



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

DESIGN AND TECHNOLOGY

9705/32

Paper 3

October/November 2009

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.



2

Section A

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

Part A – Product Design

1 Fig. 1 shows a design for a candleholder.

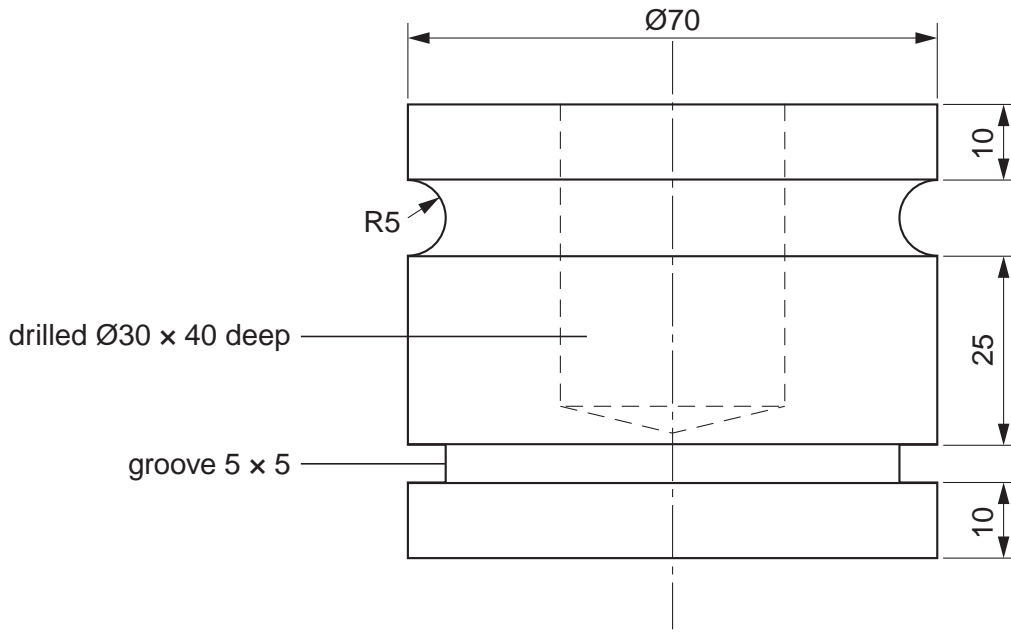


Fig. 1

- (a) State a suitable material for the candleholder and give **two** reasons for your choice. [3]
- (b) Describe, using notes and sketches, how you would make the candleholder. [9]
- (c) Explain what changes may be necessary to the design, in the manufacturing method used and in the material selected if 500 were required. Use notes and sketches to support your answer. [8]

