VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2010 Design and Technology GA 3: Examination

GENERAL COMMENTS

Students performed well on the 2010 Design and Technology examination. Students are reminded that they should read questions carefully and ensure that they answer questions directly.

If a question asked for a number of points and a student gave more than the number of points required, only the required number were assessed in the order in which they were presented. If a student thinks of a better response after finishing their initial answer, they should cross out the answer that they feel is the weakest and add the extra response.

Areas of strength

- understanding of design factors, fundamentals and applications
- understanding of the promotion of a product, for example, the Vebo
- risk assessment and risk control
- knowledge of the environmental impact of products and the reasons a manufacturer would conduct a Life Cycle Analysis (LCA)
- ability to list client specifications taken from the brief, giving examples of how this specification will be met and developing an evaluation criterion in question form

Areas of weakness

- understanding of key words such as 'process', 'criterion', 'annotation' and 'weighted evaluation criteria'
- ability to describe aspects of a high quality product – students were too general when the question asked for specifics
- understanding the differences between different types of manufacturing systems
- why weighted evaluation criteria are used for design options

In relation to the design option, the following are areas of weakness.

- Some students drew products that were not specified by the client.
- Some students annotated information that was not required.
- Generally, annotations were inadequate and did not address what was being asked for in the question.
- A number of students used pen to draw the design option.

SPECIFIC INFORMATION

Section A

Question 1a.

Marks	0	1	Average
%	8	92	**0.9**

Students were expected to be able to show their understanding of design factors and how these factors have influenced the designer of a beach chair. Students could refer to any design factor or give an answer that showed a link between the design and a related influence; for example, beach, surf and waves. Examples of design factors that could have influenced the designer include human needs and wants; purpose, function and context; visual, tactile, aesthetics; materials, etc.

The majority of students were able to answer this question.

Question 1b.

Marks	0	1	2	3	4	Average
%	19	12	24	26	19	**2.2**

The following is an example of a possible response.

Benefit – Reduce the need for raw materials
Description – Fewer raw materials are needed. This reduces the environmental impact through less mining, less destruction of forests (in the case of this bench, plastic replaces wood that would have to be logged and metal that would have to be mined), less pollution from sourcing of materials.

A majority of students were able to name the long-term benefit of using recycled plastic milk containers; however, few students were able to clearly link the named benefit with their written description or their description was limited. Full marks were awarded for a complete and full description that covered more than one relevant issue or point. Students had to show a link between the benefit and the description to obtain full marks.

Question 1c.

Marks	0	1	2	3	Average
%	30	21	22	27	**1.5**

Students could have included the following points:

- an LCA identifies the stages at which environmental impacts can be reduced
- an LCA is a decision-making tool. It helps the company to decide whether a product should be made, modified or shelved
- an LCA allows the company to assess how much impact the product will have on the environment at different stages of its life
- an LCA reduces the financial cost to the company and the impact the product has on the environment
- an LCA helps the company to identify changes/modifications in order to reduce the impact on the environment
- the reputation of the company in terms of its concern for the environment is enhanced.

Students had to show an understanding of the benefits of conducting a Life Cycle Analysis before manufacturing. To achieve full marks, a clear understanding of the stages of the LCA from sourcing of the material through to disposal was expected. A majority of students demonstrated some level of understanding of the Life Cycle Analysis; however, their ability to clearly explain the benefits varied.

Question 1d.

Marks	0	1	2	Average
%	14	35	51	**1.4**

A possible response could have been: The environmental impact is reduced because raw materials do not need to be extracted from the ground; there is less use of energy and chemicals to make the material; the material is readily available from waste collections; the plastic materials are very light, hence there are fewer environmental costs related to transportation.

The majority of students were able to explain, to some degree, why the environmental impact of sourcing materials for the beach bench was very low. Their response had to relate to the sourcing of materials only.

Question 1e.

Marks	0	1	2	Average
%	17	36	47	**1.3**

Possible examples included:

- research into product, materials, technologies and machines that are available
- research allows manufacturers and designers to improve a material, product, machinery or technology
- research allows resources such as raw materials and processed materials to be used more effectively in the production of a material or product.

