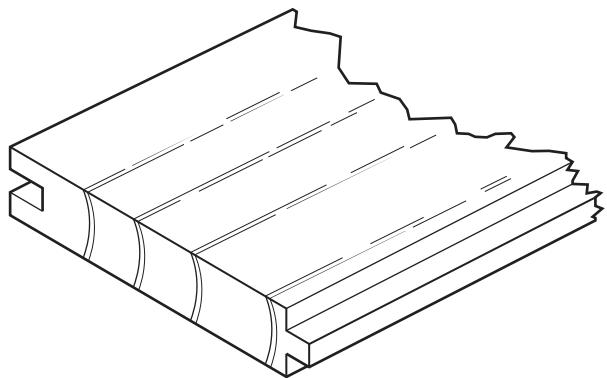
- (a) State a suitable material for the part you have chosen and give **two** reasons for your choice. [3]
- (b) Use sketches and notes to describe how you would make a prototype of the part you have chosen in a school workshop. [9]
- (c) Explain the changes which may be necessary to the design, the manufacturing method used and the material selected if 1000 identical parts were required. Use sketches and notes to support your answer. [8]

3



**item:** tray  
**material:** aluminium  
**process:** pressing

**item:** tongue and groove floorboard  
**material:** softwood  
**process:** profile forming



**item:** pendant  
**material:** copper  
**process:** enamelling

**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 circuit for a simple torch.

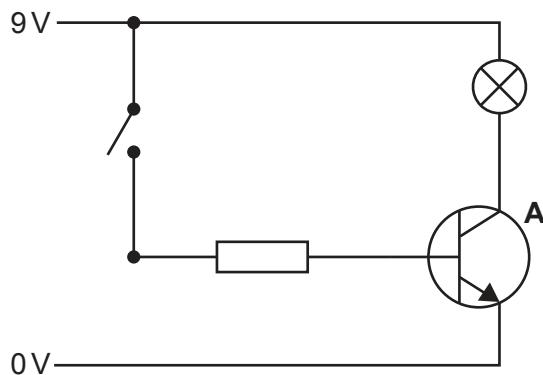


Fig. 4.1

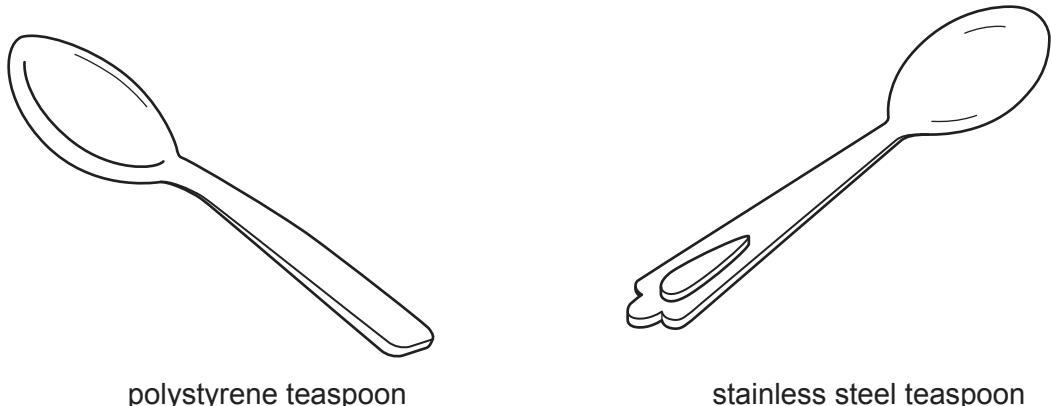
(a) (i) Identify **and** describe the function of component **A** in the circuit. [3]

(ii) Modify the circuit to enable the brightness of the lamp to be adjusted. [3]

(b) Use sketches and notes to design a casing for the torch and show how it could be made in a school workshop. [14]

5 Discuss the impact of the use of computers in design, production and management in industry. [20]

6 Fig. 6.1 shows a polystyrene teaspoon and a stainless steel teaspoon.



**Fig. 6.1**

For each of the teaspoons shown in Fig. 6.1:

