



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

DESIGN AND TECHNOLOGY

9705/31

Paper 3

October/November 2010

3 hours

Additional Materials: Answer Booklet/Paper
A range of design drawing equipment
A3 Drawing paper (5 sheets)



READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A

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

Section B

Answer **one** question.

All dimensions are in millimetres.

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.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **11** printed pages and **1** blank page.



Section A

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

Part A – Product Design

1 Fig. 1 shows an item of jewellery.

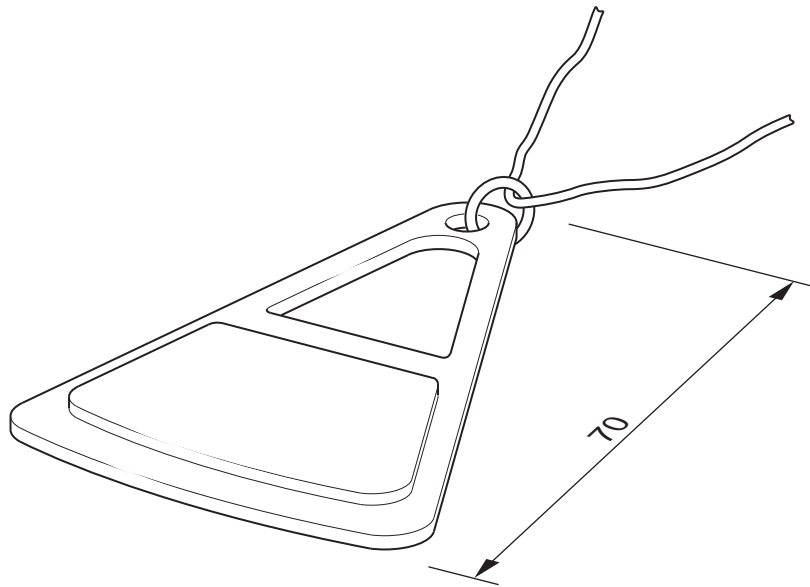


Fig. 1

- (a) State a suitable material for the item of jewellery and give **two** reasons for your choice. [3]
- (b) Describe, using notes and sketches, how you would make the item of jewellery. [9]
- (c) Explain what changes may be necessary to the design, in the manufacturing method used and in the material selected if 50 000 items were required. Use notes and sketches to support your answer. [8]

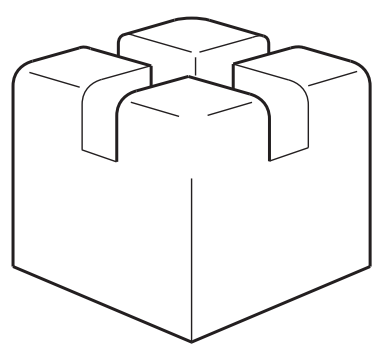
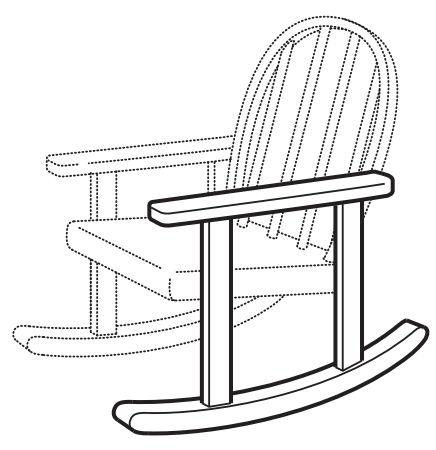
3

2



item: football
process: blow moulding

item: chair side
process: shaping and joining



item: display board holder
process: milling

Fig. 2

Choose **two** of the items shown in Fig. 2 and for each:

- (a) use notes and sketches to describe the manufacturing process that relates to the chosen item; [7 × 2]
 - (b) explain why the process is particularly suitable for the production of the item. [3 × 2]
- 3 Discuss the economic and cultural implications of introducing products for a tourist target market compared with products for worldwide distribution. [20]

Part B – Practical Technology

4 (a) Fig. 3 shows a simple frame.

