



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

DESIGN AND TECHNOLOGY

9705/03

Paper 3

October/November 2008

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 **10** printed pages and **2** blank pages.



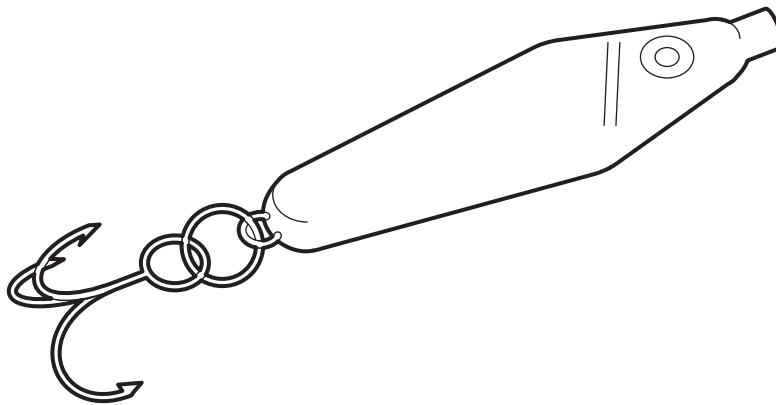
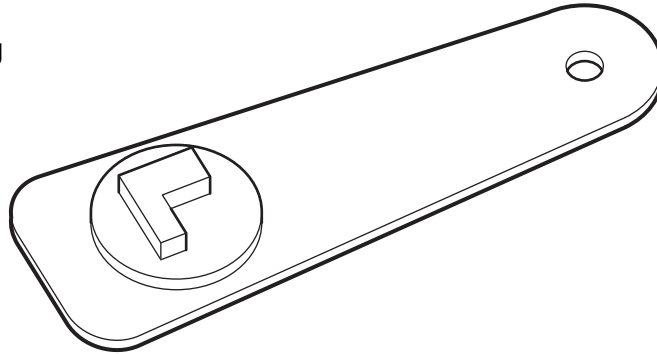
Section A

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

Part A – Product Design

1

item: identification tab
process: injection moulding



item: fishing lure body
process: die casting

item: curved wine rack shelf
process: laminating

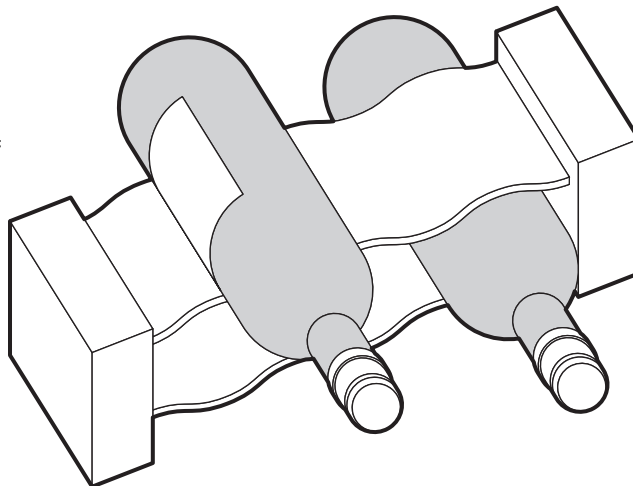


Fig. 1

Choose **two** of the items shown in Fig. 1 and for each:

(a) use notes and sketches to describe the manufacturing process that relates to the chosen item; [7 x 2]

(b) explain why the process is particularly suitable for the production of the item. [3 x 2]