Students were required to explain why research is an important stage in the development of new materials and products. A majority of students were able to answer this question to some degree. No marks were awarded for references made to market research. Students received full marks if they demonstrated an understanding of the importance of research and included at least two key points.

Question 1f.

Marks	0	1	2	3	Average
%	12	24	30	34	**1.9**

- The process was created to make use of recycled materials.
- To provide a competitive edge for the manufacturer because of consumer demand for more environmentally friendly/green products, therefore increasing market share for the company.
- The use of recycled materials is more cost-effective.

- Replaces wood, improves the properties and characteristics of the material, low cost to the company, cuts down the cost of maintenance when in use, and therefore people would want it.

Students were asked to discuss why the manufacturer would create a process that allowed Polyboard to be created. If students used the properties of Polyboard in their discussion and related this to why the manufacturer would create this process, then marks were awarded. Students were asked to 'discuss why', and therefore more than one point was needed to gain full marks. No marks were awarded if students simply restated the properties of Polyboard as listed in the question.

Question 1gi–iii.

Marks	0	1	2	3	Average
%	28	6	20	46	**1.9**

Some students did not show an understanding of the relationship between an evaluation criterion, justifying and testing. Some had difficulty developing an evaluation criterion, providing justification and methods of testing.

A number of students had difficulty with this question as they did not address the client's need, which was for ease of maintenance.

Students were not penalised if the evaluation criterion was not in question form as that was not specified.

1gi.

Possible responses could have been:

- does Polyboard reduce the amount of time spent on maintaining our benches?
- is the park bench easy to maintain?

This question asked students to list an evaluation criterion that related to the council specification that the new park benches should be easy to maintain. Responses needed to refer to the ease of maintenance/cleaning/upkeep/painting.

1gii.

Students needed to justify the importance of the criterion listed in 1gi. Possible responses could have been:

- save money
- increase/improve safety
- reduce number of employees needed to maintain park facilities.

1giii.

Students needed to explain how the criterion could be tested by ParkBuild. Possible responses could have been:

- test for effects of water, light and heat on the new park benches
- place prototypes of furniture into outdoor environments and see what happens to the product over a period of time.

Question 1h.

Marks	0	1	2	3	Average
%	15	17	38	30	**1.8**

Students were expected to demonstrate an understanding of risk assessment and risk control. To gain full marks a discussion/comparison was required. Students' level of understanding of risk assessment and risk control was good; however, the discussion or comparison between the two was not done as well. A number of students provided only a definition of each, and others restated the question: 'Risk assessment is assessing the risk and risk control is controlling the risk'. Some students did not attempt this question.

Question 2a.

Marks	0	1	2	3	Average
%	7	11	32	51	**2.3**

Students were asked to draw a poster that highlighted two features of the Vebo. Any of the following features could have been included in the drawing:

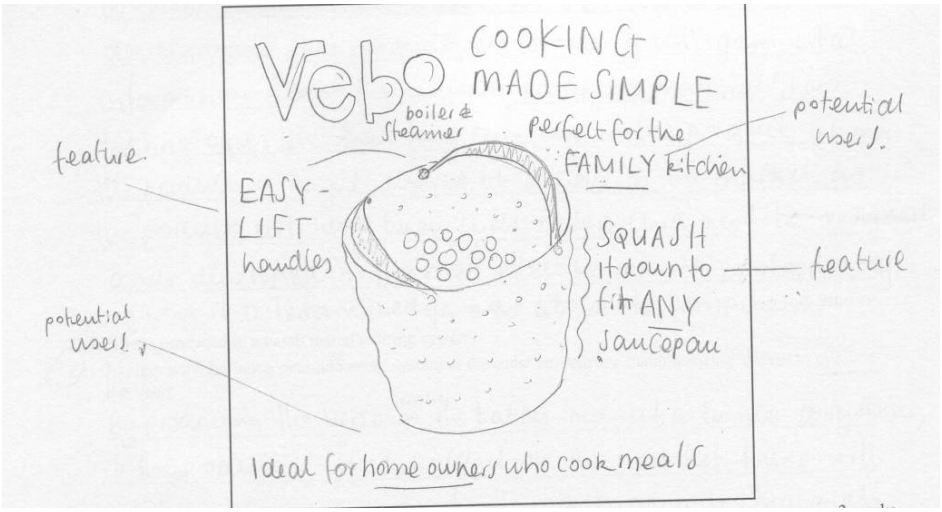
- fits in a saucepan
- use for boiling/steaming/draining
- easy to remove

