2011 Assessment Report

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2011 Food and Technology GA 3: Written examination

GENERAL COMMENTS

The 2011 examination assessed students' knowledge and understanding of Unit 3, Areas of Study 1, 2 and 3, and Unit 4, Areas of Study 1 and 2. All key knowledge and skills that underpin the outcomes were examinable.

The paper consisted of two parts. Section A contained 15 multiple-choice questions and Section B contained six short answer questions, apart from Question 3 which required an extended response.

This report should be read in conjunction with the 2011 Food and Technology examination paper.

Strengths and weaknesses

Strengths

- understanding the role of market strategies
- understanding the requirements of labelling
- understanding the role of marketing considerations: place, promotion, product and price
- understanding the role of the Australian Quarantine and Inspection Service (AQIS) in ensuring safe food for Australian consumers
- demonstrating an understanding of health and safety practices in food storage and preparation
- demonstrating an understanding of correct personal hygiene practices in food preparation and processing
- understanding the effect of the disposal of packaging on the environment
- understanding functional foods
- understanding the preservation method of dehydration

Weaknesses

- providing answers that were irrelevant or not directly related to the question asked
- not giving examples for specific questions when required
- not reading the information provided in the question and relating the answer to this information
- not understanding new technological developments in the food industry
- not understanding the key stages in the process of food product development
- not understanding what constitutes an 'ethical consideration' in the marketing of a food product
- not understanding or difficulty describing environmental issues in food production and their impact on the environment
- not understanding the reasons for farmers adopting organic farming methods
- not explaining the responsibilities of Food Standards Australia New Zealand (FSANZ) and its role in developing the Food Standards Code
- not explaining the Hazard Analysis and Critical Control Point (HACCP) system and its role in ensuring safe food production
- not explaining functional roles of the natural components found in key foods in food preparation and processing
- not understanding the system of aseptic packaging
- not explaining complex processes used in food production
- not identifying or difficulty describing wet and dry methods of cooking
- not understanding terms used in the study design; for example, strategies, sensory properties, product development, functions and design process

SPECIFIC INFORMATION

Note: Student responses reproduced herein have not been corrected for grammar, spelling or factual information.

For each question, an outline (or answer) is provided. In some cases, the answer given is not the only answer that could have been awarded marks.

Section A – Multiple-choice questions

The table below indicates the percentage of students who chose each option. The correct answer is indicated by shading.

Question	% A	% B	% C	% D	% No Answer	Comments
1	3	2	92	2	1	
2	12	81	4	3	0	
3	3	87	6	3	0	
4	78	9	6	7	6	Primary processing of apples includes picking, washing and grading for size (option A). The other options included secondary processing methods.
5	23	55	7	14	16	The quantitative analysis of a food measures its viscosity, shelf life, nutrient content, weight and volume (option B). It is not a measure of any sensory properties, which were included in other options.
6	8	58	26	8	3	Overuse of pesticides and over spraying of chemicals in primary food production can result in harmful runoff into rivers and creeks (option B). The other options related to land use.
7	8	17	15	61	4	Modified Atmosphere Packaging (MAP) is a suitable system for packaging fresh fettuccini (option D). The atmosphere within the packaging is altered or modified to extend the shelf life of fresh products that are usually stored in the chiller section.
8	1	1	1	97	0	
9	12	9	78	1	2	By law, a food label must contain any mandatory warnings (option C). The other options may appear on labels but are not mandatory.
10	5	9	4	82	2	
11	74	4	9	14	2	Acids are important ingredients in marinades used in meat recipes. They assist by softening the connective tissue (option A).
12	11	11	68	10	3	Maillard reaction during food preparation involves sugar or starch and protein and dry heat. This is the reaction that may occur during baking cakes, biscuits and yeast products.
13	5	5	11	79	1	
14	74	7	2	17	4	'Ethical considerations' in marketing means taking into account what is seen to be morally correct (option A).
15	2	11	85	1	1	

Section B

Question 1a.