2 Fig. 2 shows a prototype design for a kitchen roll holder.

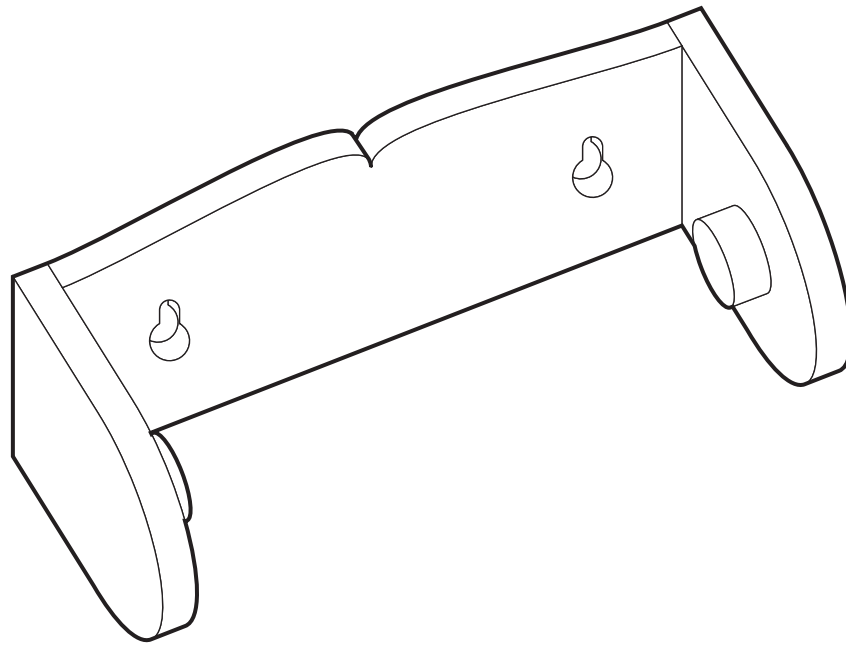


Fig. 2

- (a) State a suitable material for the holder and give **two** reasons for your choice. [3]
- (b) Describe, using notes and sketches, how you would make the prototype holder. [8]
- (c) Explain what changes may be necessary to the design, in the manufacturing method used and in the material selected, if 100 holders were required. [9]
Use notes and sketches to support your answer.

3 Designers use different forms of modelling when developing ideas.
Use a different example in each case to explain when and why a designer would use:

- 2D models; [5]
- computer modelling; [5]
- 3D mock ups; [5]
- scaled prototype. [5]

Part B – Practical Technology

4 Fig. 3 shows designs of simple mechanical toys operated by turning the handle on the side.

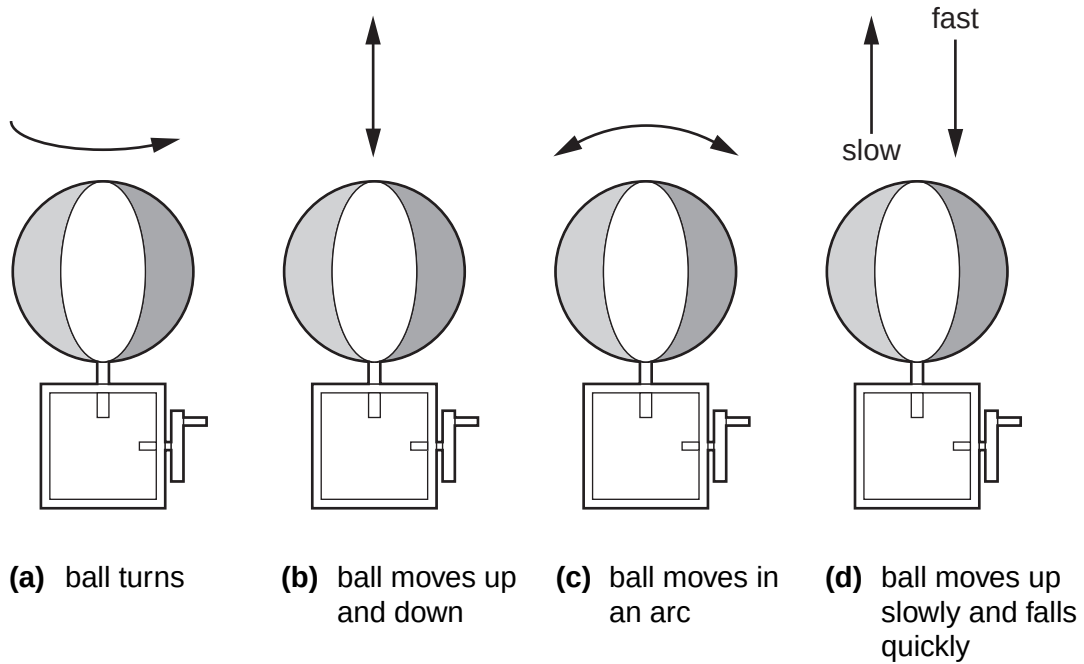


Fig. 3

Use labelled sketches and notes to show how the motions can be achieved.
State the name of the motion produced in each case.

