



**2009 Food and Technology GA 3: Written examination**

**GENERAL COMMENTS**

The 2009 examination was designed to assess students' knowledge and understanding of Unit 3, Areas of Study 1, 2 and 3, and Unit 4, Areas of Study 1, 2 and 3. All key knowledge and skills that underpin the outcomes were examinable.

The seven examination assessment criteria listed on page 23 of the *Food and Technology Assessment Handbook* were drawn from the six areas of study. The paper consisted of seven short answer questions that were based on the criteria.

**Areas of strengths and weakness**

**Strengths**

- understanding the requirements of labelling
- understanding the role of considerations and constraints found within a design brief
- explaining the difference between primary and secondary processing
- demonstrating an understanding of health and safety practices in food storage and preparation
- understanding food sensitivities and their impact on the consumer
- understanding the role of the design brief in planning, production and evaluation activities
- understanding and identifying marketing strategies used in food promotion
- understanding the types of production systems and their benefits to the manufacturer

**Weaknesses**

- providing answers that were irrelevant or not directly related to the questions asked
- not giving examples when required by specific questions
- not reading the information provided in the question and relating the answer to this information
- understanding new technological developments in the food industry
- understanding what constitutes 'health claims' and 'novel foods'
- understanding and describing environmentally friendly farming practices and their impact on the environment
- explaining the advantages and disadvantages of genetically modified foods for consumers and/or food producers
- defining genetic modification
- explaining the responsibilities of Food Standards Australia New Zealand (FSANZ) and its role in developing 'The Food Standards Code'
- explaining the HACCP system and its role in ensuring safe food production
- understanding functional roles of the natural components found in key foods in food preparation and processing
- defining types of packaging systems and their benefits to the manufacturer and the consumer
- understanding the impact of packaging on the environment
- understanding the role of sensory testing and the methods used to record results
- explaining complex processes used in food production
- understanding of some of the terms used in the study design; for example, strategies, sensory properties, product development, functions and genetic modification
- understanding the meaning of ethical marketing

This report should be read in conjunction with the 2009 Food and Technology examination paper.

**SPECIFIC INFORMATION**

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

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

**Question 1**

**1a.**

Marks	0	1	Average
%	44	56	0.6

Continuous processing system

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## Question 1b.

Marks	0	1	2	Average
%	46	12	43	1

Benefits to the manufacturer could be any two of the following:

- quick and efficient
- high automation and often computer-generated
- less labour, less wages
- operates 24/7, high production rate
- the unit cost is relatively low
- running costs are low
- uniform products are produced.

'High set-up costs' was not accepted as this is not a benefit.

## Question 1c.

Marks	0	1	2	Average
%	11	19	70	1.6

Suitable marketing strategies could have included two of:

- free samples: sample products are given out to encourage people to taste a product they would not normally buy. The samples are free so people will buy it
- letterbox drop: many more people are reached by delivering the product to consumers' homes. The product gets to the whole family, not just the person doing the shopping
- use of media: TV or radio advertisements provide viewers and listeners with information about the product. Advertisements in magazines give more information about the product
- billboards/flyers: a wide audience is reached as consumers will see the billboard as they drive to work/school. Flyers will get into every home so parents and children will see the new product and be tempted to buy it
- promotional campaign: buy-one-get-one-free campaigns encourage people who are price conscious, especially parents of young children, to purchase this new product as it is less expensive, especially if it is combined with another well-recognised product; for example, Rice Bubbles® breakfast cereal with LCMs® snack bar
- point of sale display: the use of in-store displays of the product at the ends of aisles or advertising below the product on the shelves
- taste-testing at the supermarket: marketing representatives offering customers in the supermarket free tastings of the new product, often located near where the product is displayed on the shelves.

To gain two marks, students needed to include a clear explanation of the strategy and include an example.

## Question 1d.

Marks	0	1	2	Average
%	58	25	17	0.6

Suitable explanations of 'ethical considerations' could have included:

- marketing that conforms to or is in accordance with accepted principles of right or wrong
- marketing that protects the consumer from misleading information through marketing procedures or false advertising, which is not necessarily breaking the law but may give a false impression of the product to consumers
- when making health claims, the company meets the FSANZ regulations and does not use 'fear' tactics to influence consumers to think that the product will provide a remedy for a health concern.

Following is an example of a good student response.

*Using marketing strategies that are considered to be morally correct so consumers are not influenced unfairly or misled in any way regarding about the way the bar can be included in their child's diet, e.g. suitable to be eaten every day or as a treat.*

## Question 1e.

Marks	0	1	Average
%	21	79	0.8

'Me too' product development

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## Question 1f.