Marks	0	1	2	Average
%	3	16	81	**1.8**

Other than hand washing, personal hygiene practices that should be carried out when working with food include (two of):

- tie back long hair; wear a hair net/beard net to stop any loose hair from falling into food
- no jewellery – for example, rings, earrings, facial piercings, bracelets, watches, etc. – as it traps food particles
- fingernails should be short, no nail polish or nail extensions
- always wear a clean apron, chef's jacket or other protective clothing
- clean and cover cuts/grazes with clean, waterproof dressing and cover with a disposable glove.

An answer that included only hand washing did not receive any marks.

Question 1bi–ii.

Marks	0	1	2	3	4	Average
%	5	12	27	25	30	**2.7**

1bi.

Cross-contamination (one of):

- of food involves the transfer of harmful bacteria from uncooked or raw food to food that has already been cooked or prepared
- is the transfer of harmful bacteria to food by contact with another food or a chopping board/equipment or hands that have not been cleaned thoroughly.

Students needed to indicate clearly that harmful bacteria are transferred from a source to another food.

1bii.

In responding to this question, students needed to include two different causes of cross-contamination. Suitable responses could have included two of the following:

- storing raw and cooked ingredients together
- using the same equipment, such as a chopping board and knife to prepare raw chicken and other ingredients without washing the equipment after each task
- not cleaning hands thoroughly before starting to work with food
- not cleaning the sink in between uses; for example, if celery is rinsed and dirt is removed
- double-dipping – using the same spoon to taste food and then to mix/stir the food
- using dirty tea towels or sponges – provides a moist environment and trapped food particles can spread bacteria over surfaces/equipment.

Question 1c.

Marks	0	1	2	3	4	Average
%	46	8	14	12	20	**1.5**

A suitable response would have included two of the following HACCP system steps:

- analyse hazards – identify hazards in food production, which may include storage of ingredients, cooking of food or storage temperatures and use of chemical cleaners
- identify critical control points – identify the point at which important things can go wrong; for example, temperature control, cleaning
- set limits for critical control points – including the acceptable temperature range for cooking and storage
- monitor critical control points – establish a system for checking so that the limits set are not exceeded
- corrective action – what to do if something goes wrong; for example, how to dispose of contaminated food
- keep records – for auditing purposes, check for improvements
- verify HACCP system is working – review the system on a regular basis, amend and update if necessary.

This question was generally poorly answered.

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

Step. *Identify critical control points.*

Explanation. *Allows the establishment to anticipate where things might go wrong – the high risk areas e.g. freezers and fridges not working correctly.*

Step. *Monitor the critical control points*

Explanation. *By checking the control points the café can ensure that they are kept within the critical limits and prevent any hazards from occurring and ensure safe food for the consumer.*

Question 1d.

Marks	0	1	2	3	4	Average
%	19	11	27	17	27	2.2

A suitable response could have included two hazards and the related corrective action from the three stages given in the question.

Stage in production	Hazard	Corrective action
1. Delivery of raw ingredients	Ingredients delivered may be out of date.	On delivery, check use-by or best-before date to ensure goods are not out of date and discard if they have passed their use-by or best-before date.
	Vegetables may be contaminated by soil or insects.	Wash all vegetables thoroughly before use to remove any soil or insects.
	Minced chicken or beef may be in the 'danger zone' (above 4 °C and below 60 °C) when delivered.	Check temperature of cold ingredients; contact supplier and discard any that are in the danger zone.
	Packaging of dry ingredients; for example, flour, spices may be damaged during delivery – possible contamination.	Check packaging and seals to ensure there is no damage; contact supplier and discard or do not accept any that are damaged.
2. Storage of ingredients	Perishable ingredients such as chicken, beef and vegetables may not be refrigerated or the refrigerator may be set at the incorrect temperature or may not be working correctly.	Check that the refrigerator is operating at below 5 °C on a daily basis and dispose of any food not refrigerated appropriately.
	Bread rolls not stored in a clean environment – dust, vermin and insects can cause possible contamination.	Store in cool, dry storage area; store in an airtight container off the floor.
3. Cooking of the chicken and beef patties	Café staff may not follow correct hygiene procedures when cooking the burger patties.	• Ensure premises and equipment are cleaned according to the Food Safety Program. • Keep food out of the danger zone during preparation; only remove from the refrigerator just before use.
	Burger patties may not be cooked through and may contain food poisoning bacteria; for example, salmonella.	Ensure burger patties are thoroughly cooked – check internal temperature with a food probe, check that juices run clear or that patties have changed colour throughout.
	Holding temperature may not be adequate or the cooked burgers held too long before sale.	Check that the holding temperature in the bain-marie is above 60 °C and discard any burgers that are not sold within the safe holding time.

