IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

N05/4/DESTE/SP2/ENG/TZ0/XX

88056205

DESIGN TECHNOLOGY
STANDARD LEVEL
PAPER 2

Monday 7 November 2005 (afternoon)

1 hour

Candidate session number

0	0							

INSTRUCTIONS TO CANDIDATES

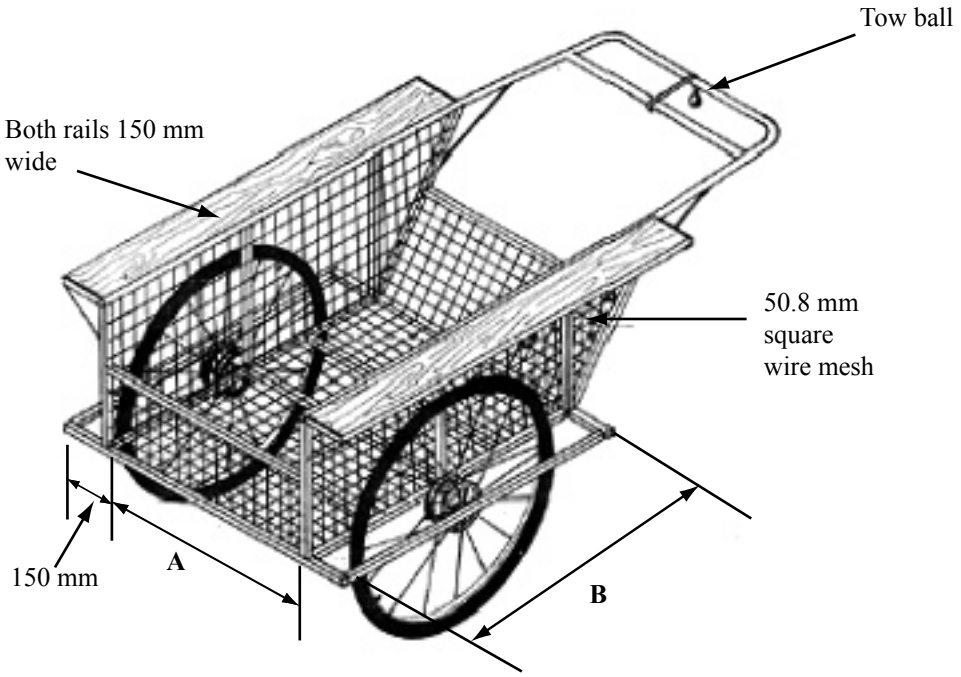
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all of Section A in the spaces provided.
- Section B: answer one question from Section B. Write your answers on answer sheets. Write your session number on each answer sheet, 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. In some developing countries the lack of access to transport for goods and materials makes life difficult for many people. To help solve this problem low cost bicycle trailers such as the one drawn in **Figure 1** below, have been designed to be manufactured locally.

Figure 1



[Source: www.itdg.org/docs/technical_information_service/bicycle_trailers.pdf]

Table 1: shows bicycle trailer details. The cost, weight and load of the trailer models increase proportionally as they get larger.

Bicycle Trailer	Model	
	Standard	**Long**
Cost	$240	$280
Weight	12 kg	15 kg
Load capacity	60 kg	80 kg
Dimension A	800 mm	800 mm
Dimension B	1.0 m	1.2 m

(This question continues on the following page)

(Question 1 continued)

(a) (i) State the overall width of the trailer. *[1]*

. . . . . .

(ii) Calculate the area of the horizontal wire mesh forming the base of the standard trailer. *[2]*

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(iii) If the cost, weight and load capacity of the trailer models increase proportionally as they get larger, state the projected cost for a trailer with a load capacity of 100 kg. *[1]*

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(b) (i) List **two** ways the wheels could be strengthened for heavy loads and for use on rough tracks. *[2]*

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(ii) List **two** modifications that could be made to the trailer to make it useful for carrying books as a mobile library. *[2]*

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(This question continues on the following page)

(Question 1 continued)

(c) (i) Outline **one** featue of the trailer that could make it unsafe for carrying children. *[2]*

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(ii) Identify **one** modification that would make the trailer safer for carrying children. *[2]*

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2. (a) Define *density*. *[1]*

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(b) Explain **one** reason why density is important in the design specification for food packaging. *[3]*

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3. (a) Define *life cycle analysis*. *[1]*

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(b) Explain **one** way in which harm to the environment can be reduced at the disposal stage of the Life Cycle of a washing machine. *[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. **Figure 2** and **Figure 3** show the OZ23 fridge-freezer manufactured by Electrolux Zanussi. It has a "rollerball" foot at the base of the door.