[4 x 5]

5 Adhesives are widely used to join wood, metal and plastic.
For each of the following combinations:

- (a) state a suitable example of use and name a specific adhesive.
- (b) describe the process of how the materials would be glued, including any possible safety considerations.
Use a different adhesive in each case.

- Wood to wood.
- Metal to metal.
- Plastic to plastic.
- Plastic to wood.

[4 x 5]

6 (a) (i) Define the following terms:

- toughness;
- ductility.

[2]

[2]

(ii) State **one** material that is tough and give an appropriate product application.

[2]

(iii) State **one** material that is ductile and give an appropriate product application.

[2]

(iv) Use sketches and notes to describe a test to compare the toughness of materials.

[4]

(b) Discuss the importance of material selection in the design and manufacture of products.

[8]

Part C – Graphic Products

- 7 Fig. 4 shows the plan of a room for a university student.

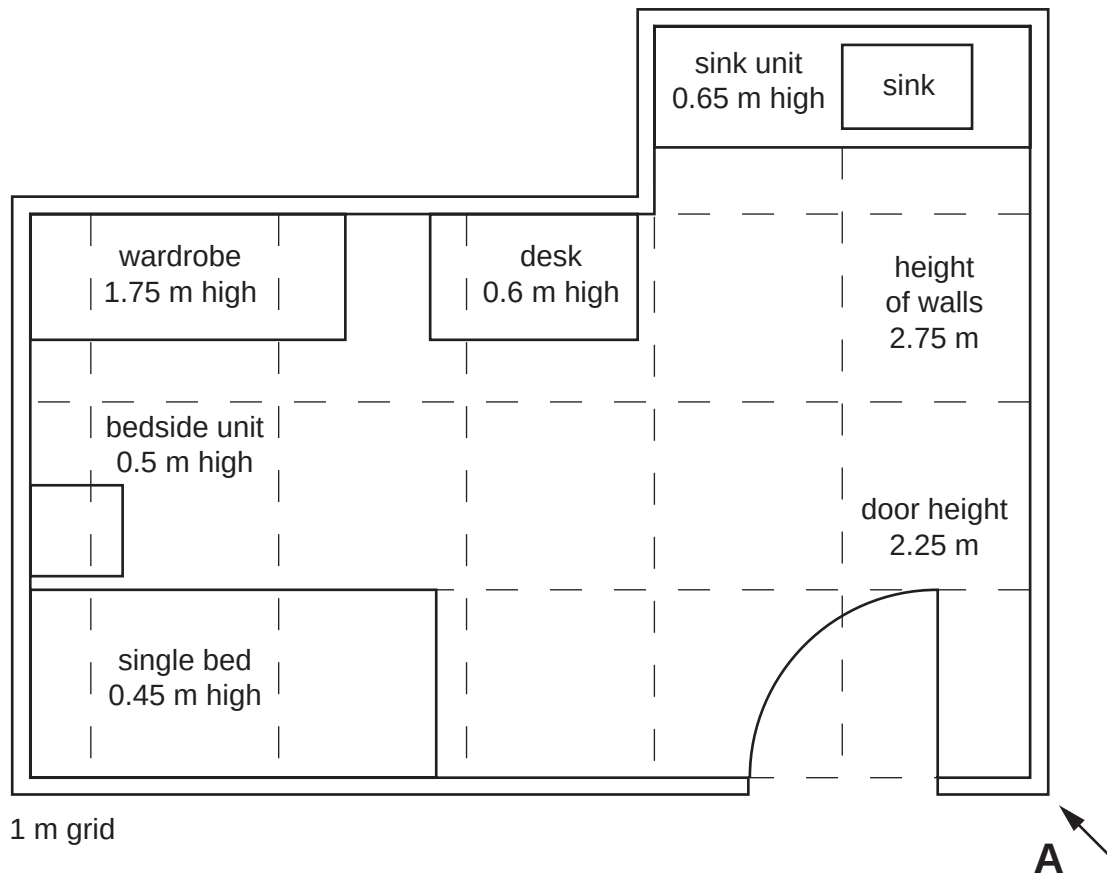


Fig. 4

Draw, to an approximate scale, a planometric drawing of the room viewed from arrow **A**.
Cut away part of the front wall to ensure that details of furniture are clearly visible.

