



Cambridge International AS & A Level

DESIGN & TECHNOLOGY

9705/33

Paper 3

October/November 2022

3 hours



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

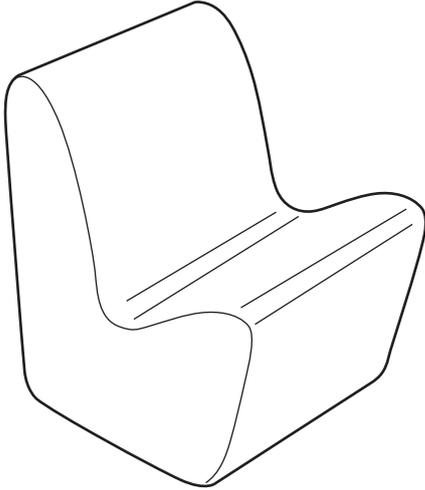
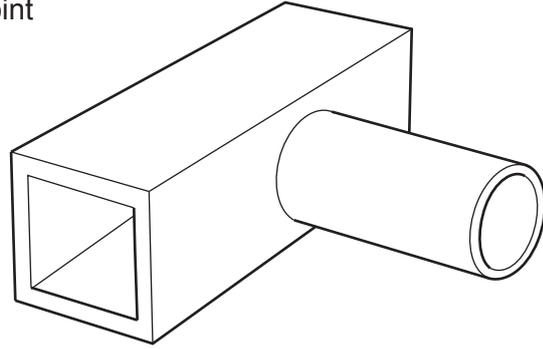
- Answer **three** questions in total:
Section A: answer **two** questions from **one** of the Parts A, B or C.
Section B: answer **one** question.
- If you have been given an answer booklet, follow the instructions on the front cover of the answer booklet.
- Use a black or dark blue pen.
- Write your 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

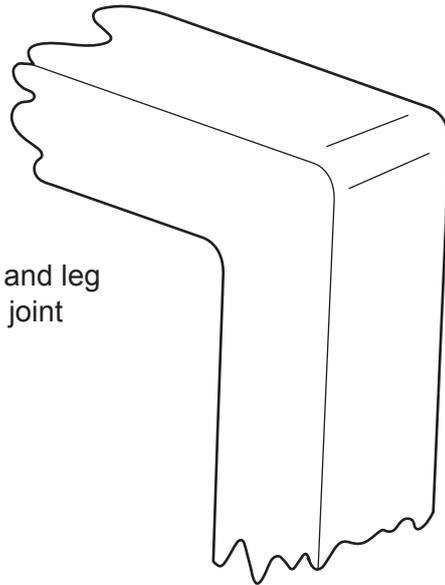
- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [].
- All dimensions are in millimetres.

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

item: mild steel tube joint
process: brazing



item: chair
process: rotational moulding



item: corner of chair arm and leg
process: making a bridle joint

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 in the production of the item. [6]

Part B – Practical Technology

4 (a) State what is meant by the following electrical terms:

(i) AC [1]

(ii) DC [1]

(b) Fig. 4.1 shows resistors in part of a circuit.

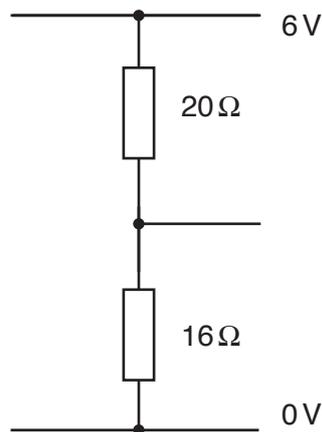


Fig. 4.1

(i) Calculate the current flowing through both resistors. [3]

(ii) Calculate the voltage across the 20Ω resistor. [3]

(c) Explain the benefits and drawbacks of using the following systems in products:

- pneumatics
- hydraulics. [12]

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

- corrosion resistance
- thermal conductivity
- ductility
- brittleness. [16]

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

6 Fig. 6.1 shows a gear train.

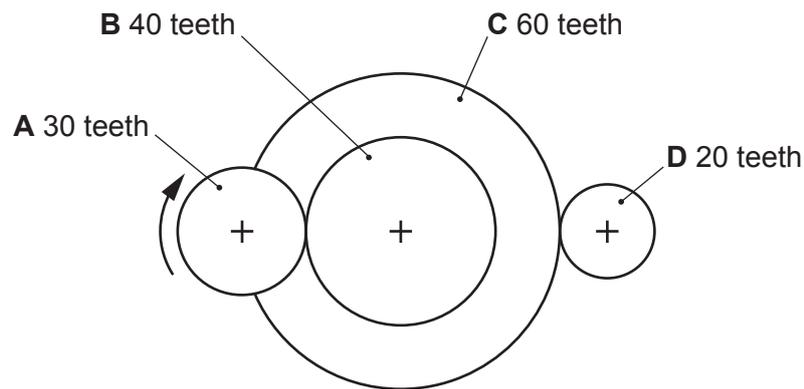


Fig. 6.1

- (a) Gear **A** rotates clockwise. State the direction of gear **D**. [1]
- (b) Calculate the gear ratio of the compound gear train. [3]
- (c) Use sketches and notes to describe:
- a method of converting linear motion to rotary motion
 - a method of transmitting rotary motion through 90° .
- For each, describe in detail how the method works in a product or system. [10]
- (d) Explain how mechanisms can be made to work as efficiently as possible. [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 an orthographic drawing of a laptop stand.

