

Victorian Certificate of Education
Year

SUPERVISOR TO ATTACH PROCESSING LABEL HERE

STUDENT NUMBER Letter

PRODUCT DESIGN AND TECHNOLOGY

Written examination

Day Date

Reading time: *.*.* to *.*.* (15 minutes)

Writing time: *.*.* to *.*.* (1 hour 30 minutes)

QUESTION AND ANSWER BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of marks
A	13	13	45
B	11	11	45
			Total 90

- 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 15 pages
- Detachable insert for Section B in the centrefold

Instructions

- Detach the insert from the centre of this book during reading time.
- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

At the end of the examination

- You may keep the detached insert.

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

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SECTION A**Instructions for Section A**

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

Question 1 (3 marks)

When applying risk management, there are four steps that help to reduce occupational health and safety (OH&S) hazards and risks. One of these risk management steps is given in the table below.

List the other three risk management steps that should be applied throughout production. The steps do not have to be in order.

	Risk management steps
1	
2	
3	
4	<i>Check controls.</i>

Use the following information to answer Questions 2–8.

The Woobi Play

Scandinavian design team Kilo designed an air filter mask, Woobi Play, for children living in areas with highly polluted air.

According to a report from 2016, more than 300 million children live in areas with toxic levels of outdoor air pollution.



Woobi Play is a modular system. It comes disassembled and with an educational manual. This assists children and parents with putting the parts together themselves. Children are helped to understand the functionality of the product. Children and parents are also encouraged to discuss issues of pollution and protection.

Features

- an approved filter (on the side of the mask with the larger hole) to filter at least 95% of airborne matter
- does not hide the face as many traditional masks do
- made from medical-grade silicone and interchangeable plastic parts

The background research for the product included:

- three-dimensional (3D) scans of more than 1000 children aged 6–14 years to profile their faces
- surveys that revealed parents were more concerned about air pollution than children were.

The Kilo design team tested the product on children during all stages of the process, from design and development to planning and production. Testing of fit and usability (interaction) were important areas of feedback.

Source: Kilo Design <<http://kilodesign.dk/work/woobi>> (image); Kilo Design <<http://kilodesign.dk/work/woobi>> and Core77 Design Awards 2017 <<http://designawards.core77.com/Consumer-Product/64321/Woobi-Play>> (data)

Question 2 (1 mark)

What is the global problem that Woobi Play was designed for?

Question 3 (2 marks)

Who are the end users of Woobi Play?

Question 4 (6 marks)

Research was undertaken to assess the attitudes of parents and children towards traditional air filter masks and other respiratory or health products that require fittings and adjustments.

- a. Develop four survey questions for parents and children that would result in the collection of both quantitative data and qualitative data from potential end users. 4 marks

	Survey question for quantitative data	Survey question for qualitative data
For parents		
For children		

- b. List **two** ways in which the Kilo design team may have collected end user feedback during the design and development and planning and production stages. 2 marks

Question 5 (6 marks)

The Kilo design team explored the use of design elements and principles to make Woobi Play appealing to children and user-friendly.

- a. Identify and describe two design elements in Woobi Play that achieve these aims. 4 marks

1. _____

2. _____

- b. Name **one** design principle that is evident in Woobi Play. 1 mark

- c. How does the principle named in **part b.** work with the two elements identified in **part a.**? 1 mark

Question 6 (2 marks)

Outline **two** attributes of Woobi Play that improve the quality of life of end users.

Question 7 (2 marks)

Explain the primary function of Woobi Play and one secondary function that supports it in meeting its purpose.

Primary function _____

Secondary function _____

Question 8 (5 marks)

The manufacturer of Woobi Play wants to create a product that filters toxic air for children and also wants to manufacture the product in the most sustainable way.

- a.** Outline two aspects that should be considered if the manufacturer chooses the Extended Producer Responsibility (EPR)/product stewardship sustainability framework. 4 marks

1. _____

2. _____

- b.** What role does the consumer play in the EPR/product stewardship sustainability framework? 1 mark

Question 9 (4 marks)

Designers and manufacturers make both 3D mock-ups and prototypes.