[20]

8 Fig. 5 shows a prototype design for a torch made in card.

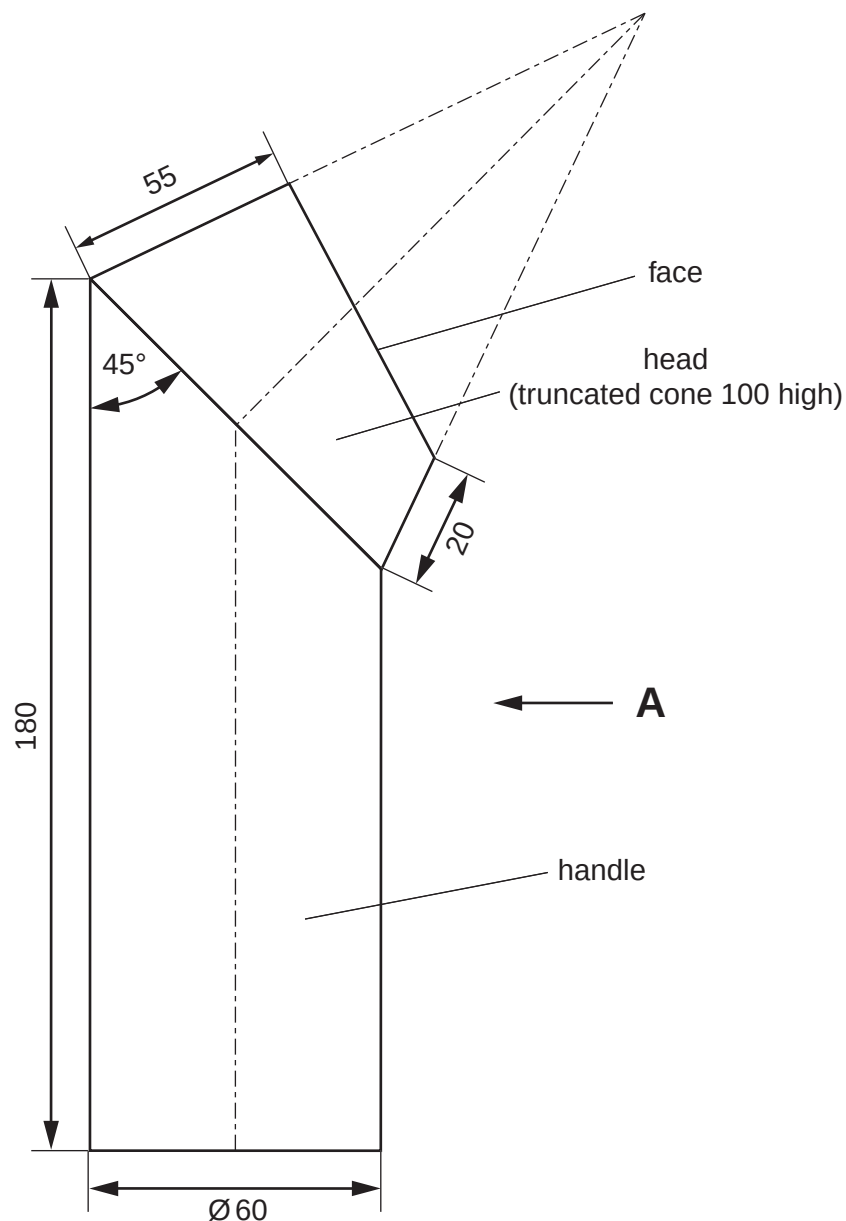


Fig. 5

(a) Complete an elevation seen from arrow **A**. [10]

(b) Produce the development (net) of:

- the torch head; [7]
- the torch handle. [3]

9 A magazine, produced in school, has a section aimed at supporting students preparing for exams.

You have been asked to produce revision sheets for Graphics students.

Use sketches and notes to produce a draft outline for an A4 revision sheet that explains, stage by stage, how to construct the locus of a simple linkage. [20]

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 local playgroup for 3 – 5 year old children requires outdoor play equipment.

Design a piece of equipment that will:

- allow children to climb to a safe height and slide down;
- be stable in use.