Question 2a.

Marks	0	1	2	Average
%	9	27	65	**1.6**

Suitable responses could have included two of the following marketing strategies:

- point of sale tastings – staff offer tastings to potential customers in a supermarket
- two-for-one offer – consumers buy a packet of the cookies and get a second packet free
- free samples of the cookies are included in magazines or in a letterbox drop
- nutrition campaign – an information campaign on billboards highlighting that the cookies are enriched with vitamins A and B
- tie-in promotion – the vitamin-enriched cookies are combined with a free snack box and are packaged together and sold at a special price
- celebrity endorsements – using a sporting personality to promote the new cookies, focusing on their health benefits.

Students were required to describe two marketing strategies other that advertising in newspapers, magazines and on television.

Question 2b.

Marks	0	1	2	Average
%	8	26	65	**1.6**

Suitable responses could have included two of the following marketing considerations:

- product – consumers become aware of the packaging and size, shape and other physical characteristics of the cookies; for example, a small size suitable for children, possibly packaged in individual serves
- place – the location from where the consumer can purchase the cookie and see the advertising; for example, placing the cookies at the front of the store so that they are easily seen when parents are shopping for snacks to include in their children's lunchboxes
- promotion – the cartoon character and the vitamin enrichment would be clearly evident on the packaging of the product and in any promotional material so that it draws the children's attention towards it. The product may be advertised during the cartoon
- price – the cookie should not be too expensive as this may deter parents from purchasing the product. It needs to be comparable with similar products that may be considered a snack product, such as muesli bars or crisps.

Question 2c.

Marks	0	1	2	Average
%	36	42	22	**0.9**

A target market consists of a group of consumers who have similar wants and needs and will likely buy similar products, whereas a niche market consists of a smaller group within the target market with specialised needs and wants.

Students were required to explain the difference between the two types of markets to receive full marks.

Question 2d.

Marks	0	1	2	3	Average
%	47	23	17	12	**1**

A suitable response could have included one of the following ethical considerations that the manufacturer should consider:

- the use of cartoon characters to promote the cookies is a persuasive method as many children relate to their favourite cartoon character. However, such a strategy may be unethical as in general children do not have the critical literacy skills to be able to recognise the persuasive content of the advertising
- the time advertisements are shown – it would be unethical to screen the advertisements during peak viewing time (for example, between 6.00 pm and 9.00 pm) for school-aged children. During this time slot, most children watch television and seeing these advertisements could encourage children to 'pester' their parents to buy a product such as the cookies, which may be energy-dense

- although it is stated that the cookies contain added vitamins A and B, they would still be high in fat and sugar. Therefore, inferring that the consumption of these vitamins will improve or ensure good health would be unethical as the vitamin content would be low in comparison with the higher amounts of fat and sugar they contain. This could add to the growing concern of increasing weight in children.

This question was generally poorly answered.

Question 2e.

Marks	0	1	2	Average
%	30	47	24	**1**

A suitable response could have included two of the following functions of fat:

- aeration – incorporates and holds air bubbles in a creamed mixture, giving a lighter texture to both cakes and biscuits
- shortening effect – tenderises the gluten strands to give a short texture
- keeping qualities – are improved, provided correct storage is used to prevent cakes or biscuits from becoming stale or dry
- sensory properties – fat gives both cakes and biscuits a buttery taste, a moist texture and a smooth mouth feel
- moist texture in cakes
- crispness – biscuits
- colour – Maillard reaction in both biscuits and cakes.