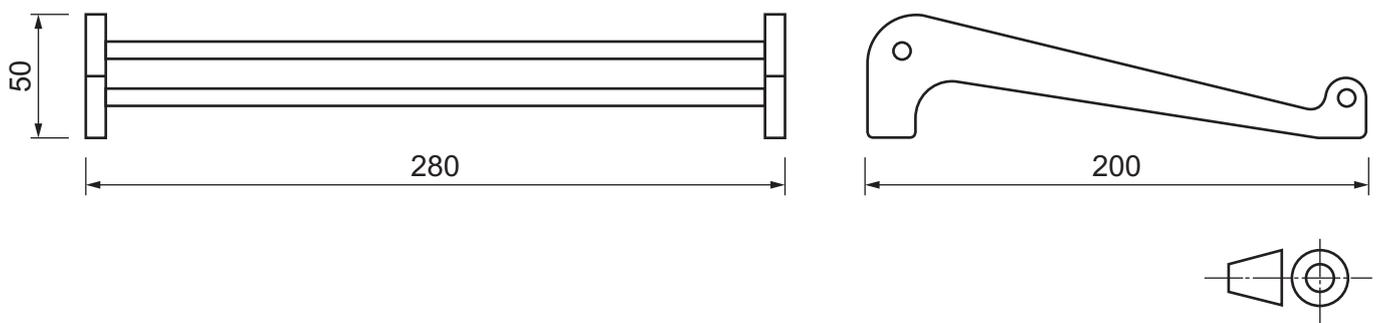


Fig. 7.1

- (a) Draw to a scale of 1:2, a two-point perspective view of the laptop stand. Render the sides to show that they are made from wood. [10]
- (b) Use sketches and notes to explain how you would display a laptop stand in a large computer shop. [10]

- 8 Discuss how aesthetic qualities, unit costs and manufacturing processes influence a designer when designing **one** of the following: [20]
- a desktop point of sale (POS) display for a new brand of perfume
 - packaging for take-away meals
 - an A4 tri-fold leaflet to advertise holidays.

9 Fig. 9.1 shows details of a display for three fitness bands. The display is made from card.

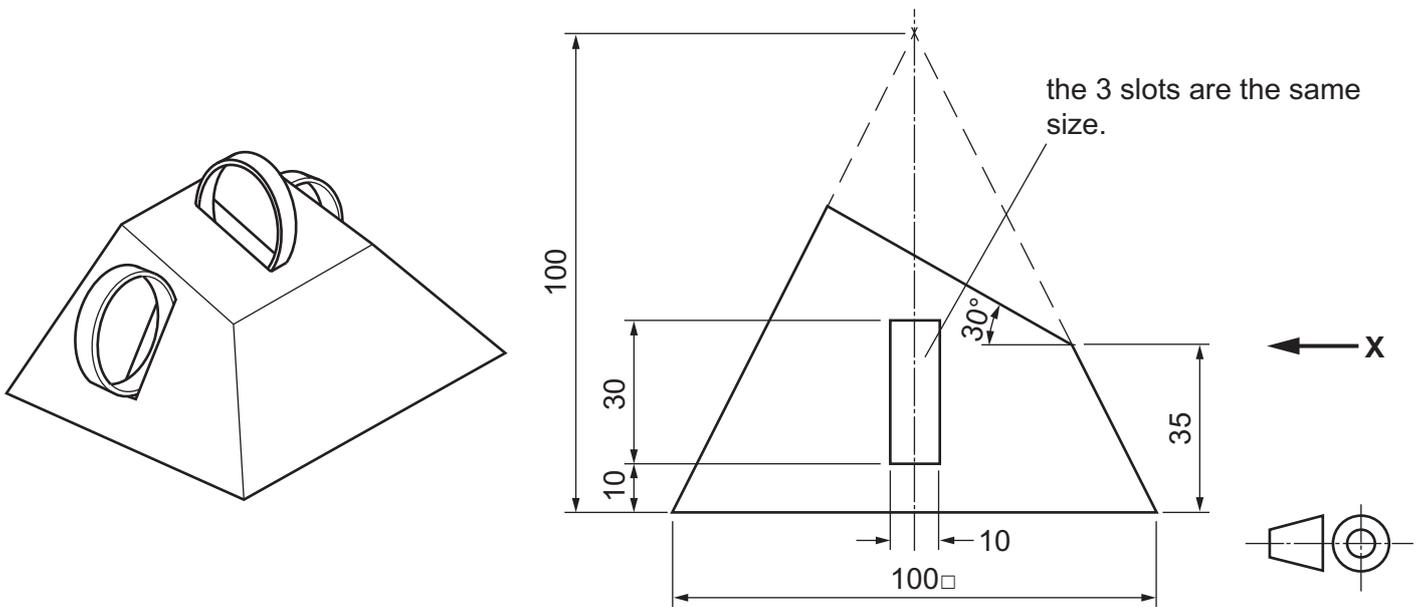


Fig. 9.1

(a) Draw full size the elevation given, an end elevation from arrow **X** and a plan of the display. [12]

(b) Draw a development (net) of the display. [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 families enjoy visiting the beach. Carrying items across a beach to a desired spot can be difficult.

You are to design a product that will:

- transport items across a beach and provide a dual purpose
- fit easily in a car.

[80]

- 11** A games company wishes to expand its product line and produce a timer to be included in games. Design an imaginative timer for a game of your choice, incorporating a mechanical and/or electronic system.

The timer must:

- provide at least two different time durations
- be based on the theme of the chosen game.

[80]

- 12** A school has been asked to raise awareness of local or national environmental concerns.

You are to design a free standing eco-display to be placed at the entrance of the school.

The display must:

- take up no more than 1 m × 1.5 m floor space
- include an interactive feature.

[80]

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