Explain the different purposes of a 3D mock-up and a prototype.

3D mock-up _____

Prototype _____

Question 10 (3 marks)

a. Identify **one** form of planned obsolescence.

1 mark

b. What is **one** problem of this form of obsolescence for the manufacturer and **one** problem of this form of obsolescence for the consumer?

2 marks

Manufacturer _____

Consumer _____

Use the following information to answer Questions 11–13.

Plastic materials can now be recycled into outdoor furniture.

The photograph of the beach bench below was taken at a beachside location. Many types of plastics, such as recycled plastic milk containers, are used to manufacture this type of outdoor furniture. The sign on the beach bench in the photograph states the following: ‘This seat contains the equivalent of 2100 plastic milk containers.’



Question 11 (3 marks)

Describe two advantages and one disadvantage of using recycled plastic milk containers in the construction of outdoor furniture.

Advantages

1. _____

2. _____

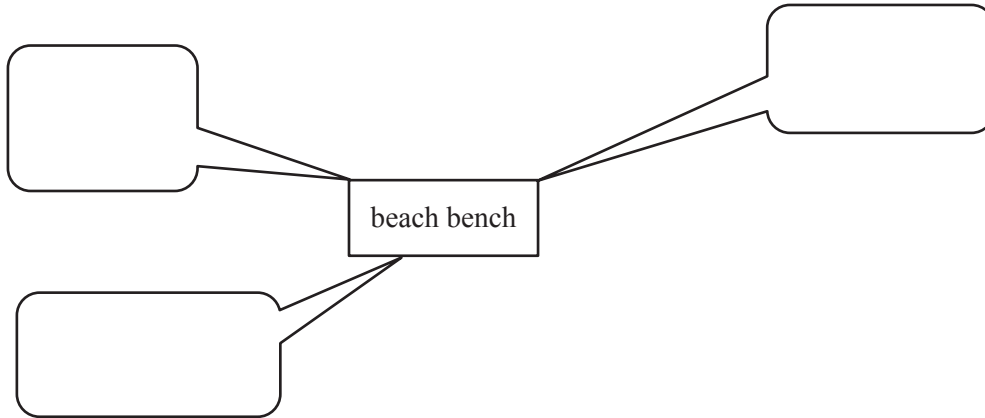
Disadvantage

1. _____

Question 12 (3 marks)

The team designing the plastic beach bench was told it needed to use recycled materials for a bench that could seat three or four people. The team began brainstorming with the use of a concept map.

Complete the concept map below with three ideas for taking advantage of the material's characteristics or properties in the new seat design.



Question 13 (5 marks)

The team designing the plastic beach bench used both creative and critical thinking techniques.

- a. Explain the difference between creative and critical thinking techniques. 2 marks

- b. Give one example of a critical thinking technique and one example of a creative thinking technique that the team designing the plastic beach bench may have used in the development of the product. 2 marks

Critical thinking technique _____

Creative thinking technique _____

- c. During the product development process, many important decisions were made. Identify **one** decision that would have relied on critical thinking by the design team. 1 mark

SECTION B**Instructions for Section B**

Please remove the insert from the centre of this book during reading time.
Use the material provided in the insert to answer the questions in this section.
Answer **all** questions in the spaces provided.

Tick (✓) one product from the list below and use this product to answer the questions that follow.

beach play set or game	
beach picnic set	
adult beachwear (not bathers)	

Question 1 (2 marks)

Devise two questions to be asked of potential end users who would purchase your product at the Woodlane Craft Market.

1. _____

2. _____

Question 2 (10 marks)

You are required to write the specifications of the design brief for your product. The specifications should include:

- a description of the context (the potential end user, purpose and function)
- four relevant product design factors and their associated parameters as requirements for your product.