Marks	0	1	2	Average
%	26	33	40	1.2

Suitable reasons could have included two of:

- a competitor's product has proved successful in the marketplace, therefore the manufacturer knows that it will be a profitable product to produce as consumers will want to buy it
- they can enter the marketplace with a new product that people will wish to buy
- to maximise brand loyalty
- less expensive for the manufacturer to develop because the market research has already been done.

## Question 2

### Question 2a.

Marks	0	1	2	Average
%	4	39	57	1.6

Suitable reasons for preserving foods could have included two of:

- preserving foods can increase the choice of foods year-round
- to increase the shelf life of foods
- make the food easier to transport around the country
- protect the food from spoilage
- convenient as it saves time in preparation of some food products
- to increase the variety of food products available to consumers
- retains the foods' nutrient value by preserving them in their peak condition.

### Question 2b.

Marks	0	1	2	3	4	Average
%	38	20	20	8	14	1.4

Suitable responses could have included two of the following functional roles of sugar:

- caramelisation: the colour of the sugar is changed from a white to a brown colour by the application of heat
- stabiliser: sugar helps to stabilise egg white after it has been beaten and helps to trap the air within the egg white
- Maillard reaction: a browning reaction occurs when sugar or starch and a protein are present in the same mixture and undergo baking by dry heat
- tenderising: sugar in a mixture helps to produce a fine crumb and good volume during mixing and baking. It absorbs the liquid and prevents the flour from taking up water and developing gluten
- aeration: sugar, when mixed with butter and creamed together, allows air into the mixture and when baked, gives volume and an aerated texture
- activator: in yeast mixtures the sugar provides the yeast with food during fermentation and helps speed up the production of carbon dioxide that helps make the dough rise
- gel formation: pectin forms a gel with the sugar, giving jams and jellies a thicker consistency
- flavour: sugar blends dominating flavours; for example, in a sweet and sour sauce; in frozen foods such as ice-cream it balances and enhances the flavours; it captures the colour, flavour and aroma of the fruit used in making jams and marmalades
- crisp crust formation: sugar crystallises when moisture evaporates during baking and a crisp, cracked crust is formed
- reduction of curdling: sugar added to a custard will raise the temperature at which the custard will coagulate reducing the risk of curdling
- shape retention in poached fruit: the sugar in the syrup helps to retain the shape of the fruit during cooking.

This question was very poorly answered.

Following is an example of a good student response to this question.

*Colour enhancer – sugar when used in cakes works together with starches and proteins to form a brown crisp outer layer when dry heat is applied, also known as maillard reaction.*

*Tenderiser – sugar in preparation and processing of foods acts as a tenderiser as it alters the texture and structure of the product creating a softer crumb and texture.*

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## Question 2c.

Marks	0	1	2	3	Average
%	20	3	29	47	<b>2.1</b>

A suitable wet cooking method, including an example of a food cooked using this method could have been one of:

- poaching: a method of cooking food in a liquid just below simmering point. The liquid does not boil. Fish, eggs and fruit such as stone fruit and apples are suitable for poaching
- steaming: a method of cooking food in the steam from boiling water. The food does not come into contact with the water. Vegetables, fish and other foods such as Christmas puddings, steamed pudding, dim sims and wontons are suitable for steaming
- stewing: a long, slow method of cooking food in a small amount of simmering liquid. Meat, poultry, game and fruits such as stone fruits are suitable for stewing.

One mark was awarded for naming a wet cooking method, one mark for the description of the method and one mark for a correct example.

Microwave cooking is not a wet method of cooking.

## Question 2di–ii.

Marks	0	1	2	3	4	5	Average
%	8	6	21	22	27	17	<b>3.1</b>

Sensory and/or physical properties of home-made jam that could be compared with commercial jam, and a name and description of a suitable test to compare one of the selected properties could have included two of:

- sensory properties: aroma, flavour and texture/mouth feel
- physical properties: thickness/viscosity/consistency, nutrient content, colour, appearance or clarity
- taste test or preference test: this can be done using a tasting panel or a group of consumers who taste the jams and record their opinions using words, hedonic descriptors or a nine-point scale
- difference tests: a triangle test, when two of the three samples used are the same and a third sample is the other type of jam, or a 'two-out-of-five' test, when three of the five samples are the same type of jam and the other two samples are slightly different from the other three and from each other. Results are recorded and compared
- profiling test: this test uses a star diagram to rate the sensory and physical properties of each jam and then the results are compared; for example, colour and viscosity.