Question 2f.

Marks	0	1	2	3	Average
%	40	23	21	16	**1.1**

A suitable response could have included one of the following roles for each authority.

Federal/National authority

- Food Standards Australia New Zealand (FSANZ) develops the Food Standards Code from which the states develop their food Acts, which control the manufacture of food in Australia.
- FSANZ has developed Food Standard 3:2:1 to ensure all food in Australia is produced safely.

State authority

- The Victorian Government developed the *Food Act* 1984 and the *Food (Amendment) Act* 1997 to ensure a safe food supply. These outline the legal responsibilities of all food manufacturers and retailers in Victoria.
- The Department of Human Services (DHS) makes guidelines readily available so that food businesses can register their food safety program.
- Auditing of food safety programs – DHS will establish guidelines for auditors to follow when they review the food safety program of the cookie manufacturer.

Local authority

- Registration of food businesses that have an approved food safety program.
- Employment of environmental health officers who inspect food premises on behalf of local councils and check the proposed food safety program.
- Inspection of all food premises on an annual basis by environmental health officers.

Question 2gi.–ii.

Marks	0	1	2	3	Average
%	27	18	31	24	1.5

2gi.
The full name of the statutory body responsible for protecting Australian consumers from the importation of unsafe food from overseas is the Australian Quarantine Inspection Service.

The acronym AQIS did not receive any marks; students were required to write the name in full.

2gii.
A correct response could have included two of the following ways the importation of food products into Australia is monitored:

- raw and processed food products that are imported into Australia are inspected to make sure the food complies with the regulations of the Australian Food Standards Code
- AQIS inspection operates at all international airports and seaports and outlines all food products that must be declared
- quarantine inspections at all borders – Declare and Beware program that operates at all international airports and seaports
- trained dogs are used to identify passengers who are carrying undeclared food items.

Question 3

Marks	0	1	2	3	4	5	6	7	8	9	Average
%	41	9	11	10	7	6	6	4	3	2	2.3

A correct response could have included three of the following key stages in the development of Heidi's Breads.

Market research
Research is important as it provides Heidi's Breads with information about the type of product required and whether there will be a market for the new product. Heidi's Breads collects and analyses information from a range of primary and secondary sources to assist them in their product development. Their research may have shown that consumers have a better understanding of the relationship between diet and good health and have therefore demanded a healthier style of bread; for example, one with a higher fibre content or a lower glycemic index. Another driving force identified by Heidi's Breads may have been the demand for bread packaged in smaller sizes as there are now many more one- or two-person households. Other research has indicated that consumers are demanding that manufacturers consider environmental issues such as using organic or traditional seeds such as flaxseed.

Design brief
The design brief defines the aims or intentions of the new product and contains all of the specifications (considerations and constraints) set by Heidi's Breads. A clear design brief is essential to Heidi's Breads as it will ensure there is no misunderstanding during the design and development of the new product. In this case, the design brief for the new bread would include specifications such as the new bread should contain a variety of whole grains and flaxseeds. A further specification is that the bread is packaged in a smaller size and be higher in fibre than traditionally packaged sliced bread.

Criteria for evaluation
Criteria for evaluation ensure that the product meets the needs outlined in the design brief that Heidi's Breads has established and will therefore be a successful solution to the problem in the brief. Evaluation questions are developed that are based on the specifications in the design brief established by Heidi's Breads. For example:

- Does the bread contain a variety of whole grains and flaxseeds?
- Is the bread packaged in a smaller size than traditionally packaged sliced bread?
- Is the fibre content of the bread higher than traditionally packaged sliced bread?

New product ideas (screening of ideas)
This is a brainstorming stage that investigates new product ideas and alternatives. A design team will develop three or four ideas for new breads that use a variety of whole grains and flaxseed, have an increased fibre content and can be successfully packaged in smaller sizes. A part of this process will be to screen the ideas against specific criteria to determine those that meet the specifications set out in the design brief. For example, some mixtures available from

cereal grain wholesalers may not contain flaxseed. From these new ideas, a decision is made about the bread that will provide the best solution to the problem outlined in the design brief.