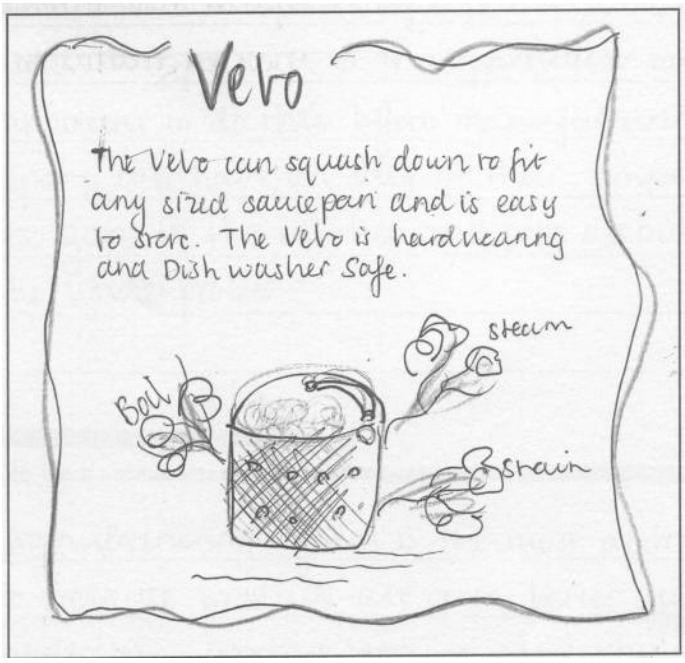
- heat resistant
- food-grade silicon
- pop-up handles
- food served straight from the Vebo
- dishwasher safe.

Students were able to extract information from the product description and include the features on their poster. Students addressed this question very well; however, some students obviously spent too much time doing a detailed drawing. Students should weigh up the 'value' of the question and use their time in proportion to the marks allocated. Students who copied the drawing provided were not given full marks for the drawing of the poster.

The following student example met all requirements. The student created a poster that addressed two features of the Vebo and indicated the end-user group as supporting information. Marks were awarded for the drawing and for the two features listed.

The following are examples of high-scoring responses.





Question 1b.

Marks	0	1	2	Average
%	4	37	59	**1.6**

Possible responses included:

- TV advertising at a time when families are sitting down to their evening meal
- demonstration in supermarkets when people are buying their food.

This question enabled students to demonstrate their understanding of promoting a product and the majority of students did well. Students who received full marks attempted a discussion of other ways that the Vebo could be promoted. Students who listed other ways to promote the product without including a discussion or explanation were not awarded full marks.

Question 1c.

Marks	0	1	2	3	Average
%	13	26	35	26	**1.8**

Possible responses included:

- broadens the market – different vegetables can be separated and cooked at the same time
- different people can cook at the same time; for example, when camping, in share houses
- restaurants may use the Vebo to speed up service by cooking more vegetables at the same time
- Vebo is a space saver – you don't need two saucepans on the stove at the same time
- more compact for easy storage.

To receive full marks, students needed to show an understanding of the increased functionality of the Vebo and how this increases the saleability of the product. Students could have included a number of reasons or focused on one feature in detail. Students had a reasonable understanding of the increased functionality and how this could extend the market for the Vebo.

Question 1d.

Marks	0	1	2	3	Average
%	9	21	32	38	**2**

Students needed to explain the importance of market research for the design and development of a product before manufacturing begins. Students could have related their answers to the Vebo; however, this was not required. Responses could have been based on the following.

Market research:

- is the basis for making a decision about whether a product is made, modified or not made at all
- helps to understand consumer demand, especially in niche markets
- shows the willingness of consumers to buy the product
- enables comparison with other products and assesses the visual appeal of the product.

The following are examples of high-scoring responses.

> *Market research is vital when producing a new product to establish information or market research about the consumers' needs and wants and demographics; the competitors and type of market the product is aimed at; the existing products and aspects of materials and functions. Gaining this information allows the designer to have direction and an aim for their design and how it will suit its intended market.*
>
> *It is important for the design and development because it helps identify the key needs of the target market which aren't being met by currently available products and any other preferences such as style, shape and colour which will help the product sell more successfully than its competitors.*

Question 1e.