One mark was awarded for correctly naming the test, and two marks for the description, including a detailed explanation about the method used and how the information is used.

If two physical properties were given in part i., taste test was not an acceptable response for part ii.

## Question 2ei–ii.

Marks	0	1	2	3	Average
%	21	43	12	24	<b>1.4</b>

### 2ei.

Either of:

- FSANZ
- Food Standards Australia New Zealand.

The acronym and/or the full name were accepted, but unfortunately some students gave the incorrect meaning of the acronym when they expanded it into words. Many students gave 'Food Safety Australia and New Zealand', which was incorrect. ANZFA was not accepted.

### 2eii.

One of:

- the composition of the food
- the nutrient value of the ingredients in the food
- levels of micro-organisms
- labelling for specific foods; for example, types of fats – trans fats, saturated fats
- permitted ingredients
- identity and description of the given food.

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## Question 2f.

Marks	0	1	2	3	4	Average
%	2	1	7	9	81	3.7

A suitable response could have included two of labelling requirements outlined below.

Labelling requirement	Explanation
Identification of packaging premises and job lot	Assists consumers and health authorities in case of recall
Name and address of business	Enables consumers to make direct contact with the manufacturer if required
Mandatory warning and advisory information	Identifies ingredients likely to harm health; for example, aspartame, phytosterol esters, unpasteurised egg products
List of ingredients	Must be listed in descending order by ingoing weight so that consumers can identify specific ingredients and make comparisons if desired
Food additives	Listed by class so consumers can identify any likely allergic reaction
Declaration of the presence of potential allergens in food	Labels must identify ingredients likely to trigger an allergic reaction; for example, nuts, milk, eggs and gluten
Declaration of the presence of any genetically modified material that has been added to the food	To inform consumers and enable them to make an informed choice
Use-by or best before date	Indicates optimal quality
Health and safety advice	Protects consumer health by providing directions relating to storage of product
Nutrition information panel	Enables consumers to make informed choices
Percentage of the characterising ingredient of the food	Allows comparison for quality or value
Country of origin	The consumer is able to determine the source of the product
Weight or measurement of contents – the metric unit of measure must be used, including Net weight	The minimum weight must be declared to enable consumers to compare products

## Question 3

In 2009, Question 3 drew on students' understanding of the key knowledge and key skills underpinning Unit 3, Area of Study 3 and Unit 4, Area of Study 4. Students who spent time developing their School-assessed Task (SAT) and who had a good understanding of the requirements for the SAT were well-prepared for this question.

## Question 3a.

Marks	0	1	2	Average
%	15	35	51	1.4

One of:

- the design brief is an important stage in the design process as it outlines the requirements for the project and includes all specifications that must be met
- the design brief provides a starting point for the generation and development of ideas. It must contain all of the specifications that must be met.

## Question 3b.

Marks	0	1	2	Average
%	6	3	91	1.9

A suitable response needed to include two of the following specifications taken from the design brief provided:

- must provide a main course and sweet treat suitable to serve for lunch for the band members and conductor
- the food provided must promote healthy lifestyle choices
- the main course must be filling
- the main course will need to be served hot
- some foods must be able to be prepared well in advance of the rehearsal as the school hall only has facilities for reheating.

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## Question 3c.

Marks	0	1	2	Average
%	17	37	46	1.3

The production plan must include information about (one of):

- how all of the products will be able to be produced in the time that is available. This will involve developing an overall time plan to demonstrate that the food items can be made within the days or weeks before the Rock Eisteddfod rehearsal
- how much time will need to be set aside to make each food item
- the preparation of individual production plans for each food item, identifying the ingredients, tools, equipment and processes required to make the product
- all of the health and safety issues which should be observed during the production session.

## Question 3di–ii.

Marks	0	1	2	3	4	Average
%	4	2	10	14	69	3.4

### 3di.

A suitable response could have been:

Food type: pasta product

- Food suitable to serve as a main course dish: spinach and mushroom cannelloni
- Justification: the cannelloni can be made well in advance, especially the tomato and mushroom sauce which can be made weeks ahead and frozen. The cannelloni can be reheated easily and served warm, and is filling.

### 3dii.

A suitable response could have been:

Food type: small cakes/biscuits

- Food suitable to serve as a sweet treat: individual carrot and almond cakes
- Justification: these little cakes are a healthy sweet treat as they are made from freshly grated carrots and almonds and only contain a small proportion of sugar. They have good keeping qualities and can be made well in advance of the Rock Eisteddfod lunch.