Prototype
The development of a prototype ensures that the product is viable and that any problems detected can be overcome before Heidi's Breads begins major production. During this process, a sample product is produced on a very small scale. This enables the production team to evaluate a range of areas such as whether the flaxseeds and whole grains are in the correct proportion. They will also measure the fibre content of the prototype to make sure it is higher in fibre and conduct a sensory analysis test to ensure that its appearance, aroma, flavour and texture are acceptable. The prototype will also be tested to check that the smaller size is able to be successfully sliced and packaged, and that other physical properties such as shelf life are acceptable. During this process, the team will also evaluate the suitability of the equipment available and whether the staff of Heidi's Breads has the necessary experience or whether training will be required. Appropriate packaging materials may also be considered at this stage.

Production
This stage ensures that Heidi's Breads are able to successfully and safely produce the new 'Wholegrain & Flaxseed' bread using full-scale equipment. Before full production takes place, Heidi's Breads will develop a Hazard Analysis and Critical Control Points (HACCP) system to ensure that the new 'Wholegrain & Flaxseed' bread is produced safely. During production, the process of making the new wholegrain and flaxseed bread is constantly monitored to ensure, for example, that the ovens are operating at the correct temperature and there is a consistency between all loaves of bread.

Packaging and labelling
This stage ensures all key information about the new 'Wholegrain & Flaxseed' bread is accurate and clearly evident to consumers and that the packaging is eye-catching, appealing and will promote the product. The company must follow all of the Food Standards Australia New Zealand regulations when labelling their new 'Wholegrain & Flaxseed' bread. The company designs and produces the packaging to protect, preserve and contain the product during storage, transportation, and delivery and to communicate information about the product to the consumer; for example, the inclusion of whole grains and flaxseed and the higher fibre content.

Marketing
This stage creates interest in the new 'Wholegrain & Flaxseed' bread to encourage consumers to buy the product. The company will develop a marketing strategy for their new 'Wholegrain & Flaxseed' bread based on the '4 Ps': product, place, price and promotion. It will include the product launch and may include intensive advertising to their target market. For example, they have point of sale tasting booths, in-store two-for-one offers or an online nutrition campaign highlighting the increased fibre and wholegrain content. These campaigns are aimed at the consumer becoming a repeat purchaser, thereby ensuring a profit for the company.

Students need better preparation for providing extended responses as this question was poorly done.

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

Heidi's bread would have created a design brief to entail all of the specifications (considerations and constraints) to provide a guideline for the final product. This would also provide structure for evaluation questions when selecting/creating a product, and when it is finalised. The design brief would include her consumers' changing needs, the variety of grains, specifically flaxseed, and the possibility of the bread being available in a smaller size. This provides restrictions and things to consider in the process of food product development.

Heidi's bread would have needed to create a prototype of the product. This is the 'finalised product' produced on a small scale, to enable the manufacturer to see if they have the appropriate equipment, employees have the skills and ingredients are available that are needed to produce the product. It would also give them a small scale idea of the nutrient content and sensory properties of the new bread product. In this stage Heidi's bread would be able to clearly see whether or not the bread had higher fibre content, as it must to meet the design brief. The prototype stage allows the manufacturer to make adjustments to the product if necessary before the final product is produced on a commercial scale.

Heidi's bread would lastly have undergone the marketing stage of product development. Here the manufacturer would be required to find the appropriate price, place and possible promotion strategies for the new bread. They would refer back to the design brief at all stages, to see if all the changing consumer demands researched and included are accounted for. They would brainstorm and create advertisements to promote the new bread to the target/niche market. They would place a price on the bread that was affordable to the target market but also covered Heidi's manufacturing/marketing costs and place the bread for sale in an appropriate place that the target market would go. This could be the bread section of the supermarket, shopping malls

or delis and they may offer samples to taste in these stores to promote the new bread. This marketing stage is all about the promotion of the product and ensuring that consumers can buy it and will continue to do so.

