IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
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22066205

DESIGN TECHNOLOGY
STANDARD LEVEL
PAPER 2

Thursday 18 May 2006 (afternoon)

1 hour

Candidate session number

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INSTRUCTIONS TO CANDIDATES

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all of Section A in the spaces provided.
- Section B: answer one question from Section B. Write your answers on answer sheets. Write your session number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the numbers of the questions answered in the candidate box on your cover sheet and indicate the number of sheets used in the appropriate box on your cover sheet.

SECTION A

*Answer **all** the questions in the spaces provided.*

1. Good design takes account of the human body. Kitchen units, for example, are designed so they are convenient for human use. **Figure 1** shows a cross section through two kitchen units – a base unit and work surface and a wall unit – in relation to a manikin of the human body. **Table 1** shows the 5th, 50th and 95th percentile ranges for normal eye level, horizontal reach and vertical reach.

Kitchen units are often batch produced and distributed in flat packs. **Figure 2** shows the end view of a flat pack of the components of a kitchen wall unit. There is one shelf (12 mm thick), a top piece, a bottom piece and two side pieces (each 18 mm thick) and one back piece (22 mm thick). The door for the unit is not included and can be purchased separately.

Figure 1: Cross-section through kitchen units with manikin of human body

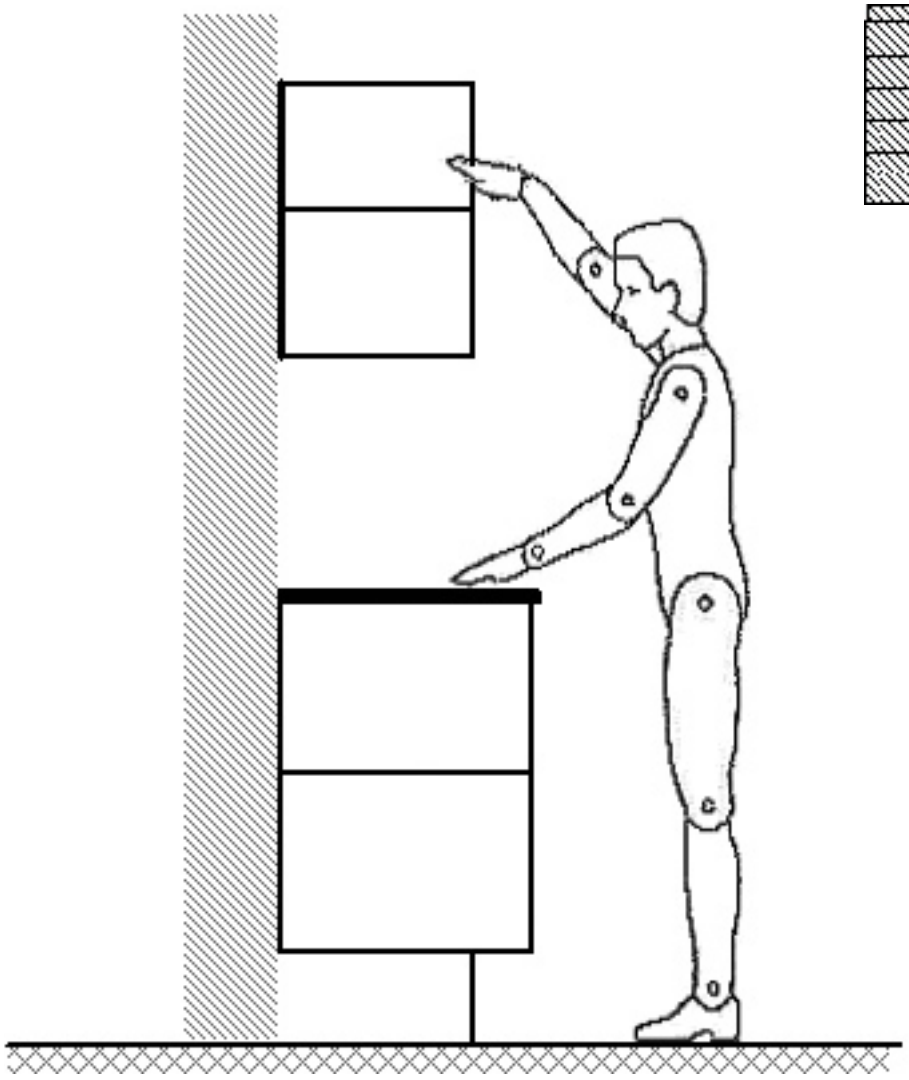
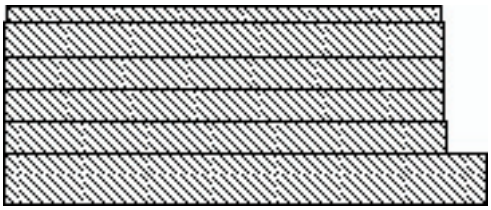


Figure 2: End view of components of kitchen wall unit



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(Question 1 continued)

Table 1: 5th, 50th and 95th percentile ranges (in millimetres) for normal eye level, horizontal reach and vertical reach

	5th percentile	50th percentile	95th percentile
Normal Eye Level	1400	1540	1680
Horizontal Reach	900	1000	1100
Vertical Reach	1650	1775	1900

(a) (i) Calculate the total thickness of the six components in the flat pack. *[2]*

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(ii) Outline **one** reason for incorporating the recessed section at the front of the base unit. *[2]*

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(b) (i) State **one** reason why measurements for the 5th percentile range would be used to determine horizontal reach in the design of the kitchen units. *[1]*