Marks	0	1	2	3	Average
%	36	23	22	20	**1.3**

Students' responses could have related to the following points. Batch manufacturing:

- is the manufacture of a specified number of articles to order
- is used to produce for a smaller market

- enables a quick response to market demand. Including success or failure of the product, changing the colour, adding additional features.

Students could have also made reference to cost saving due to the reduced amount of excess stock or materials or to financial loss.

Some students answered this question quite well; however, a number of students made a comparison between batch and mass production, which was not required.

The following is an example of a high-scoring response.

Due to the new innovation of the product, batch production allows manufacturers to test it for success on the market. If it is continually successful more can be produced, but if not, there will be reduced loss to manufacturers for unsold product, and any alterations to design can be made relatively easily in an attempt to make it a successfully selling product.

Section B

Product selected	0	Furniture	Outdoor furniture	Travelling outfit	Desk tidy	Sunglasses and sunglasses case
%	3	44	13	37	2	2

Question 1

Marks	0	1	2	3	Average
%	18	23	28	30	**1.7**

The purpose of annotating a design brief is to:

- gain an awareness of the constraints, considerations and specifications of the client/end user
- gain an awareness of the client's needs/wants
- communicate with the client
- highlight areas that need research
- develop design ideas
- highlight key points.

This question assessed students' understanding of the importance of the development of the design brief and maintaining communication with the client. Most students were able to answer this question to some degree; however, some students did not mention the importance of considerations and constraints.

The following are examples of high-scoring responses.

To ensure all specifications are met and to ensure the design reflects the beachside theme or theme requested by client and to ensure the product is suitable for its intended use and end users, by annotating the design brief, these points become obvious to the designer ensuring that each one can be successfully met.

Annotating the brief allows the designer to identify whether all the clients' specifications have been met and hence how suitable the product is at meeting the clients' needs and wants. Annotations can also provide direction for construction processes and make designs easy to understand allowing the client to provide accurate feedback.

Question 2a.

Marks	0	1	Average
%	13	87	**0.9**

2b.

Marks	0	1	Average
%	20	80	**0.8**

2c.

Marks	0	1	Average
%	20	80	**0.8**

The majority of students demonstrated an excellent understanding of how to list a client specification taken from the brief, how they will meet this specification and how to develop an evaluation criterion in question form. However, some students did not understand how to draw this information from a design brief.

Question 3
Annotated design option
Function/suitability for intended use

Marks	0	1	2	3	Average
%	16	18	27	38	**1.9**

Identification of processes including at least two processes with a degree of difficulty

Marks	0	1	2	3	Average
%	17	15	23	46	**2**

Use of visual and aesthetic design factors – fundamentals and applications

Marks	0	1	2	3	Average
%	28	31	24	17	**1.3**

Annotations that indicate how the specifications have been met

Marks	0	1	2	3	Average
%	18	23	28	32	**1.7**

Clarity and detail of drawing

Marks	0	1	2	3	Average
%	4	29	44	23	**1.9**

Innovation and creativity

Marks	0	1	2	3	Average
%	9	35	38	18	**1.7**

A number of students:

- used biro to draw the design option. This was not an effective method of completing this task and students should use greylead and coloured pencils
- drew their design option on the isometric grid paper instead of using the grid paper underneath the page
- did not design their option using a material that they were familiar with. A number of students used PolyBoard but were not able to support their design options with appropriate annotations, including processes with a degree of difficulty
- were unclear as to what a desk tidy was. A common error was to design a desk. Some students were able to apply the desk tidy to a desk
- who chose to design the sunglasses were not familiar with appropriate processes or materials suited to the task of designing sunglasses.

The following should be noted.

- Annotation is critical to gaining marks for the design option. A large percentage of students did not sufficiently annotate the design option.
- Students should choose a design option that utilises their knowledge and draws on the skills they have developed throughout Units 3 and 4
- A large percentage of students did not use/annotate the design factors – fundamentals and applications
- Students should ensure that the annotations relate to the required information/marking scheme.