2

3

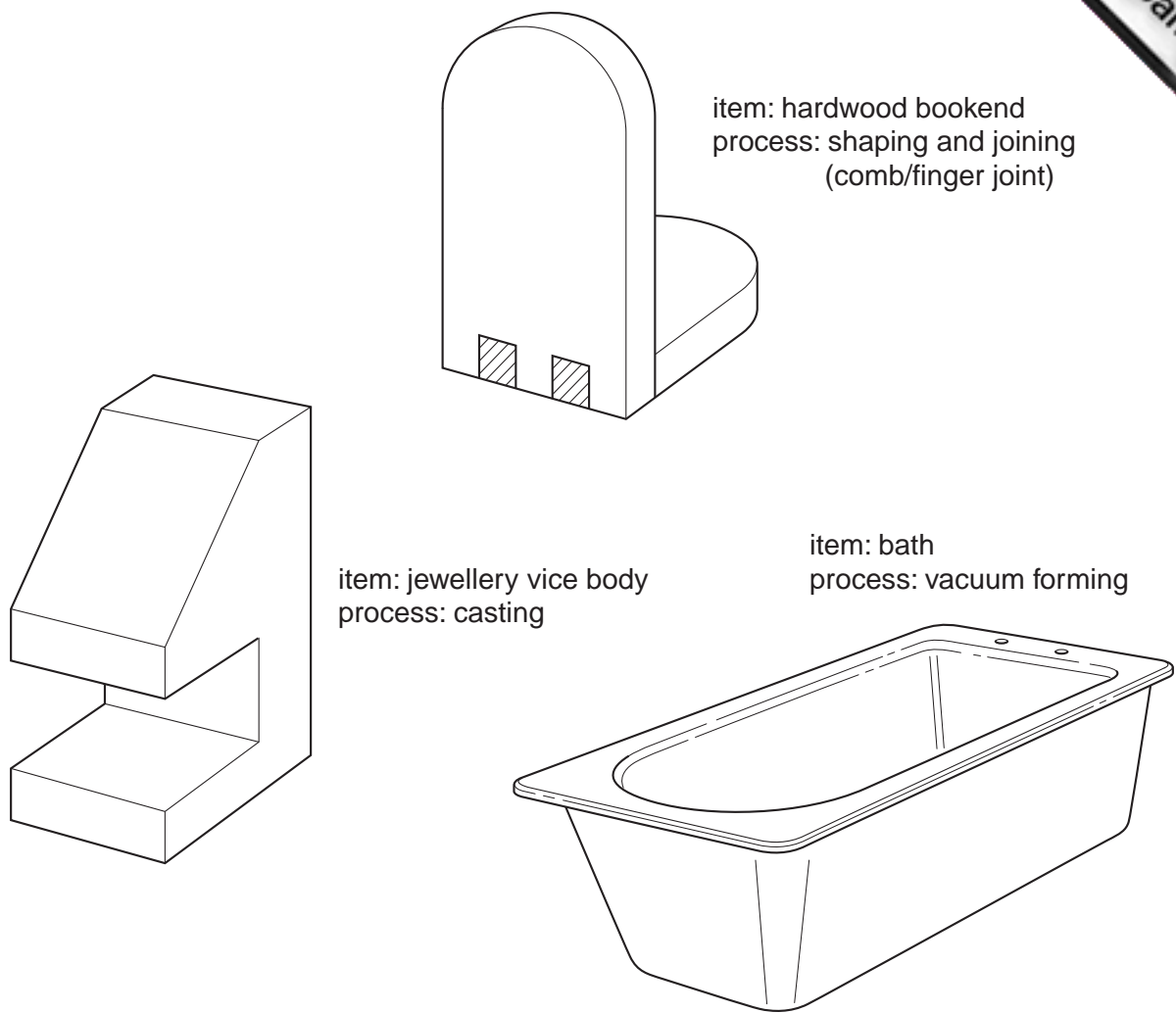


Fig. 2

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 specific item; [7 x 2]
- (b) explain why the process is particularly suitable for the production of the item. [3 x 2]

3 Discuss how the following have an impact on the work of professional designers:

- cultural considerations;
- ethical issues;
- the economic climate.

Part B – Practical Technology

- 4 Describe in detail, using sketches and notes where appropriate, the safety precautions that should be taken when carrying out **five** of the following processes:
- (i) cutting shapes in card using a craft knife;
 - (ii) soldering components onto a PCB;
 - (iii) drilling sheet material;
 - (iv) applying adhesives;
 - (v) bending plastic on a strip heater;
 - (vi) using abrasive paper on MDF (medium density fibreboard);
 - (vii) facing off mild steel bar.
- [5 x 4]
- 5 Select **five** materials from the following:
- | | | | | | | |
|-------------|-----------------|-----------|-------------------|---------|-----|-----|
| beech | MDF | plywood | teak | acrylic | ABS | PVC |
| polystyrene | stainless steel | aluminium | high carbon steel | copper | | |
- (a) Name a specific product made predominantly from each selected material. [5]
- (b) In each case, explain in detail why the properties of the material make it suitable for the selected product. [15]
- 6 (a) Define the following:
- (i) hardness; [2]
 - (ii) tensile strength. [2]
- (b) Use notes and sketches to describe:
- (i) a test to measure hardness; [5]
 - (ii) a test to measure tensile strength. [5]
- (c) Explain, using examples, why the testing of materials is important in the designing and making of products. [6]