Question 4a.

Marks	0	1	2	3	4	Average
%	24	12	23	14	28	2.1

A suitable response could include the identification and explanation of the role of two of the following driving forces in the development of the smoothie:

- health concerns – many consumers are now concerned about preventing many diet-related diseases such as obesity and so have demanded foods such as the MooFru smoothie that have health benefits, including being low in fat and high in fibre, protein and calcium
- increased demand for convenience – as many consumers are now living in smaller or one-person households they now demand drinks such as the MooFru smoothie that are available in small portions and resealable, therefore reducing wastage
- time-poor – consumers such as young adults and adolescents who have busy lifestyles are often time-poor and demand foods that they can eat 'on the go' and are also more likely to 'graze'. The MooFru smoothie may be suitable to eat as a breakfast food on their way to school/university/work
- increased knowledge – many consumers now have increased knowledge of diet-related diseases that have links between food consumption, good health and prevention of diseases. They are looking for food products that are nutrient fortified to address health concerns (for example, ageing population – high fibre = decrease risk of bowel cancer, high calcium = decrease risk osteoporosis)
- changes in technology – new developments in processing technology including membrane technology have enabled the production of new food products such as the MooFru smoothie that has improved sensory and chemical properties such as lower fat content, increased fibre, protein and calcium
- changes in technology – developments in packaging technology, such as aseptic packaging, means that the MooFru smoothie has an extended shelf life, which is convenient for consumers.

Question 4bi.–ii.

Marks	0	1	2	Average
%	25	32	44	1.2

4bi.

Functional foods are any food or ingredient that may provide a health benefit beyond basic nutrition. For example, adding omega 3 to a food that does not usually contain this nutrient.

4bii.

The MooFru smoothie is a functional food as the label states that it is 99 per cent fat free, is high in fibre and has additional calcium. Fresh milk usually has a higher fat content than the MooFru but does not contain any fibre. Therefore, this milk drink provides additional nutritional benefits beyond those usually found in regular cow's milk.

Question 4ci.–ii.

Marks	0	1	2	3	4	5	6	Average
%	21	13	14	15	15	11	11	2.7

4ci.

Aseptic packaging involves independently sterilising both the food and the packaging, and then filling and sealing the product/package in a sterile environment.

4cii.
A suitable response could have included two of the following benefits to the manufacturer and consumer.

Manufacturer	Consumer
• preformed materials are resistant to light, therefore the product will have a longer shelf life • no reactive materials used, so suitable for a wide range of products • suitable for liquids and semi-liquid foods • headspace is possible, so products can be shaken • efficient and stable shape for storage • lightweight and strong materials for distribution • large flat surface areas for printing information	• no preservatives needed, therefore improved health benefits • natural flavour and colour are maintained • nutrient value is maintained • product has an extended shelf life before opening • no refrigeration required until after opening • efficient and stable shape for storage

Some answers could be used for either the manufacturer or the consumer but were only accepted once.

Question 4d.

Marks	0	1	2	Average
%	20	47	32	**1.1**

If packaging is not reused or recycled it is often disposed of, which can create environmental concerns about the amount of waste sent to landfill or creating litter (for example, unsightly, harmful to animals). Some packaging materials are not biodegradable and can take hundreds of years to break down.

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

Food packaging has become a major problem in Australia as it contributes to landfill if it is not biodegradable and does not break down for many years. It often ends up in our waterways as litter.

Question 5a.

Marks	0	1	2	3	Average
%	42	23	21	15	**1.1**

A suitable response could have included three of the following points describing how food is processed using a high pressure processing system:

- food is processed using a system of cold pasteurisation
- pressure is applied evenly/uniformly from all sides/all directions
- food is processed in its final packaging, usually a flexible container
- products are placed in a high pressure chamber which is then filled with water to surround the product
- pressure in the water is increased, which is transferred to the product; uses water surrounding the product and in the food to conduct the pressure
- pressure is intense (600 Mpa or 6000 times the air pressure at sea level)
- pressure is applied for 2–5 minutes.