The unit must be easily dismantled so that it can be stored away indoors during holiday periods.

To assist you in your answer, anthropometric data is given in Fig. 6.

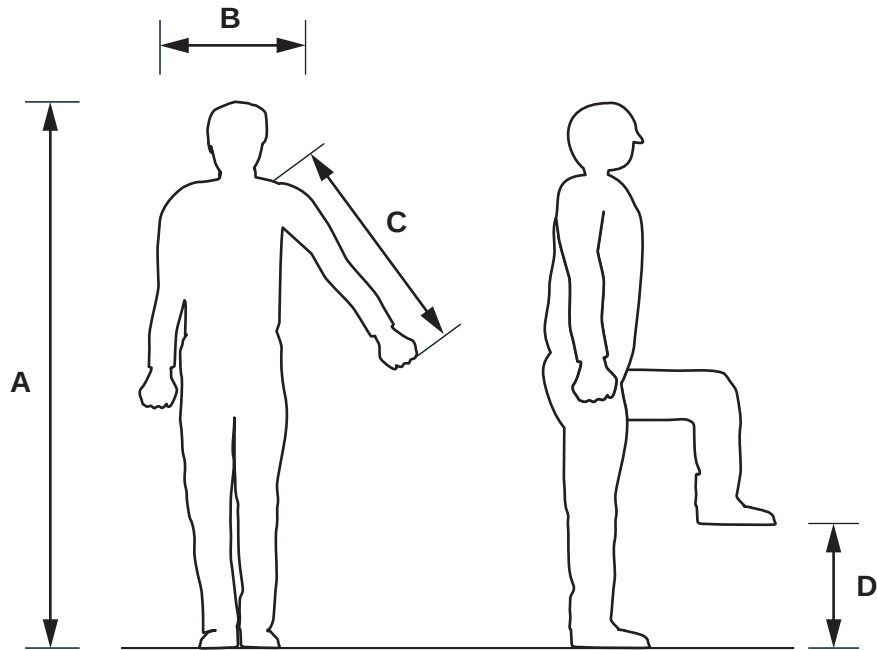


Fig. 6

Average sizes of 3, 4 and 5 year old children.

Age	A	B	C	D
3	940	265	400	205
4	1020	280	425	220
5	1090	290	450	230

- 11** Some young children are afraid of the dark and will only go to bed if a light is left on.

Design a battery powered night-light that will fit into the bedroom environment of a young child.

The light must:

- include a timer that will turn off the light after a set time;
- be free standing on a bedside cabinet or table.