No marks were given for the food type selected. Students needed to justify their choice of a food item against the requirements outlined in the design brief provided.

## Question 3ei–iv.

Marks	0	1	2	3	4	5	6	7	Average
%	16	7	9	13	16	13	11	14	3.6

<b>Food item:</b> Individual carrot and almond cakes	
<b>Complex process:</b> Making of cake batter	
<b>Key step 1</b> Cream butter and sugar together	<b>Key step 2</b> Beat the egg whites to firm peaks
<b>Explanation of judgment made</b> The butter and sugar should be pale and creamy in colour and resemble whipped cream.	<b>Explanation of judgment made</b> The egg whites should hold stiff peaks and the colour will have changed from cream to quite white.
<b>Effect on finished product</b> Creaming the butter and sugar traps air in the mixture, adding to the light and airy texture of the finished carrot cakes.	<b>Effect on finished product</b> The beaten egg whites act as a raising agent in this cake mix, enabling the cakes to rise and giving the cakes structure.

Students needed to select one of the food items they had listed in Question 3d. to complete the table. No marks were awarded for the item selected.

This question was poorly answered. Many students were unable to identify one complex process used in the preparation of the food item.

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Following is an example of a good student response to this question.

<i>Food item: Individual egg and bacon quiches</i>	
<i>Complex process: Making of shortcrust pastry for the quiche</i>	
<i>Step 1</i> <i>Rubbing the butter into the flour with my fingertips</i>	<i>Step 2</i> <i>Kneading the dough</i>
<i>Judgement made</i> <i>The butter needed to be rubbed in until the mixture resembles breadcrumbs and any large lumps of butter have disappeared before the water was added.</i>	<i>Judgement made</i> <i>I kneaded the dough until it was smooth with my hands but did not over-knead as I did not want to develop the gluten. The pastry was then rested in the frig for 30 minutes before rolling out.</i>
<i>Effect on finished product</i> <i>It gives the pastry good sensory properties – tender, crisp texture and a rich mouthfeel and aroma</i>	<i>Effect on finished product</i> <i>The pastry did not shrink when it was cooked and was tender and crumbly to eat.</i>

### Question 3f.

Marks	0	1	2	Average
%	12	37	51	1.4

Suitable answers could have included any of the following examples.

It is important to evaluate your planning and production activities to ensure:

- the effectiveness of planning
- the efficiency of a production procedure; for example, it is important to evaluate the production process to determine whether the processes used and time available were appropriate to produce a high-quality product or whether any changes were required
- appropriate safety and hygiene practices
- the value of the research undertaken when planning relevant production activities
- the effectiveness of any work plans or production plans
- the tools and equipment used were appropriate to produce high-quality food items for the lunch
- the specifications in the design brief were met
- the product meets the relevant design brief criteria, including considerations and constraints in the design brief.

### Question 4

#### Question 4a.

Marks	0	1	2	Average
%	55	21	24	0.7

A suitable explanation of 'novel food' could have been one of:

- a non-traditional food for which there is insufficient knowledge in the broader community to enable safe use in the form or context in which it is presented
- foods or food ingredients which have not traditionally been used in Australia or New Zealand and for which there is insufficient knowledge in the broader community to ensure safe use.

This question was poorly answered.

Following is an example of a good student response to this question.

*A novel food is a new food item which contains any plant, animal or other ingredients which have not been commonly used by Australians or in New Zealand and there is insufficient knowledge whether it is completely safe for consumption.*

### Question 4b.

Marks	0	1	2	3	Average
%	61	6	10	24	1

A suitable response could have included one of the following technologies.

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Flora® pro-activ® or Pura Heart Active milk

- developments in plant breeding – plant sterol esters
- new developments in technology have enabled plant sterol esters to be identified and isolated, and special canola-based spreads to be produced to carry the plant sterol esters

Sunblest Up omega-3 bread or Golden Circle orange juice with omega-3

- microencapsulation
- an active ingredient, such as omega-3 fatty acid, is surrounded by a thin biodegradable shield, forming a minute capsule (to protect it during processing or to mask the flavour or odour)

Rev milk, Pura Boost or HiLo milk

- membrane technology or ultrafiltration: ultrafiltration occurs when milk is pumped through a series of membranes that separates dissolved or suspended solids, such as fat from milk

Flavr savr tomatoes, faster growth rates in cattle, non-browning/non-sprouting potatoes

- genetic modification
- involves the application of genetic engineering to directly manipulate genetic information by selecting desired characteristics and transferring them by splicing them into another plant or animal to create a new species with improved characteristics

Kumato, delayed-ripening pineapple, seedless watermelons, broccolini, baby cos lettuce, baby bok choy, purple cauliflower

- plant breeding
- the use of technology to select chosen characteristics (genes) from a plant (from a related species) and place into another plant in a laboratory environment to create new plant varieties. This process is quicker and more accurate than traditional plant breeding

Wonder White bread/muffins

- developments in plant breeding – hi-maize
- scientists identified and isolated maize with a high amylose content that would provide high levels of resistant starch. This product has unique manufacturing properties: it is able to withstand most food processing methods, and has no flavour or aroma.