Generally, this question was not well answered.

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

The food is placed in a flexible (usually plastic) container and submerged in a chamber of water. The food is subjected to high amounts of pressure from all sides, which kills most bacteria, yeasts and mould organisms. It is a form of cold pasteurisation.

Question 5b.

Marks	0	1	2	3	Average
%	24	26	30	21	**1.5**

A suitable response included three of the following advantages of high pressure processing to consumers and/or producers:

- extended shelf life
- shelf stable for longer; less waste for producers
- no distortion to the shape of the food, therefore retains sensory properties of appearance
- retains flavour – flavour molecules are not affected so food/fruit retains its 'just picked' taste
- it is a cold treatment, therefore heat-sensitive nutrients (especially vitamin C) are not destroyed
- cold pasteurisation does not affect colour molecules; has better sensory properties
- no additives required to preserve the product so 'clean' labelling, which is of benefit to consumers
- inactivates microbes.

Question 5c.

Marks	0	1	Average
%	70	30	**0.3**

Food products that can be processed using high pressure processing include (one of):

- avocado
- dips such as guacamole/salsa
- mayonnaise
- egg products
- fruit purees
- sliced meats
- apple sauce
- fresh curd cheese
- oysters
- cooked meats
- potato or egg salad.

Green, leafy salads are not a suitable example of food processed using high pressure processing.

Question 5d.

Marks	0	1	2	Average
%	30	41	29	**1**

A correct response could have included some of the following reasons farmers may adopt organic farming:

- organic farming methods are based on sustainable farming practices
- enable farmers to reduce the use of chemical fertilisers, therefore being beneficial for the environment; for example, no runoff into streams and waterways
- improve the fertility of soil through practices such as crop rotation or the use of organic, compostable material
- increased demand for organic foods they produce because consumers feel they have better sensory and nutritional properties
- livestock can be raised in stress-free conditions without the use of antibiotics or growth hormones
- crop diversity increased by using traditional seed varieties.

The following is an example of a good response to this question.

> *Organic farming has a positive effect on the environment; therefore farmers will have healthier crops/pastures from crop rotation. Farmers may be concerned with the changing effects of herbicides and pesticides which can contaminate fresh water systems.*

Question 5e.

Marks	0	1	2	3	Average
%	46	25	17	12	**1**

A correct response required students to select one of the environmental issues listed and could have included the following.

Energy use

The use of energy can include the use of non-renewable resources – coal and gas. This has a substantial impact on the environment; for example:

- it can increase the production of greenhouse gases – methane and nitrous oxide during the production process, therefore an increase in the carbon footprint of the product
- energy is used in all stages of the manufacturing process – preparation, cooling, storage, heating water for sanitation purposes
- energy is used in the production of packaging
- transportation of ingredients to manufacture food; for example, the delivery of the completed food product to the point of distribution all involve the use of energy, such as oil or gas
- energy is also used in the retail sector for refrigeration and storage of food and the lighting of premises.

Water usage

Water is becoming an increasingly scarce resource. The scarcity of water means that food manufacturers need to consider more sustainable food production processes.

- Water may be used for washing or preparing raw ingredients before being used in the preparation of the food item.
- A significant amount of water is also used in cleaning and sterilising equipment or in cooling processes during production.

Production of waste

The production of waste in food manufacturing has become an environmental issue; for example:

- some waste is inevitably created as a result of food manufacture; for example, fruit, vegetable and meat trimmings.
- much of the waste ends up in landfill that may be on the outskirts of cities and towns
- food waste/organic material creates methane as it breaks down
- methane (a greenhouse gas) is released into the atmosphere and gives off a strong and unpleasant odour. It can also leach into groundwater supplies
- the use of fuel for transport vehicles also creates greenhouse gases when the food waste is moved from the manufacturing plant to the landfill site, contributing to environmental pollution.