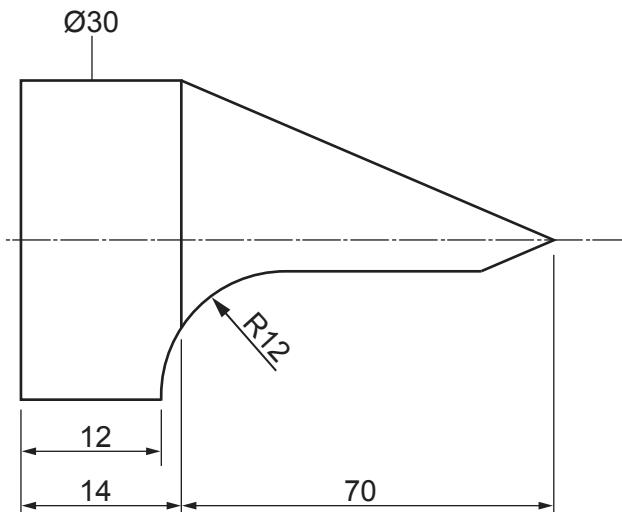
- (a) explain how the aesthetic features and properties of the material used relate to the requirements of the product [4]
- (b) explain, using sketches and notes, how the properties of the material influence the choice of manufacturing process [10]
- (c) explain the wider implications of the choice of materials. [6]

## Part C – Graphic Products

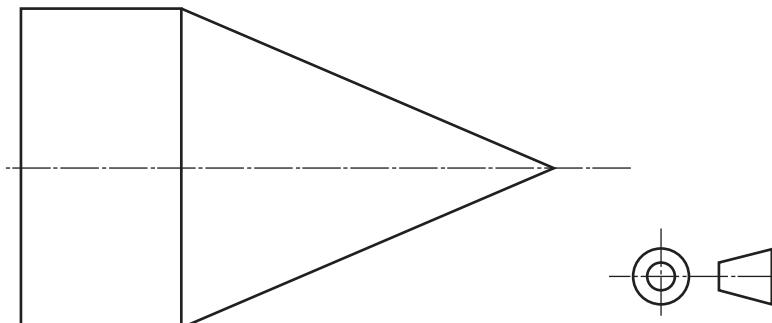
The instruction 'discuss' denotes that you should:

- 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 views of the head of a lathe half-centre.



Elevation A



Elevation B

Fig. 7.1

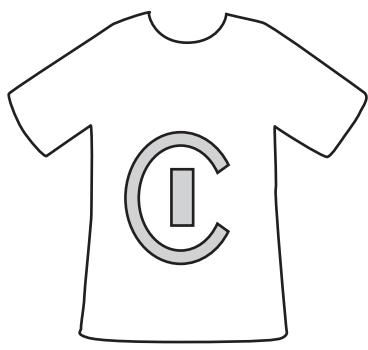
Draw to a scale of 2:1 an elevation to the right of elevation A and complete elevation B.

[20]

8 Discuss the issues to be considered when setting the retail price for a graphic product.

[20]

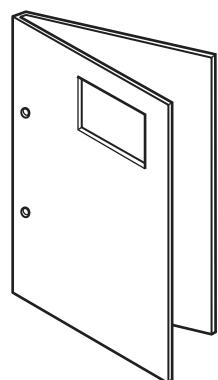
9 Fig. 9.1 shows three graphic products.



**item:** T-shirt  
**process:** printing logo onto a batch of 50 T-shirts



**item:** fashion catalogue  
**process:** printing a batch of 10 000 fashion catalogues



**item:** document holder  
**process:** manufacturing a batch of 1000 card document holders

**Fig. 9.1**

Choose **two** of the items shown in Fig. 9.1.

For each:

- (a) use sketches and notes to describe a process that could be used to produce the batch number required [14]
- (b) explain why the process is particularly suitable for the production of the item. [6]

**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 adults and children enjoy reading in bed. It is sometimes difficult to read larger books or magazines.

You are to design a product that could support a book or magazine to make reading in bed easier.

The product must be:

- adjustable to different heights and angles
- usable by children and adults.

Details of the largest size of book or magazine are given in Fig. 10.1.

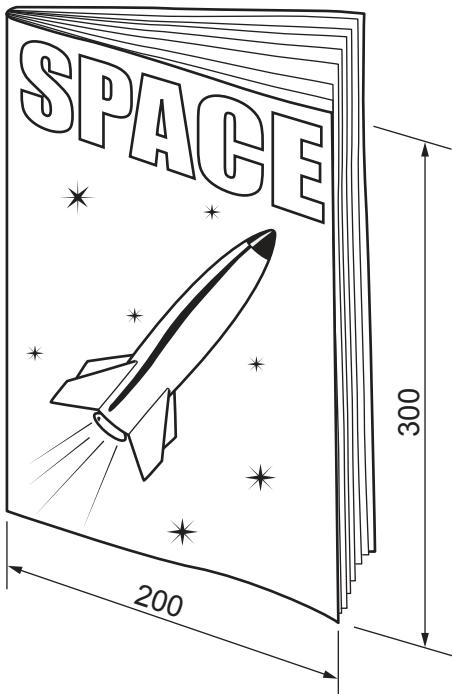


Fig. 10.1

[80]

11 A community golf course requires the cutting of new holes into its grass putting greens.

You are to design a product that will enable the ground staff to accurately cut a hole on a grass putting green.