Part C – Graphic Products

7 Fig. 3 shows a hinge bracket for a large gate.

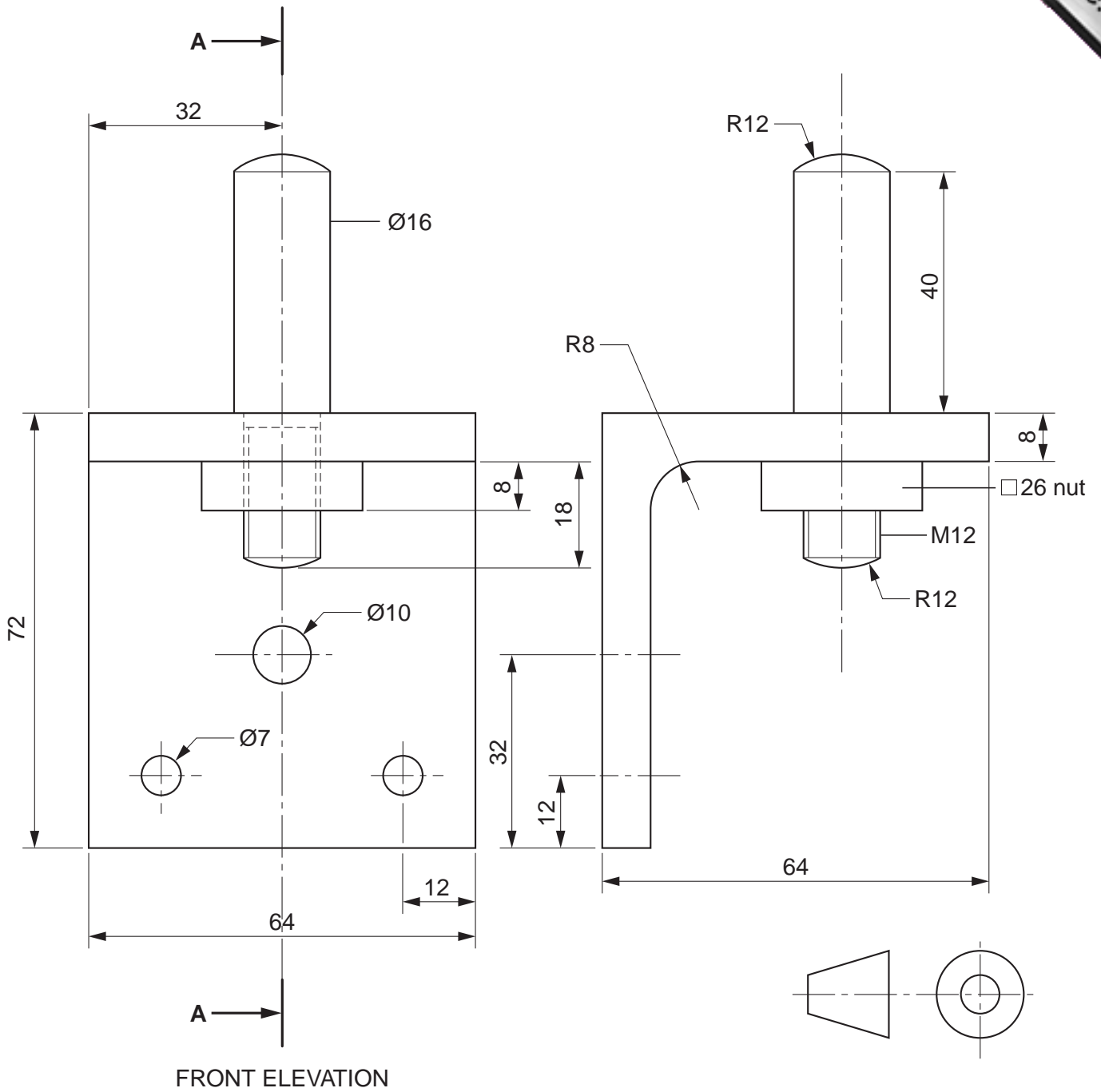


Fig. 3

(a) Draw the given front elevation and a sectional elevation on **AA** of the hinge bracket. [12]

(b) Discuss the effect of the use of computers on the storage and transfer of design data. [8]