The following is an example of a high-scoring response. The design option is creative, well drawn and clearly annotated. The student has used a colour-coded key to draw attention to some aspects of the brief. The design option clearly shows annotations for each of the following sections and marks were awarded accordingly.

i - Function/suitability for intended use)

1. *Rounded off corners and foam underneath so can't cut head.*
2. *Bevelled edges to stop cuts and bumping it.*
3. *Legs made of hardwood for durability and strength.*

ii – Identification of processes including at least two with a degree of difficulty

1. *Dowel joints for strength*
2. *Frame biscuit jointed*
3. *Nail gun nails used to fasten ply*

iii – Use of visual and aesthetic design factors – fundamentals and applications

1. *Shape – Wave design jig sawed out of marine plywood.*
2. *Colour - Marine plywood been painted blue.*
3. *Spatial organisation-Ergonomically fits contours of back*

iv – Annotations that indicate how the specifications have been met

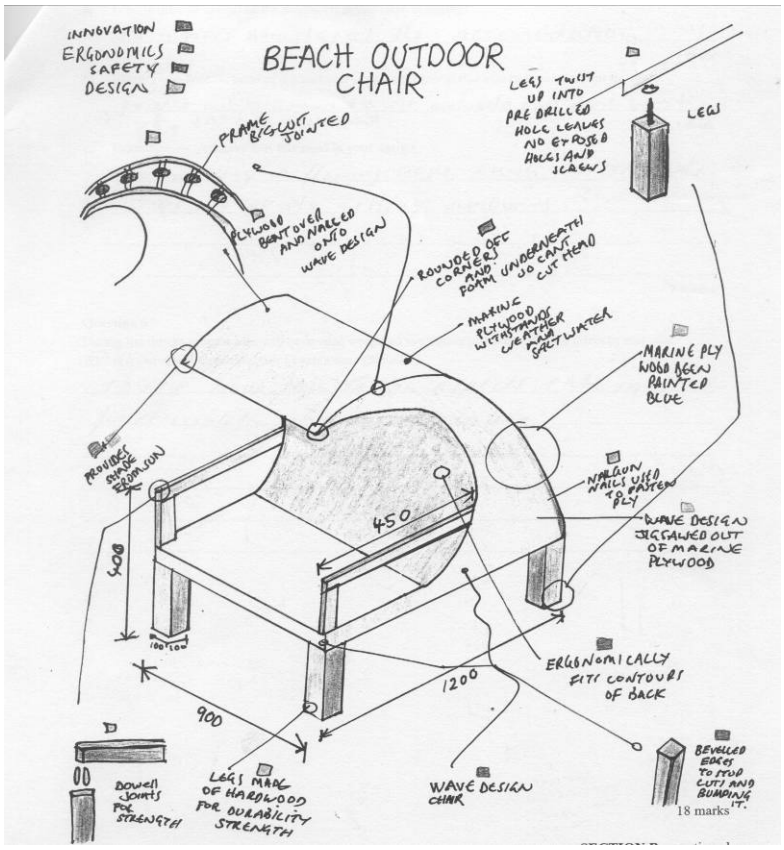
1. *Beach Outdoor chair*
2. *Marine ply withstands weather and salt water*
3. *Provides shade from sun.*

v – Clarity and detail of drawing.

These marks were gained by presenting a design option that was easy to read, a design with detailed annotations and that could be read and understood clearly.

Vi - Innovation and creativity –

These marks were awarded for innovative and creative designs and design features.



The following is an example of a high-scoring response. A colour-coded key was used to easily locate the annotated information. It is well supported with clear annotations. Full marks were awarded for innovation and creativity, partly because these elements had been annotated on the design option and because of the processes used to decorate/create the garments. The design option is made easier to read/visualise by the front and back views of the outfit.

i - Function/suitability for intended use - KEY to annotations = F/S

1. *Poly cotton shorts breathe well, are colour fast for sun and are strong and durable*
2. *Pockets on shorts, shirt and back of shorts allow user to place phone or sunscreen in.*
3. *Light blue poly-cotton shirt breathes well, keeps wearer cool on hot day.*

ii - Identification of processes including at least two with a degree of difficulty. KEY to annotations = DD