The product must:

- not damage the putting surface
- accurately cut the same size hole on each putting green.

Details of a grass putting green and a golf hole are shown in Fig. 11.1.

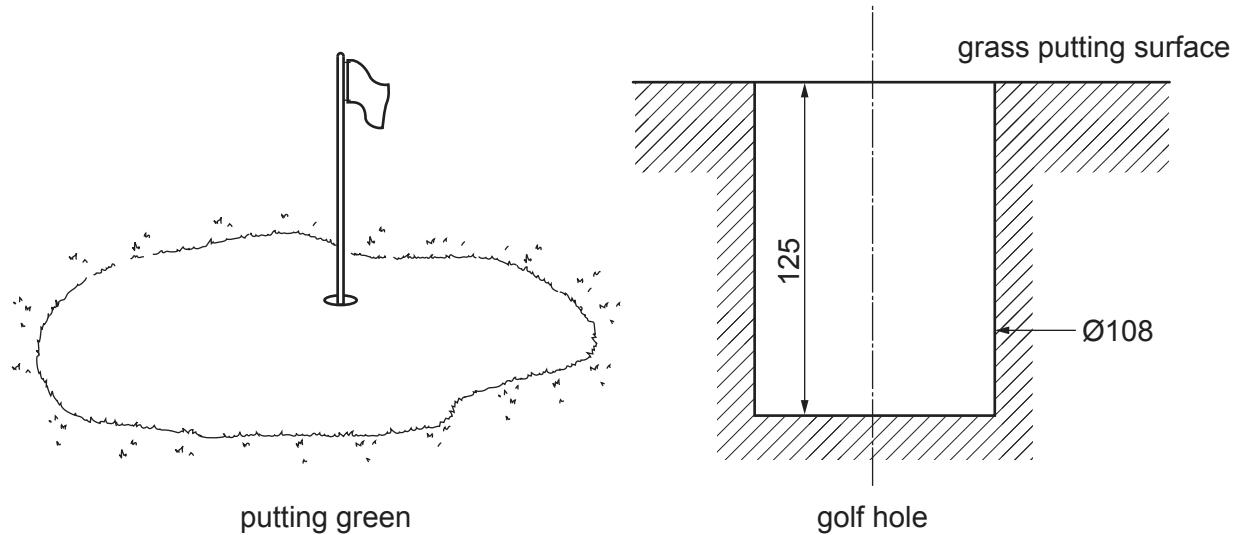


Fig. 11.1

[80]

12 A company wishes to introduce a new lightweight battery-powered drill targeted at the DIY market. Instead of selling the battery-powered drill in a plastic carry case, the company has decided to use more eco-friendly packaging.

You are to design:

- innovative packaging for the battery-powered drill
- a desktop point-of-sale display to enable customers to pick up and try the battery-powered drill under supervision.

Details of the battery-powered drill are given in Fig. 12.1.

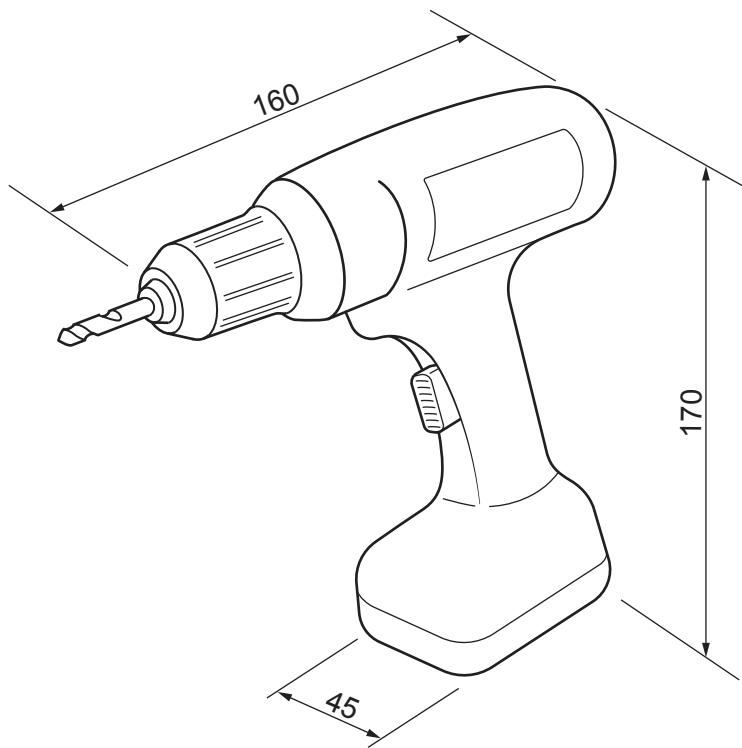


Fig. 12.1

[80]

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