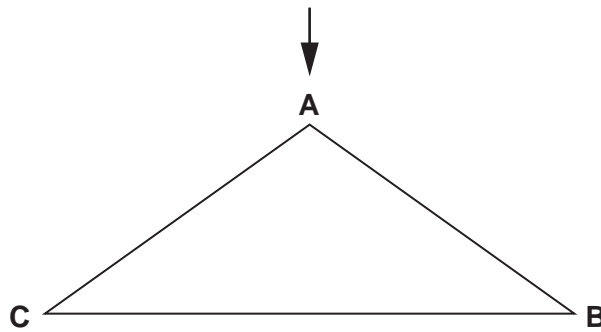


Fig. 3

State which member is in tension and which member is in compression.

[2]

(b) Fig. 4 shows a simple beam supported at F.

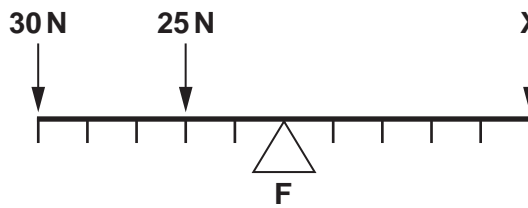


Fig. 4

Calculate what force X would be required to keep the beam in balance.

[2]

(c) Explain the difference between a monocoque and a frame structure. Use an example of each to support your answer.

[6]

(d) Discuss how fatigue and changes in temperature may cause structures to fail.

[10]

5

5 (a) Calculate the gear ratio of the compound gear train shown in Fig. 5.

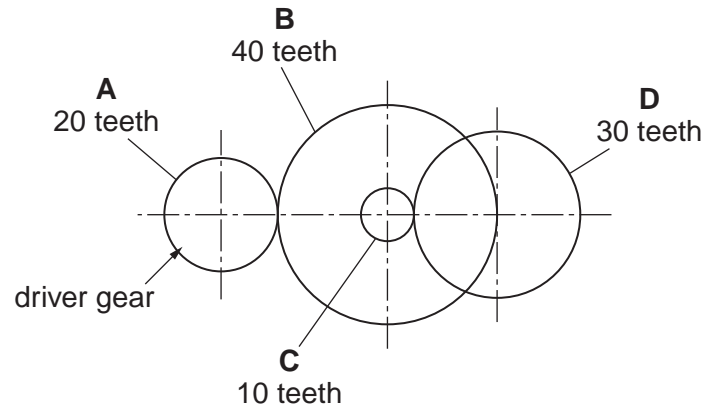
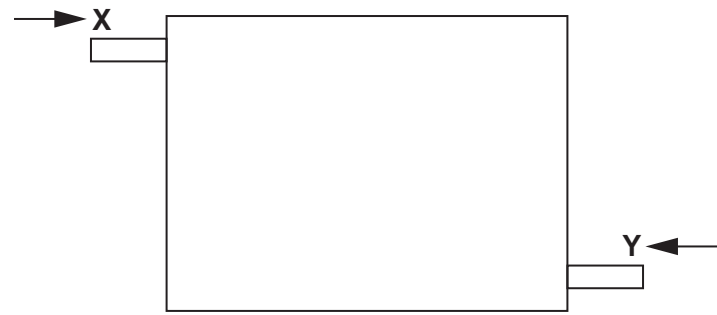


Fig. 5

[3]

(b) (i) Draw out and complete the diagram given below to show how lever Y would move inwards the same distance as lever X, when X is pushed inwards. [2]



(ii) Draw out and complete the diagram given to show how lever Y would move inwards twice the distance as lever X, when X is pushed inwards. [3]

(c) Use examples to compare and explain how linear motion can be achieved through mechanical, pneumatic and hydraulic systems. [12]

6 Fig. 6 shows a model car which is to be mass produced.



Fig. 6

(a) (i) State an appropriate material that could be used to make the model car body. [1]

(ii) Give **two** reasons for your choice. [2]

(b) Use sketches and notes to describe the process used to manufacture the model car body. [7]

(c) Discuss the impact of the use of computers on the manufacture of products. [10]

Part C – Graphic Products

7 A company is to launch a new range of sunglasses.
Discuss the implications of the product, the pricing and promotion in relationship to the marketing strategy that is required. [20]

