PRODUCT DESIGN AND TECHNOLOGY

Written examination

Thursday 3 November 2016

Reading time: 9.00 am to 9.15 am (15 minutes)
Writing time: 9.15 am to 10.45 am (1 hour 30 minutes)

QUESTION AND ANSWER BOOK

Structure of book

<table>
<thead>
<tr>
<th>Section</th>
<th>Number of questions</th>
<th>Number of questions to be answered</th>
<th>Number of marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>13</td>
<td>13</td>
<td>42</td>
</tr>
<tr>
<td>B</td>
<td>13</td>
<td>13</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total 90</td>
</tr>
</tbody>
</table>

- Students are permitted to bring into the examination room: pens, lead and coloured pencils, water-based pens and markers, highlighters, erasers, sharpeners and rulers.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.
- No calculator is allowed in this examination.

Materials supplied
- Question and answer book of 17 pages.
- Detachable design brief insert for Section B in the centrefold.

Instructions
- Detach the design brief insert from the centre of this book during reading time.
- Write your student number in the space provided above on this page.
- You may use diagrams, notes or sketches to help explain your answers.
- Use the space provided in this book for your design brief drawings.
- All written responses must be in English.

At the end of the examination
- You may keep the detached design brief insert.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.
SECTION A

Instructions for Section A
Answer all questions in the spaces provided.

Question 1 (3 marks)
In the correct order, identify three components that are present in a folio that documents the product design process.

1. 

2. 

3. 

SECTION A – continued
Use the following information to answer Questions 2–10.

The Focal Upright Locus Leaning Seat

Due to copyright restrictions, this material is not supplied.

Source: www.touchboards.com/focal-upright-flt-1000-bk-nb/

1homage – respect or reverence paid

Question 2 (1 mark)
The Focal Upright Locus Leaning Seat has been compared to a traditional office chair.
Identify one main difference between a traditional office chair and the Focal Upright Locus Leaning Seat.
Question 3 (2 marks)
Identify one qualitative and one quantitative method of evaluating the Focal Upright Locus Leaning Seat.

Qualitative method

Quantitative method

Question 4 (3 marks)
A prototype of the Focal Upright Locus Leaning Seat has been produced.

Outline three advantages of using a qualitative rather than a quantitative method to research its viability.

Question 5 (4 marks)
Describe how performance and durability (parameters) can determine the quality of the Focal Upright Locus Leaning Seat.

Performance

Durability
**Question 6** (3 marks)
Explain why the Focal Upright Locus Leaning Seat is an example of socially responsible design.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

**Question 7** (2 marks)
Anthropometric data has been used to develop the adjustable seat height of the Focal Upright Locus Leaning Seat.

Define what is meant by anthropometric data.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

**Question 8** (4 marks)
The designer places value on a range of product attributes of the Focal Upright Locus Leaning Seat.

a. List two product attributes the designer would value for the Focal Upright Locus Leaning Seat, excluding performance and durability. 2 marks

1. ________________________________________________________________

2. ________________________________________________________________

b. Select one of the product attributes you have listed in part a. Provide one example of how this product attribute would apply to the Focal Upright Locus Leaning Seat. 2 marks

Attribute ____________________________________________________________

Example ____________________________________________________________
**Question 9** (2 marks)
Computer-aided design (CAD) was used to design the Focal Upright Locus Leaning Seat.

Identify two ways that emerging technologies, such as CAD, could have an impact on how the Focal Upright Locus Leaning Seat was designed.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

**Question 10** (3 marks)
Identify the manufacturing system method that is most suited to producing the Focal Upright Locus Leaning Seat and explain why this method would be the most effective.

Method ______________________________________________________________________

Explanation __________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Question 11 (5 marks)

a. Identify one creative design thinking technique.  
   1 mark

b. Identify one critical design thinking technique.  
   1 mark

c. How does the use of both creative and critical design thinking techniques help the designer to develop and refine their ideas?  
   3 marks

Question 12 (4 marks)

a. Identify two quality measures that could be used in the production process.  
   2 marks

   1. 