1. *Zip inserted in shorts to allow easy removal for swimming*
2. *Surface decorating embellishment blue stitching (hand sewn) to reflect the ocean waves*
3. *Button holes created using special buttonhole presser foot on sewing machine creating 4 lines. Middle of buttonhole created with stitch ripper*

iii - Use of visual and aesthetic design factors – fundamentals and applications. KEY to annotations = VA

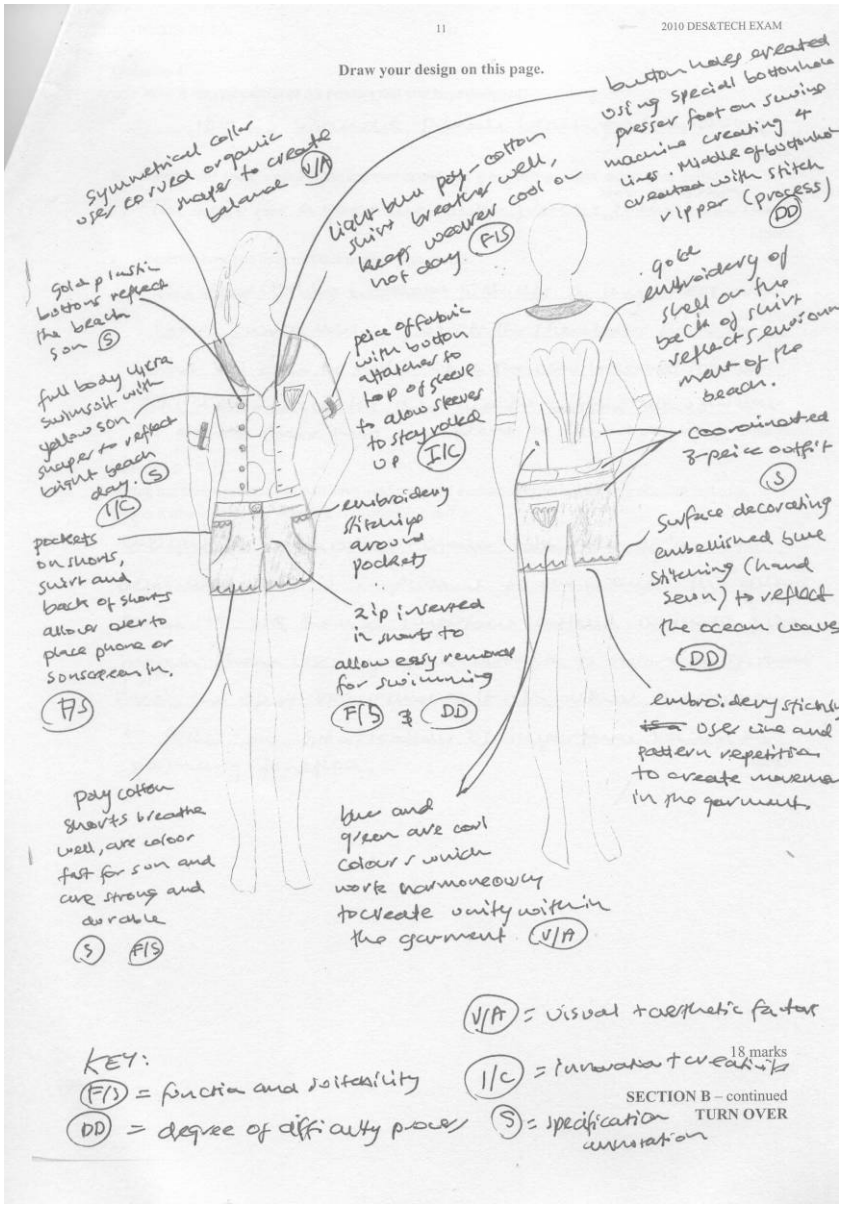
1. *Symmetrical collar over curved organic shaped to create balance*
2. *Blue and green are cool colours which work harmoniously to create unity within the garment*
3. *Embroidery stitching uses line and pattern repetition to create movement in the garment*

iv – Annotations that indicate how the specifications have been met. KEY to annotations = S

1. *Coordinated 3 piece outfit*
2. *Gold plastic buttons reflect the beach sun*
3. *Full body lycra swimsuit with yellow shapes to reflect bright beach day*

v - Clarity and detail of drawing.
These marks were gained by presenting a design option that was easy to read, a design with detailed annotations and that could be read and understood clearly. marks

vi.- Innovation and creativity
These marks were awarded for innovative and creative designs and design features.