8 Fig. 7 shows a cable tensioning device.

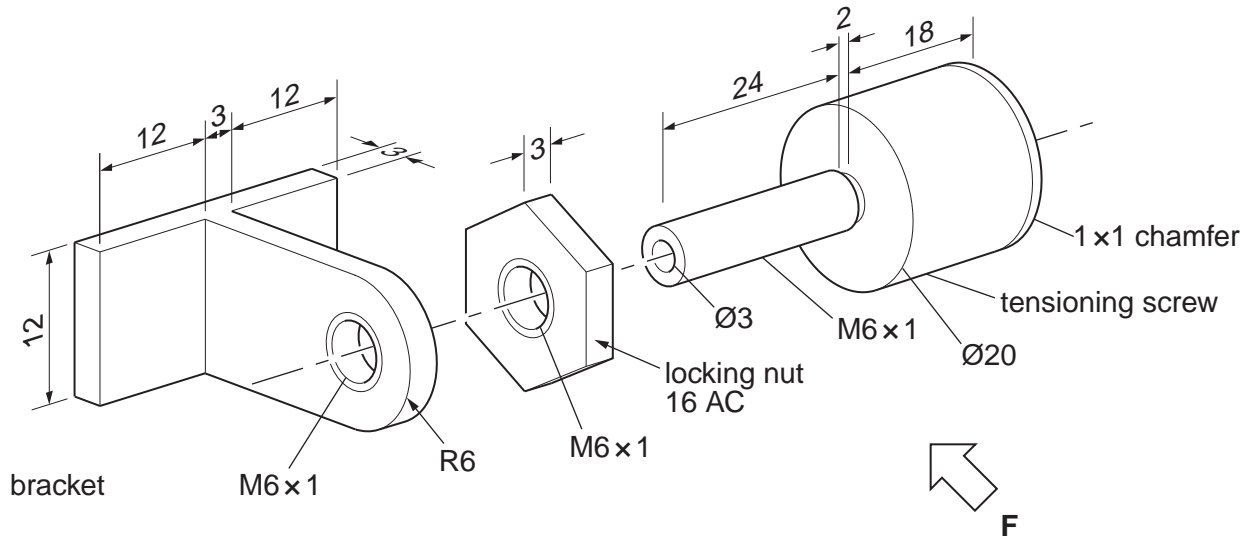


Fig. 7

- (a) The device should be assembled with the tensioning screw protruding 5mm through the bracket.
Draw to a scale of 2:1, a sectional front elevation from arrow **F** and a plan of the assembled cable tensioning device.
Fully dimension the drawings. [16]
- (b) Sketch **two** different ways of improving the grip on the tensioning screw. [4]

9 Fig. 8 shows a design for a house on a new housing development.

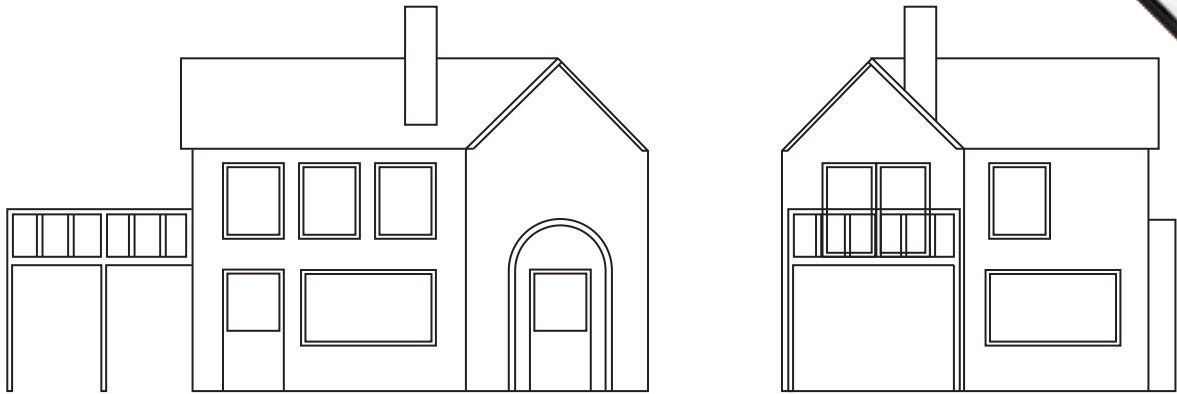


Fig. 8

- (a) The housing developers require a promotional image of their design.
Draw approximately twice full size, a view of the design using estimated two-point perspective. [14]
- (b) Render your view to make the design look realistic. [6]

Section B

Answer **one** question on the A3 paper provided.