Design specifications

Outline of context _____

End user _____

Purpose _____

Function _____

Product design factors and associated parameters

	Product design factor	Associated parameter
1		
2		
3		
4		

Question 3 (3 marks)

a. Identify **one** constraint or consideration from your specifications in Question 2. 1 mark

b. List **one** area for research and **one** area for design exploration. 2 marks

Research _____

Design exploration _____

Question 4 (2 marks)

Identify **one** specific material that you will use in your product.

List two characteristics and/or properties of this material that would make it suitable for your product.

1. _____

2. _____

Question 5 (8 marks)

- a.** Draw and annotate two visualisations as a solution for your design option in the boxes provided below. One of the annotations must indicate a joining method.

6 marks

Your response to **part a.** will be assessed against the following assessment criteria.

1	innovation and creativity	2 marks
2	clarity and detail	2 marks
3	suitability/function for intended use of the product	2 marks

- b.** Identify two specific steps and the equipment needed to complete the joining method annotated in **part a.**

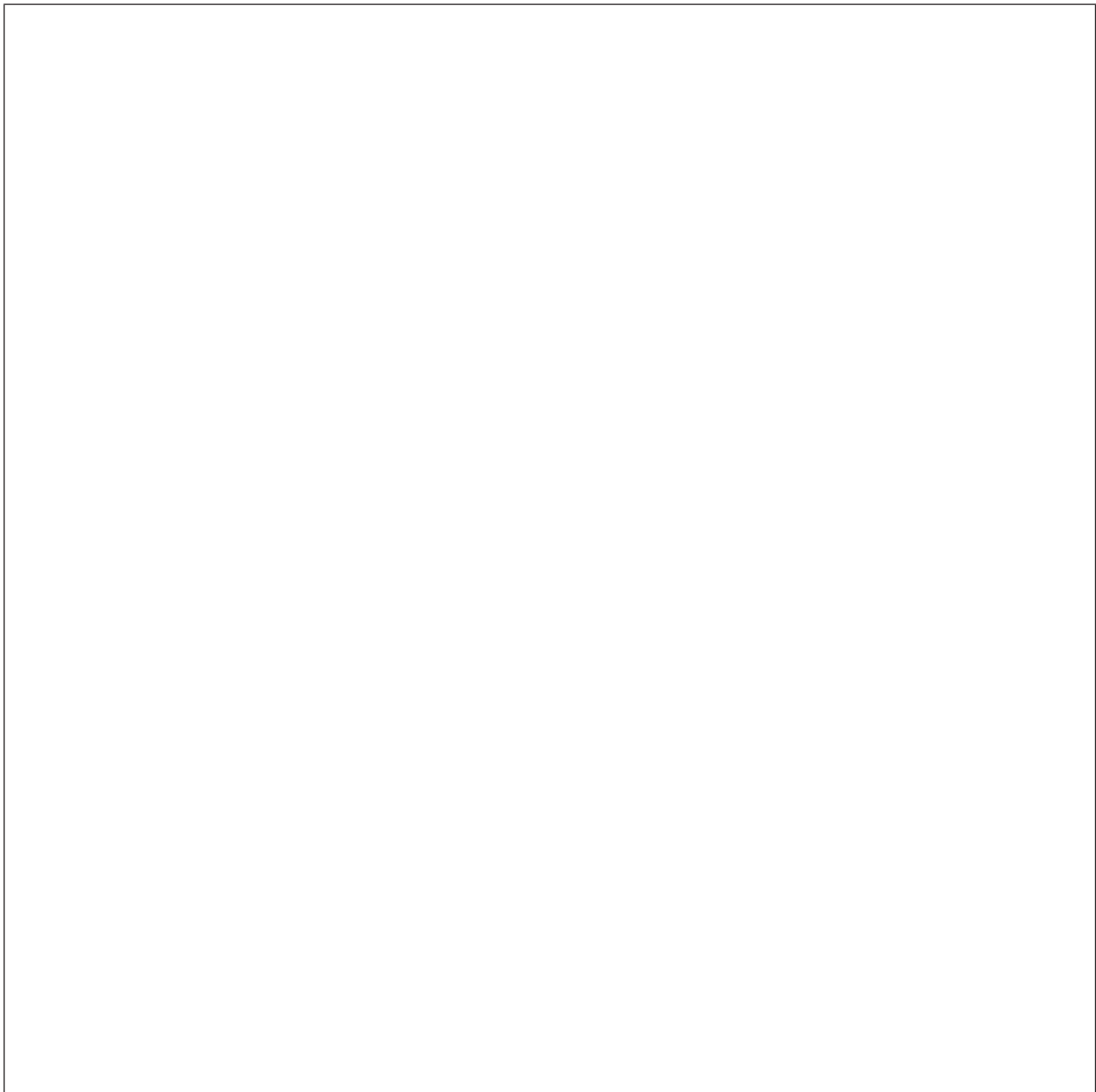
2 marks

Step	Equipment

Question 6 (10 marks)

Draw **one** annotated view of your design option based on the visualisations in **part a.** of Question 5. This drawing should be a three-dimensional (3D) pictorial drawing to show what the whole product looks like. Your response to this question will be assessed against the following assessment criteria.

1	function/suitability and use of visual, tactile and aesthetic parameters in the design option	4 marks
2	four annotations that indicate how the requirements of the design brief have been met	4 marks
3	clarity and detail of drawing	2 marks



Question 7 (2 marks)

How have you met end user requirements in your design option?

Question 8 (2 marks)

List four production steps you would implement for your product.

	Production step
1	
2	
3	
4	

Question 9 (2 marks)

Identify one component of the scheduled production plan and explain its role.

Component _____

Explanation _____

Question 10 (2 marks)