6

8 Fig. 4 shows a design for a napkin holder.

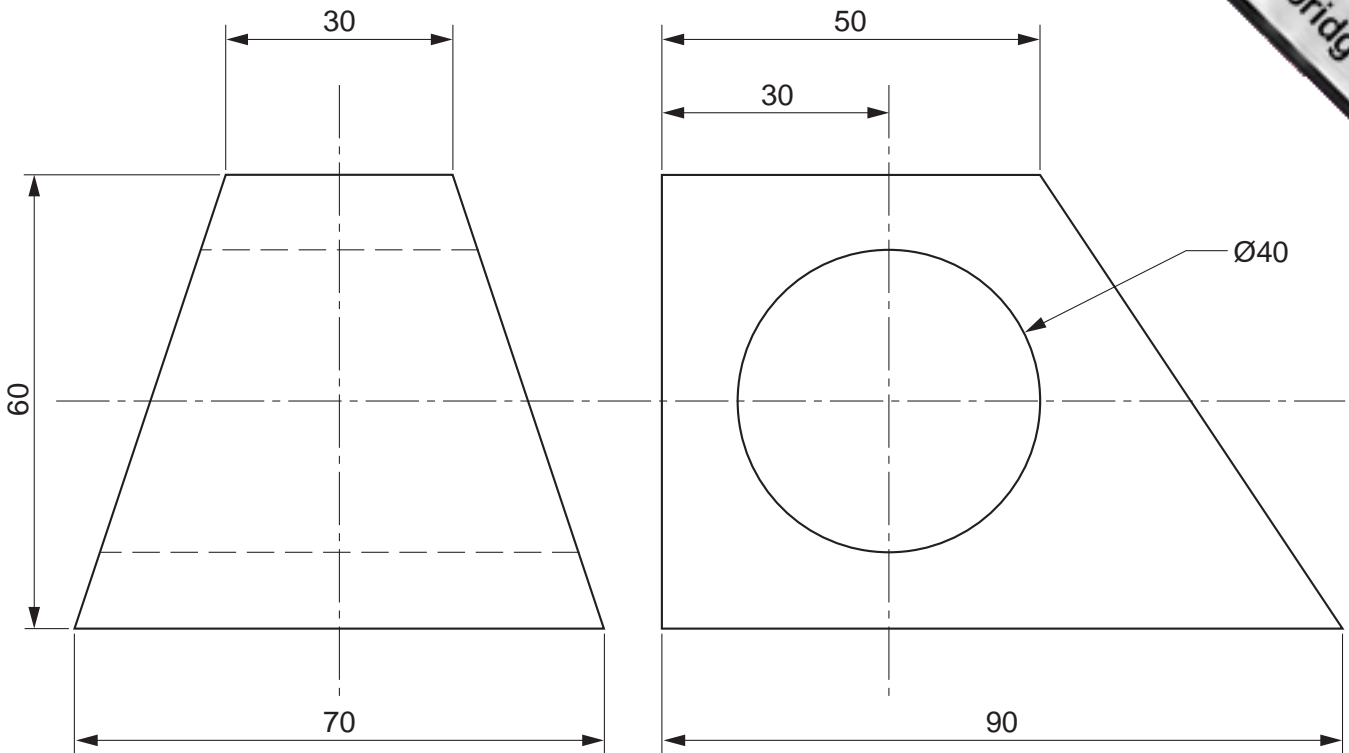


Fig. 4

(a) Draw an isometric view, twice full size, of the napkin holder. [10]

(b) Use examples to explain how designers would use one point and two point perspective drawings. Use sketches and notes to support your answer. [10]

9 Products are often redesigned as a result of several factors including the development of new materials and processes and changes in market needs. Select a product that has been redesigned and use sketches and notes to explain in detail the changes made and the reasons for the changes. [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 care home looks after long-term residents. The residents are unable to get out of bed for meals.

Meals are served on trays and the residents find it difficult to support the trays whilst eating.

You are to design a product to enable a resident to eat a full meal whilst in a bed.

Details of the bed are given in Fig. 5.

Details of the meal tray are given in Fig. 6.

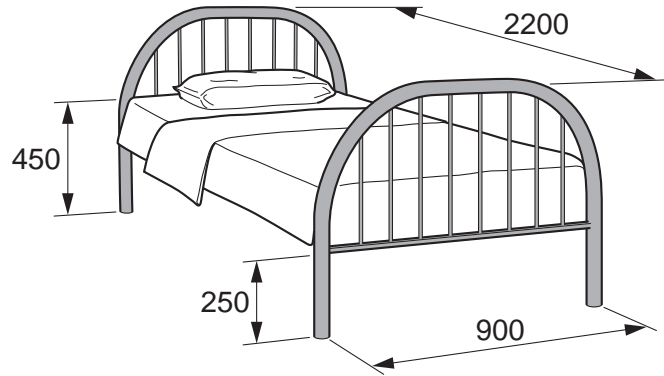


Fig. 5

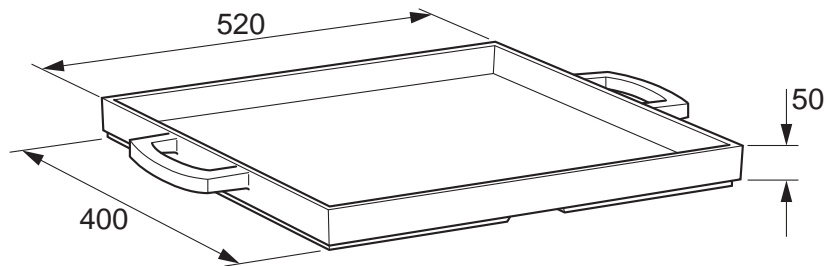


Fig. 6

- 11 Your school is to host a Technology Day for up to 40 prospective students from 10 schools. One activity will be the assembly of a small vehicle to be powered by two 1.5V

Design a small powered vehicle kit that will use the components shown in Fig. 7.