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]

[Total: 80]

10 A school is to hold a summer fête. The weather is often unpredictable.

Design a temporary shelter that can be quickly erected.

The shelter must house up to a maximum of 10 people.

To assist you in your design, anthropometric data of an adult is given in Fig. 9.

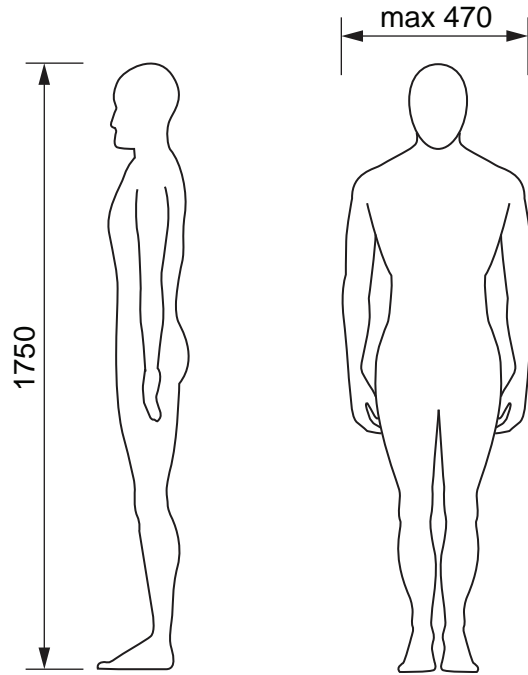


Fig. 9

- 11 A school fête requires litter bins that will encourage visitors to recycle their drinks containers. Design a litter bin that will hold a range of drinks containers made from different materials. It must include a mechanism to reduce the size of metal drinks containers. To assist you in your design, details of drinks containers are given in Fig. 10.

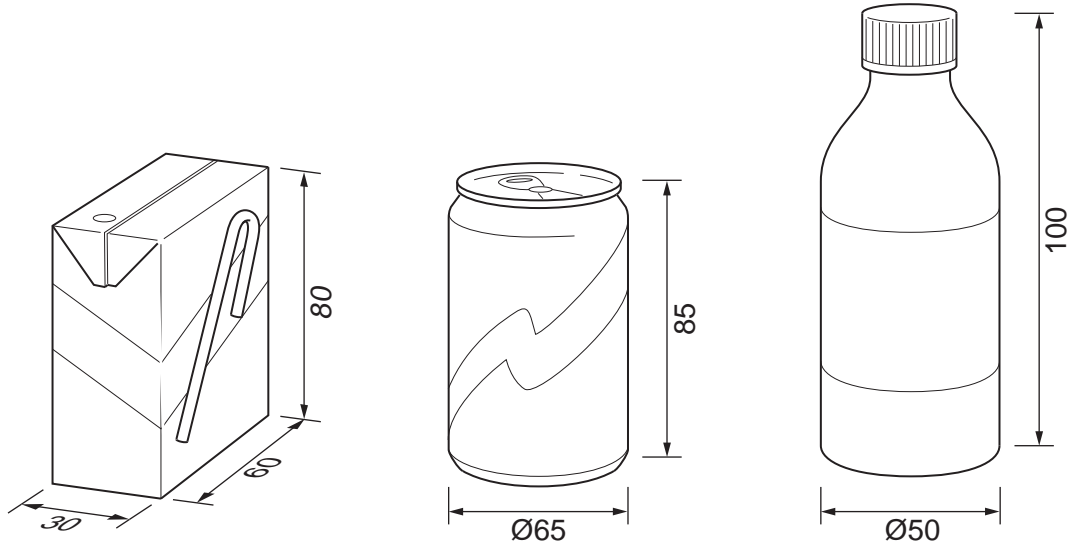


Fig. 10

- 12 A food stall at a school fête wishes to sell meals in a container, which holds a slice of pizza, a portion of French fries, cutlery and a drink.