Figure 2

Figure 3

[Source: *The Eco-design handbook* by Alastair Fuad-Luke (Thames and Hudson)]

(a) (i) State the technique used for manufacturing the fridge-freezer outer body. *[1]*

(ii) Describe the influence of aesthetic considerations on the design of the fridge-freezer. *[2]*

(iii) Outline **one** reason for designing the fridge-freezer with a rollerball at the base of the door. *[2]*

(b) Outline **one** piece of legislation which has imposed a constraint on the designer of the fridge-freezer. *[2]*

(c) (i) State **one** fixed cost of the fridge-freezer production. *[1]*

(ii) Explain why fridge-freezers are batch produced. *[3]*

(d) Compare user trial with performance test and expert appraisal for evaluating the fridge-freezer. *[9]*

5. **Figure 4** and **Figure 5** show a public seating (bench) design by VK and C Partnership (UK). The seating is made from extruded plastic and the legs and back rests from aluminium. The seat can be made any length and the backrest any shape depending on client requirements.

Figure 4

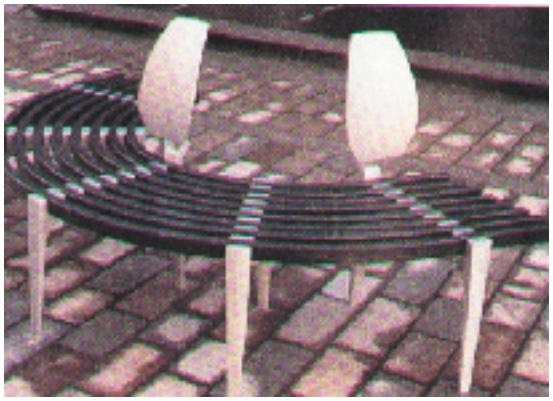


Figure 5

[Source: *The Eco-design handbook* by Alastair Fuad-Luke (Thames and Hudson]

(a) (i) State **two** anthropometric requirements for the design of the bench. *[2]*

(ii) State the percentile used to decide the height of the bench. *[1]*

(iii) Outline the importance of **one** ergonomic consideration (other than anthropometric data) to the design of the bench. *[2]*

(b) List **two** reasons why the technique of extrusion is appropriate for manufacturing the seating. *[2]*

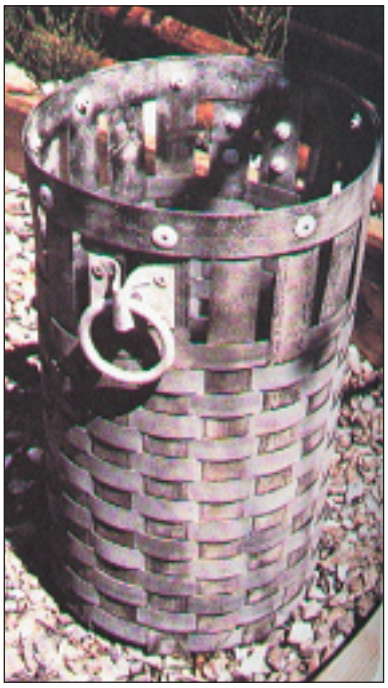
(c) (i) State the most likely scale of production for manufacturing the bench. *[1]*

(ii) Explain the contribution of materials costs as part of the final cost of the product. *[3]*

(d) Explain how the designer has taken into account ease of maintenance in the choice of materials for the design of the bench. *[9]*

6. **Figure 6** shows a litter bin manufactured as a prototype by Arunas Oslapas Company USA. It is made from waste metal strips from shipping containers woven and fastened with rivets into a bin suitable for use in a private garden or public space.

Figure 6



[Source: *The Eco-design handbook* by Alastair Fuad-Luke (Thames and Hudson]

(a) (i) List **two** properties of metal which make it a suitable choice for manufacturing the bin. *[2]*

(ii) Describe **one** advantage of using the technique of weaving to manufacture the bin. *[2]*

(b) Outline how the technique of adaptation has been used in the design of the bin. *[2]*

(c) Discuss the design of the bin in relation to

(i) ease of use. *[3]*

(ii) safety. *[2]*

(d) Evaluate the cost effectiveness of the prototype bin for making in batches. *[9]*