Question 4a–c.

Marks	0	1	2	3	4	Average
%	6	9	14	29	42	2.9

Possible responses for the end user included:

- young backpackers/travellers
- travellers who want low-budget accommodation, families
- older travellers
- people who go to the snow fields or to the beach.

Students' answers needed to relate back to the design brief and the product that the student had chosen for their design option. Some students had difficulty identifying the end user from the client, making the links between 4a., 4b. and 4c. and relating them back to the brief.

The following example demonstrates a good link between the brief, design option and Questions 4a., 4b. and 4c.

a. Females who visits the YHA ski lodge

b. Warmth in cold weather

c. Fabrics used are mostly wool or waterproof fabric which traps in body heat to insulate wearer. Also accessories such as beanie and gloves warm difficult areas through which a lot of heat is lost

Question 5

Marks	0	1	2	3	Average
%	37	22	21	20	**1.3**

Students' answers needed to refer to the fact that, when designing a product, some criteria are more important to the client than others and that the designer must understand and address this so the preferred option can be chosen.

This question caused some difficulty for students. A number of students did not attempt it and others simply listed points but did not give an explanation.

The following is an example of a high-scoring response.

Weighting evaluation criteria allows the designer to determine what is important to the client. This allows them to use the most important criteria when designing more so than less important criteria to ensure the garment meets the users' requirements. It allows the designer to focus on specifications of importance beyond the primary function.

Question 6

Marks	0	1	2	3	4	Average
%	17	13	30	22	18	**2.1**

Students were expected to choose one design fundamental and one application used in their design option. They needed to write about them in a way that demonstrated an understanding of their meaning and how they applied to their design.

Students used the design fundamentals and applications well; however, some students were more descriptive in their response and achieved a higher mark. Some students misunderstood the word 'balance' in relation to design.

Question 7

Marks	0	1	2	3	4	Average
%	17	4	17	31	31	**2.6**

Students who did not select their process from the degree of difficulty list were not awarded any marks. Some students chose a process that they did not understand, such as laminate. High-end responses included a clearly drawn representation of the process, including the tools or machines used, and added annotation to support where and why they would use this process on their product.

Question 8

Marks	0	1	2	3	Average
%	47	21	16	16	**1**

Students were asked to describe which specific aspects of the design option made their product a high-quality product. This question was not well addressed. A number of students did not use processes represented in their design option and were too general. Many were unable to describe details that make a high quality product.

The following is an example of a high-scoring response.

The product will be made to high quality by using good quality materials (poly cotton and lycra) which are strong and durable and will last well. The finishing techniques such as sewing the hem and attaching buttons will be done with care and precision to ensure they are secure. The seams will all be straight by ensuring the line on the sewing machine base is followed during construction. Lastly, all loose threads will be cut off showing the product has a neat and tidy and high quality finish.

Question 9a–d.

Marks	0	1	2	3	4	Average
%	4	11	33	43	9	**2.4**

9a.
D – communicate a clear vision of what quality is and ways it can be achieved

9b.
C – a system of managing the outputs of processes, including goods and services

9c.
D – apply to items made in and also imported into Australia

9d.
D – best addresses all the specifications given to you by the client

Question 10i–ii.

Marks	0	1	2	3	4	Average
%	14	11	29	26	21	**2.3**

10i.
Students needed to state the importance of testing a toile or prototype prior to making the product. Some students did not attempt the question; however, those who did attempt this question answered it well.

The following is an example of a high-scoring response.

> *Testing ensures that the designer has experience with the production processes and reduces the chance of errors in actual production. Evaluation of the toile is also important to identify any aspects which have not been made to the right standard and hence need to be modified/tested again.*

10ii.
This question assessed students' understanding of the importance of end user feedback in the design process. The question was generally well answered, although some students did not attempt it.

The following is an example of a high-scoring response.

> *Testing allows end users to have a physical idea of how the product may be constructed and hence enables the client to give accurate feedback about the elements of the toile that they do not like, such as finishes. These aspects of client feedback may not be able to be obtained from a design.*