   2. 

b. Explain how one of the quality measures you have identified in part a. improves the quality of the production process.  
   2 marks

   Quality measure 

   Explanation
**Question 13** (6 marks)
Discuss how the following product design factors have an impact on each other as a designer develops a product:
- innovation and creativity
- technologies – tools, processes and manufacturing methods

Use only one example of a product to explain your answer.
SECTION B

Instructions for Section B
1. Read the design brief insert.
2. Select one product that you intend to design and answer the following questions.

Tick (✔) the product that you intend to design.

<table>
<thead>
<tr>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>low bench stool and low table</td>
</tr>
<tr>
<td>rubbish bin(s) for recycling and non-recycling</td>
</tr>
<tr>
<td>outfit for international street performer</td>
</tr>
<tr>
<td>wearable adornments for a musician</td>
</tr>
</tbody>
</table>

Question 1 (2 marks)
Identify two constraints or considerations specified in the design brief.

Question 2 (1 mark)
Change one of these constraints or considerations into an evaluation criterion.
**Question 3** (4 marks)
Select one property from the list below:
- elasticity
- absorbency
- hardness

Selected property __________________________________________

a. Describe a test that could be completed on your design to assess the selected property. 2 marks

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

b. What is the significance of the test for your design? 2 marks

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

________________________________________________________________________
Question 4 (18 marks)
Draw and annotate a design option for the product you have selected on page 9. Draw your design on this page.

The product that you intend to design 

-----------------------------
Draw and annotate two processes from your design option.
Include at least one process from the degree of difficulty list in the design brief insert.

Assessment criteria

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i.</td>
<td>innovation and creativity in the design option</td>
</tr>
<tr>
<td>ii.</td>
<td>drawing, in the boxes, communicates how the processes are constructed and includes at least one process from the degree of difficulty list</td>
</tr>
<tr>
<td>iii.</td>
<td>function/suitability of the design option for intended use</td>
</tr>
<tr>
<td>iv.</td>
<td>use of visual, tactile and aesthetic product design factors in the design option</td>
</tr>
<tr>
<td>v.</td>
<td>annotations, on the design option, that indicate how the requirements of the design brief have been met</td>
</tr>
<tr>
<td>vi.</td>
<td>clarity and detail of drawing in the design option</td>
</tr>
</tbody>
</table>
Question 5 (4 marks)
a. Identify two visual, tactile and aesthetic principles from the product design factors that you have used in your design. 2 marks

1. 

2. 

b. Explain how you have used one of the visual, tactile and aesthetic principles identified in part a. to convey food as the inspiration for your design. 2 marks

Principle 

Explanation


Question 6 (3 marks)
Identify the stage of the product design process where a designer would make a prototype or toile and explain why this stage is appropriate.

Stage 

Explanation


Question 7 (3 marks)
Identify and explain the importance of one component you could include in a production plan.

Component 

Explanation


Question 8 (2 marks)
What two actions would ensure that your product meets safety requirements for the end user?


**Question 9** (2 marks)
Your product will need to meet Australian and international standards.

What is the purpose of Australian and international standards?

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**Question 10** (2 marks)
Your product will be mass produced.

Explain how social sustainability could be achieved during production.

---

**Question 11** (2 marks)
List two ways you could ensure the effectiveness and efficiency of your design planning and production activities.

---

**Question 12** (2 marks)
Identify two different ways you could present information about the product’s features to your client.

---
Question 13 (3 marks)
You need to provide the end user with instructions on how to care for your product.
Identify one instruction you would provide and explain its importance.

Instruction ____________________________

Explanation ____________________________

_____________________________________

_____________________________________

_____________________________________
The Melbourne World Street Food Festival is an event that focuses on street food from every part of the world. It is an environmentally sustainable event held in March at Federation Square in central Melbourne. The festival celebrates multiculturalism, and how a diverse range of cultures can work and live together harmoniously.

Festival entertainment will include family-friendly music and interactive events. A party atmosphere will be created with carnival-style visual shows.