To assist you in your answer, the dimensions of the battery are given in Fig. 7

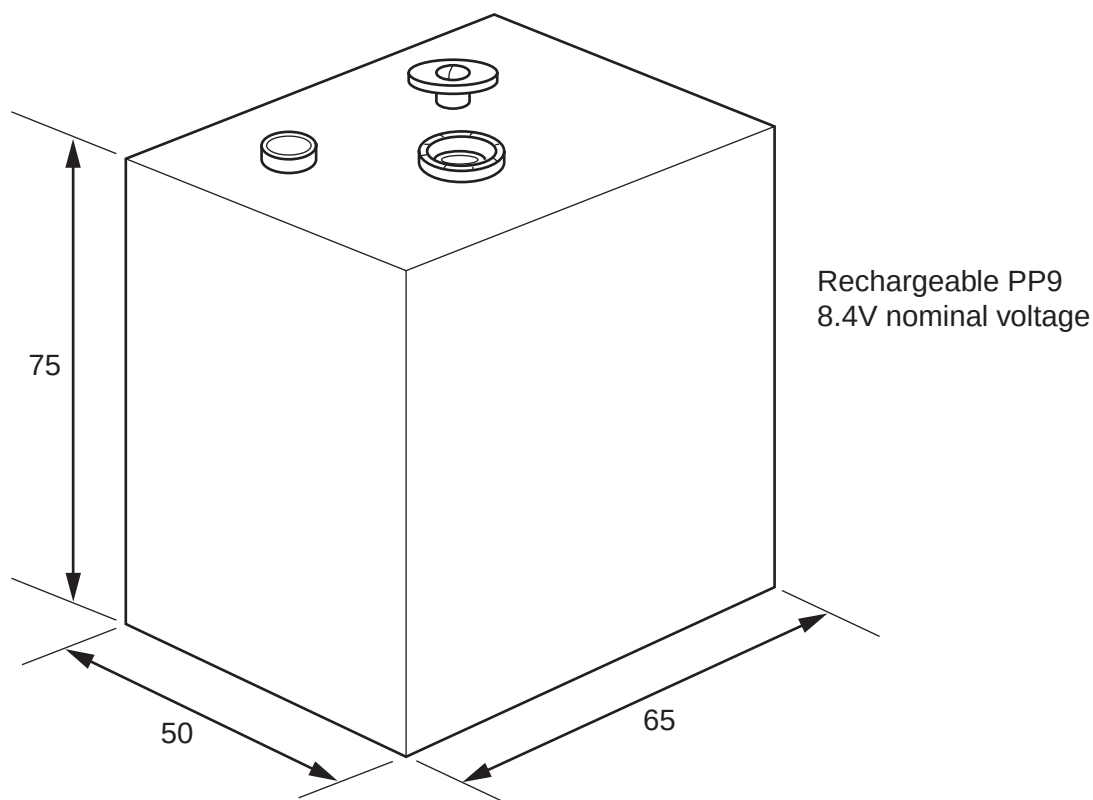


Fig. 7

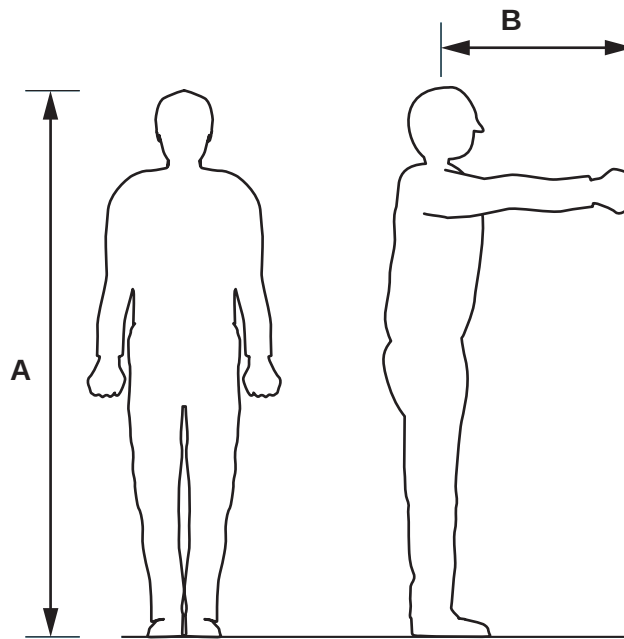
- 12** A company wishes to introduce a new range of sunglasses aimed at the teenage/young adult market. The new range will be called 'Ray Shades'.

Design a point of sales display that is floor standing and will hold 36 pairs of 'Ray Shades' sunglasses.

The display must:

- include a mirror;
- include your design for the brand name 'Ray Shades'.

To assist you in your answer, anthropometric data is given in Fig. 8(a) and the detail of the sunglasses are given in Fig. 8(b)



Average sizes of 18 to 20 year olds

Age	A	B
18	1585	572
19	1615	590
20	1655	600

Fig. 8(a)

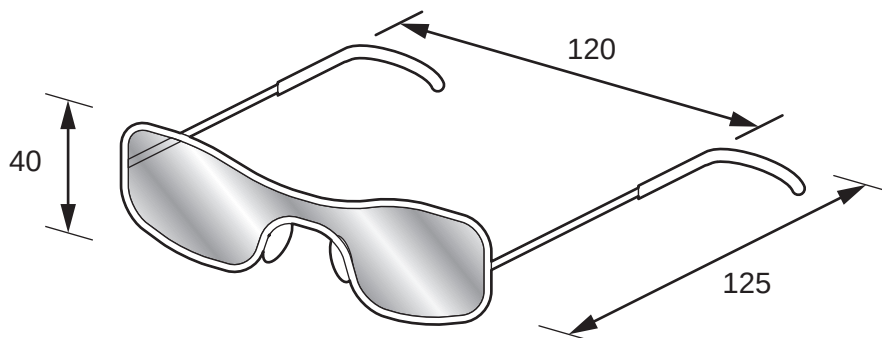


Fig. 8(b)

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