The vehicle must be easy to assemble in 15 minutes and offer the opportunity for the students to customise it.

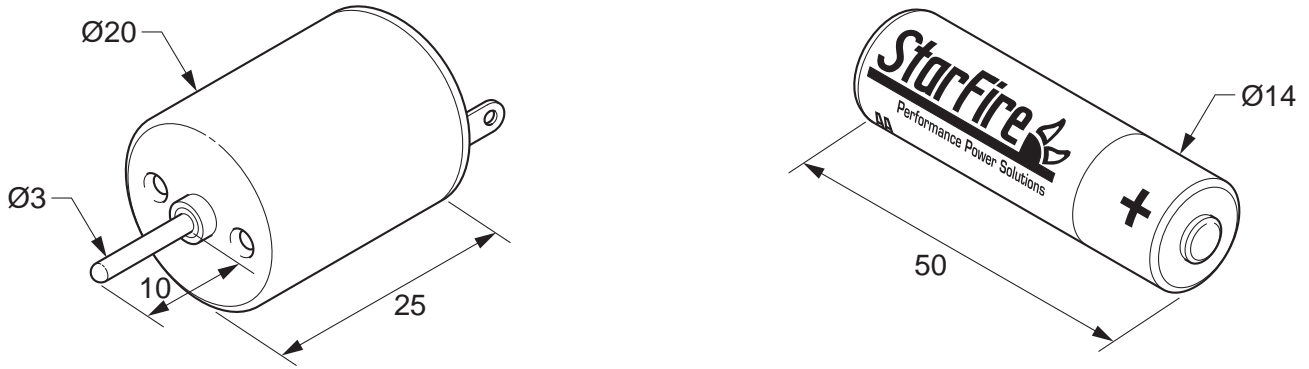


Fig. 7

12 A local company sells and hires out fancy dress party wear. It is looking to extend its product range by selling facemasks and hats. The products would be primarily designed for use at children's parties.

Design a matching facemask and hat that a child could wear at a party. The mask and hat must include 3D features.

To assist you in your design, anthropometric data is given in Fig. 8.

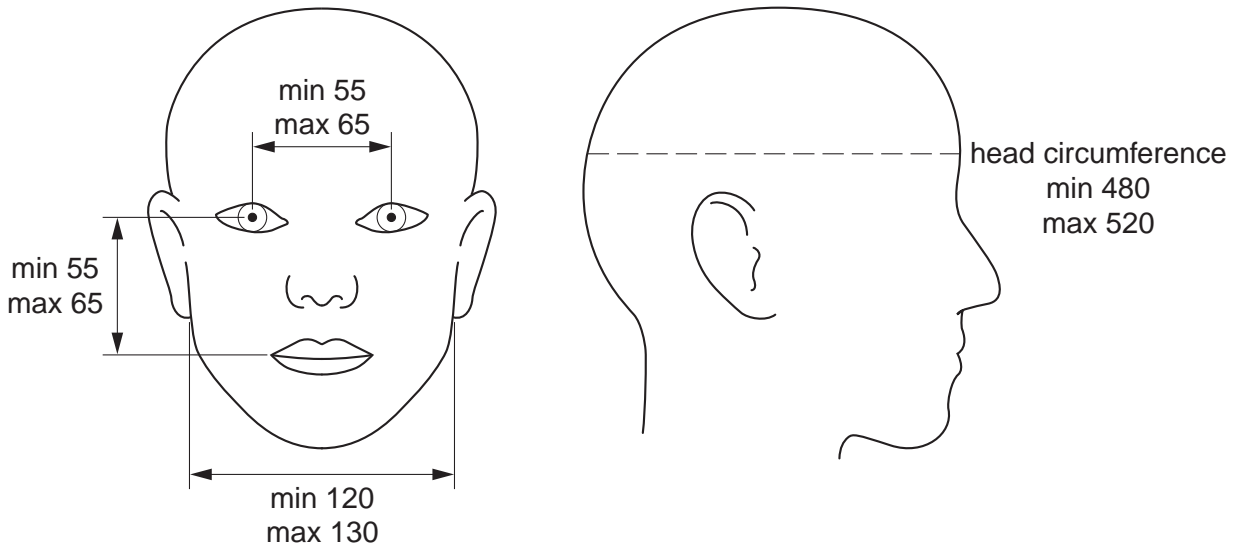


Fig. 8