The organisers want the products that are used by festival stallholders and performers to represent and promote the traditions of the cultures involved. The organisers have requested that a range of products be developed for stallholders and performers, which use food as the inspiration for the design. Designers are asked to consider the cuisines, foods or ingredients, and traditions of the diverse range of cultures taking part in the festival.

The products must be:

- durable
- family-friendly so that people of all ages can use and/or enjoy them
- eye-catching
- environmentally sustainable.
Select one product from the list below.

<table>
<thead>
<tr>
<th>Low bench stool and low table</th>
</tr>
</thead>
<tbody>
<tr>
<td>• table for two that provides space to support drinks</td>
</tr>
<tr>
<td>• combines two or more materials</td>
</tr>
<tr>
<td>• maximum stool height: 400 mm; maximum table height: 600 mm</td>
</tr>
<tr>
<td>• represents shapes, textures and/or colours that reflect the cuisines, foods or ingredients, and traditions that inspire or make up the dishes sold at the festival</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rubbish bin(s) for recycling and non-recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• combines two or more materials</td>
</tr>
<tr>
<td>• raised 200 mm off the ground</td>
</tr>
<tr>
<td>• measurements of each bin: maximum height: 1000 mm, maximum length: 600 mm, maximum width: 600 mm</td>
</tr>
<tr>
<td>• represents shapes, textures and/or colours that reflect the cuisines, foods or ingredients, and traditions that inspire or make up the dishes sold at the festival</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outfit for international street performer</th>
</tr>
</thead>
<tbody>
<tr>
<td>• three pieces of clothing</td>
</tr>
<tr>
<td>• combines two or more materials</td>
</tr>
<tr>
<td>• made with a form of surface embellishment</td>
</tr>
<tr>
<td>• represents shape, texture and/or colours that reflect the cuisines, foods or ingredients, and traditions that inspire or make up the dishes sold at the festival</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wearable adornments for a musician</th>
</tr>
</thead>
<tbody>
<tr>
<td>• three pieces of adornment: shoulder plate (maximum length: 300 mm front and back), earrings and headpiece</td>
</tr>
<tr>
<td>• combines two or more materials</td>
</tr>
<tr>
<td>• represents shapes, textures and/or colours that reflect the cuisines, foods or ingredients, and traditions that inspire or make up the dishes sold at the festival</td>
</tr>
</tbody>
</table>
Your design should include at least **two** processes with a degree of difficulty; **one** of these processes **must** be from the *degree of difficulty* list below.

<table>
<thead>
<tr>
<th>Metal</th>
<th>Polymers (plastics)</th>
<th>Textiles</th>
<th>Wood/Timber</th>
</tr>
</thead>
<tbody>
<tr>
<td>• bronze brazing</td>
<td>• blow moulding</td>
<td>• boning</td>
<td>• biscuit jointing</td>
</tr>
<tr>
<td>• cold bending</td>
<td>• casting</td>
<td>• buttonhole making</td>
<td>• crossed housing jointing</td>
</tr>
<tr>
<td>• folding</td>
<td>• injection moulding</td>
<td>• collar making</td>
<td>• dovetail jointing</td>
</tr>
<tr>
<td>• forging</td>
<td>• riveting</td>
<td>• cuff making</td>
<td>• housing jointing</td>
</tr>
<tr>
<td>• riveting</td>
<td>• turning (using an engineer’s lathe)</td>
<td>• piping</td>
<td>• mortise and tenon jointing</td>
</tr>
<tr>
<td>• rolling</td>
<td>• vacuum forming</td>
<td>• pleating</td>
<td>• rebate/shoulder butt jointing</td>
</tr>
<tr>
<td>• silver soldering</td>
<td></td>
<td>• pocket making</td>
<td>• routing (decorative edge)</td>
</tr>
<tr>
<td>• turning (using an engineer’s lathe)</td>
<td></td>
<td>• rolled hemming</td>
<td>• spline and mitre jointing</td>
</tr>
<tr>
<td>• welding</td>
<td></td>
<td>• sleeve insertion</td>
<td>• veneering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• surface decoration</td>
<td>• wood turning (using a wood lathe)</td>
</tr>
</tbody>
</table>