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(ii) Explain the value of using a manikin in the design of the kitchen units. *[3]*

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(Question 1 continued)

(c) (i) State **one** advantage of distributing the kitchen units as flat packs for the manufacturer. *[1]*

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(ii) Explain how the components of the kitchen unit would be flat packed to prevent their damage during distribution. *[3]*

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2. (a) State **one** example of a fixed cost. *[1]*

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(b) Explain how fixed costs are reflected in the final cost of an individual product. *[3]*

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3. (a) Define *green design*. *[1]*

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(b) Explain the role of legislation in promoting green design. *[3]*

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SECTION B

*Answer **one** question. Write your answers on the answer sheets provided. Write your session number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.*

4. As kitchens change with fashion so does the exterior design of appliances, *e.g.* refrigerators. The refrigerator shown in **Figure 3** has polished metal doors and is suitable for use in a large kitchen. The white plastic handles of the refrigerator are produced by extrusion.

Figure 3: Refrigerator with polished metal doors and extruded plastic handles

(a) (i) Define *fashion*. *[1]*

(ii) Outline **one** aspect of the refrigerator that is influenced by fashion. *[2]*

(iii) Compare the influence of fashion and planned obsolescence on the product life cycle of the refrigerator. *[2]*

(b) (i) List **two** advantages of using extrusion for the production of the refrigerator door handles. *[2]*

(ii) Outline **one** way in which extrusion can be regarded as a clean technology when used in the production of the refrigerator door handles. *[2]*

(c) (i) List **two** ways in which energy labels benefit consumers. *[2]*

(ii) Explain **one** way in which by considering the design pre-production designers can minimise the environmental impact of the refrigerator at each of **three** different stages of its life cycle. *[9]*

5. **Figure 4** shows a steel framed swing set designed for young children. The swing set has been designed for outdoor use. The frame of the swing set is made from extruded metal pipe.

Figure 4: A steel framed swing set

(a) (i) Define *literature search*. *[1]*

(ii) State **one** advantage and **one** disadvantage of using a performance test to collect data for designing the swing. *[2]*

(iii) Outline **one** way in which legislation imposes constraints on the designers of the swing set. *[2]*

(b) (i) Outline **one** consideration in the selection of the material for the swing seat. *[2]*

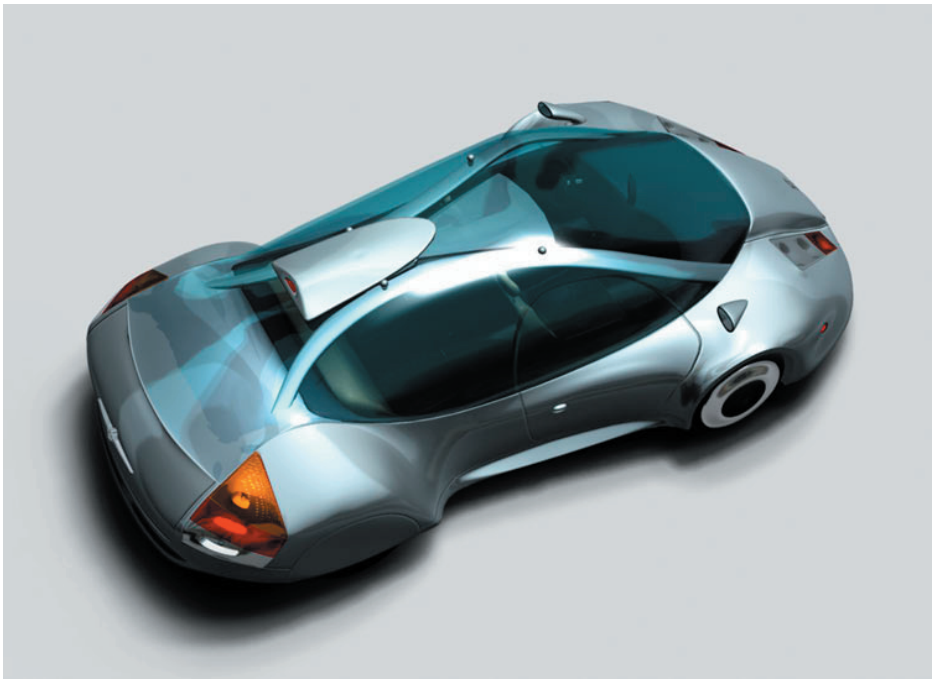
(ii) Outline **one** consideration in the selection of the material for the swing seat cables. *[2]*

(c) (i) Describe the significance of finishing in the manufacture of the lengths of extruded steel pipe used for the frame for the swing set. *[2]*

(ii) Explain how **three** different joining techniques may be used in the production of the swing set. *[9]*

6. **Figure 5** shows a miniature model of a concept car. Car designers use different types of models at different stages of the design process. It is essential that car designers convey their ideas clearly to others if the car is to reach the market place successfully.

Figure 5: Minuature model of a car



(a) (i) Define *cost-effectiveness*. *[1]*

(ii) Describe **one** way in which the manufacturer may use mathematical modelling to ensure cost-effectiveness in the production of the concept car. *[2]*

(iii) Identify **one** cost-effective material that could be used for producing a small quantity of miniature model cars. *[2]*

(b) (i) List **two** reasons for developing a full size working model of the concept car. *[2]*

(ii) Identify the scale of production appropriate for a full size working model. *[2]*

(c) (i) Identify **one** advantage of producing a full size clay model of the miniature model car. *[2]*

(ii) Evaluate the extent to which the **three** types of models, mathematical, full size working model and full size clay model, meet the design objectives for green products. *[9]*