Quality measures will be implemented during the production of your product.

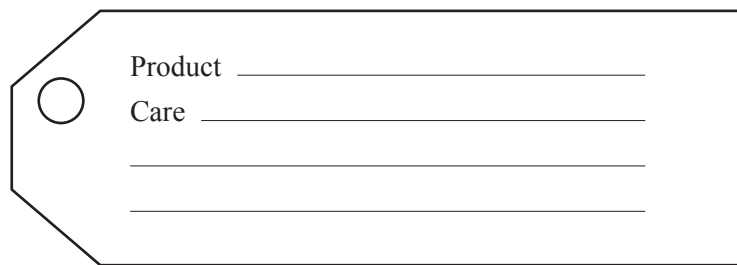
Identify one quality measure that will be implemented and describe how this quality measure would work during the production process.

Quality measure _____

Description _____

Question 11 (2 marks)

On the label below, provide the instructions for the care of your product.



Product _____

Care _____

Insert for Section B

Please remove from the centre of this book during reading time.

Design scenario

Woodlane Craft Market

Woodlane is a coastal town in Victoria with a viable tourist industry. It attracts many tourists due to its beautiful beaches and surrounding natural bushland. Every Sunday morning during summer, Woodlane Council supports a craft market along the foreshore reserve.

Woodlane Council stipulates that the local craft market sell only handmade items. The market has become a very popular way for the community to gather and for craftspeople to sell their wares.

The council has decided that the market should showcase designs from Woodlane Secondary College in order to encourage students to be future stallholders. The council wants each current stallholder to showcase a product designed by a student.

Stalls at the market sell children's games and play sets, picnic sets and beachwear.

The product concept designs required must:

- be original, creative and innovative
- incorporate **two or more** materials
- reflect **at least one** feature of the local coastal environment.

Select **one** product from the list below.

Product 1

Beach play set or game
<ul style="list-style-type: none">• for use by two or more people
<ul style="list-style-type: none">• suitable for ages six and upwards

Product 2

Beach picnic set
<ul style="list-style-type: none">• includes a container to carry the set
<ul style="list-style-type: none">• suitable for four people

Product 3

Adult beachwear (not bathers)
<ul style="list-style-type: none">• suits a range of sizes and is easy to try on (no changing facilities)
<ul style="list-style-type: none">• incorporates a 'sand-proof' and secure pocket for delicate items

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