Students were required to discuss one of the issues above in detail, not a combination of the issues.
This question was generally not answered successfully.

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

> *The production of waste from food manufacturing can have detrimental effects on the environment by contributing to the unsustainable practice of landfill. The waste products can also produce biogases such as methane which is harmful to the atmosphere. Many un-renewable sources such as petrol are used to manage these waste products e.g. trucks and machinery that are operating on tip sites and trucks used to deliver the waste to the tip site.*

Question 6a.

Marks	0	1	2	3	Average
%	56	18	15	11	**0.8**

The protein undergoes denaturation and coagulation. This creates a permanent structural change in the protein in the salmon; for example, from a liquid or soft flesh to a firm, flaky flesh and is the result of dry or moist heat. The colour changes and the salmon may shrink in size.

Overall, this question was not answered successfully.

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

When cooking the salmon the protein denatures and causes the salmon to become firmer and flakier. The fibres within the fish break down. The fish also changes colour from a translucent pink to an opaque pink and shrinks in size.

Question 6b.

Marks	0	1	2	3	Average
%	51	21	18	10	**0.9**

Taste test or preference test – this can be done using expert tasting panels or a group of consumers who have recorded their ranking of a product. After the salmon has been tasted it can be rated using a five-point scale – with 5 being the highest score where the salmon was liked a lot or 1 where the salmon was disliked – and the results recorded on a table.

One mark was awarded for the name of the test and two marks were awarded for a detailed description of the test.

Question 6c.

Marks	0	1	Average
%	80	20	**0.2**

The process that occurs when stock is absorbed by rice during cooking is gelatinisation.

This question was answered poorly.

Question 6di.–ii.

Marks	0	1	2	3	4	Average
%	23	15	25	19	18	**2**

A correct response could include the identification and description of the following Wet and Dry methods of cooking used in the risotto:

	Identification of method	Description of method
Wet method of cooking	Simmering	Allowing the rice to cook just below boiling point
Dry method of cooking	Sauté	Cooking the onions gently in a small amount of oil, without gaining colour

Questions 6ei.–iii.

Marks	0	1	2	3	4	5	6	Average
%	19	11	18	18	16	9	9	**2.7**

6ei.

A complex process requires judgment(s)/decisions to be made during the making of a food item that will directly affect the final outcome of the food item.

6eii.

A correct response could include one of the following steps:

- sautéing the onions enhances flavour development of the final product
- coating the rice evenly with the oil before adding the stock allows the rice to begin cooking evenly and begins releasing the starch, resulting in a creamy texture
- the addition of hot stock at each stage as the hot stock prevents the cooling down of the rice mixture and allows absorption and gelatinisation to continue evenly
- simmering of stock and rice allows the grains to absorb the stock gradually and to swell slowly, and for the starch to gelatinise and the grains to cook through.

6eiii.

A correct response could include one of the following:

- Saucepan or frying pan
  - ensure the saucepan/frying pan is the correct size for the gas burner/hotplate and is not too small or does not overhang the burner
  - keep handles of the saucepan/frying pan turned inwards/to the side away from any walkways

  - never leave the saucepan/frying pan unattended while sautéing to prevent the oil from catching fire
  - if the saucepan/frying pan catches on fire, turn off the heat source and cover the fire with a fire blanket or lid to cut off the supply of oxygen
- Wooden spoon – ensure the wooden spoon is clean before use by washing in warm soapy water. Do not taste test the risotto using the spoon used for stirring the risotto as this may lead to contamination – 'double-dipping'.
- Ladle/ jug – ensure the ladle/jug is:
  - heat-proof
  - clean before use by washing in warm soapy water.
- Oven mitts – use an oven mitt to handle the hot saucepan/frying pan to prevent burns.

Question 6f.

Marks	0	1	2	Average
%	36	47	17	**0.8**

Freezing is a method that allows foods to be stored on a long-term basis. Food is stored at very low temperatures (around −18°C) where the growth of microbes is stopped and the chemical and enzymatic changes are slower. Foods with low water content freeze more effectively.