Design a suitable container.

Consider how you will give the customer information relating to the contents of the container and the responsible disposal of used items.

To assist you in your design, details of meal items are given in Fig. 11.

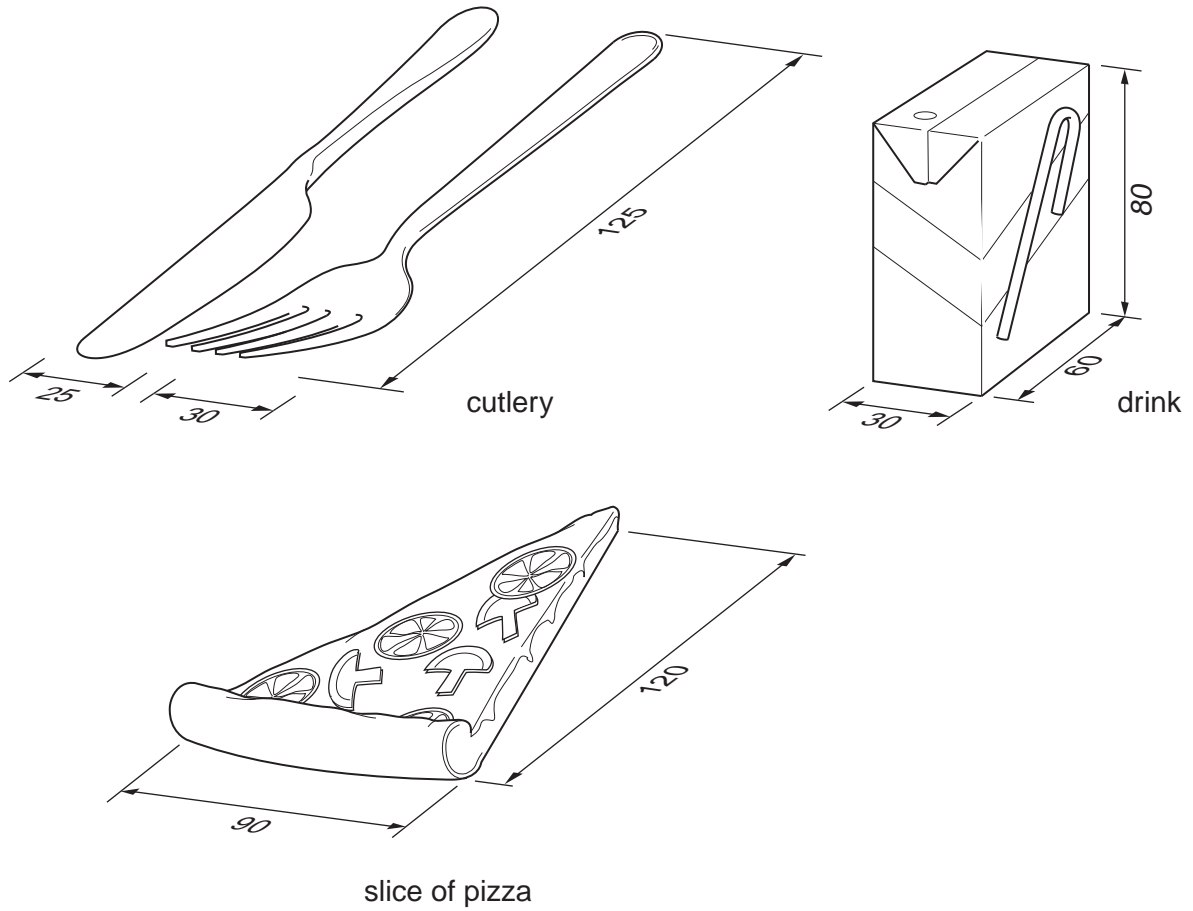


Fig. 11

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