One mark was awarded for identifying the technology and two marks for the description of the related technology. This question was very poorly answered. Pasteurization, homogenization, UHT or microwave technology were not suitable answers.

Following is an example of a good student response to this question.

*Food Product: Hi-Maize*

*Technological development: Plant Breeding using biotechnology*

*Plant breeding using biotechnology involves taking desirable traits from a plant and transferring it into another plant of the same species so that it now has the desirable trait. It is done in a laboratory. Two breeds of maize were crossed to produce the fibre rich, flavourless, colourless, aroma less Hi-Maize.*

## Question 4ci–ii.

Marks	0	1	2	3	4	Average
%	25	24	21	17	14	1.7

### 4ci.

A health claim describes or makes a claim about a direct relationship or link between a specific nutrient and a reduced risk of a disease or improved state of health.

### 4cii.

Nutrition panels are included on product labels to enable consumers to make an informed choice about the nutrient value of the food.



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This question was very poorly answered.

Following is an example of a good student response to this question.

*A 'health claim' is when a label or advertisement indicates a direct relationship between a product or ingredient in the product and a disease.*

*A nutritional information panel is available to inform consumers about the nutrient content of the food and cannot mislead them in any way. A 'health claim' is not allowed because it can be misleading and cause consumers to treat the food as a 'magic potion' and cure a disease.*

## Question 4d.

Marks	0	1	Average
%	25	75	<b>0.8</b>

A suitable explanation of 'food sensitivity' could have included one of:

- food sensitivity is an abnormal immunological reaction to food and can include food allergies and food intolerances
- a food that a person reacts abnormally to
- food sensitivity is a reaction to food which can occur repeatedly. Food sensitivities can be divided into two main types: food allergy or food intolerance
- an immune reaction to a chemical property in a food that is eaten; for example, gluten or lactose
- sensitivity to certain foods or food intolerance is the inability to properly digest or fully process certain foods, leading to chronic symptoms and, if left untreated, serious disease.

## Question 4e.

Marks	0	1	2	Average
%	19	18	63	<b>1.5</b>

A suitable response could have included one of the following food sensitivities and ingredients or food items:

- gluten intolerance or coeliac disease: gluten-free biscuits, flour, snack foods, pasta
- lactose intolerance: a range of products using soy milk; for example, So-good milk, lactose-free cheese, lactose-free yoghurt
- egg intolerance: egg replacer.

## Question 5

### Question 5a.

Marks	0	1	2	Average
%	47	26	28	<b>0.8</b>

Suitable descriptions could have included one of:

- a gene from one plant or animal being spliced onto a gene from another to improve its characteristics
- a gene from a plant or animal is used to introduce a desired trait to improve another plant/animal's characteristics.

This question was very poorly answered with many students not clearly describing the process or confusing it with a definition of plant breeding.

Following is an example of a good student response to this question.

*Genetic Modification – A process when a gene from a plant/animal containing desirable characteristics is spliced onto that of another plant/animal to improve its characteristics.*

### Question 5b.

Marks	0	1	2	Average
%	40	41	18	<b>0.8</b>

A suitable response could have included two of the following reasons:

- may cause new allergies if plants contain proteins to which some people are allergic
- can have a huge impact on biodiversity: if there are fewer weed flowers there will be fewer butterflies in areas where genetically modified crops are grown, and fewer seeds for birds to feed on

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- reduces the use of traditional seed
- tougher weeds may develop and will have a negative impact on the environment as they may be more difficult to kill and will become more widespread
- the pollen from genetically modified crops such as canola can drift onto conventional and organic crops, causing contamination of the crops – ‘genetic pollution’
- concern that pesticide levels in our food may increase
- may reduce effectiveness of antibiotics.

Students needed to list two specific concerns. Generalisations were not appropriate; for example, responses such as ‘fear of the unknown’.

### Question 5c.

Marks	0	1	2	Average
%	20	31	48	<b>1.3</b>

A suitable description could have included two of the following advantages to the community:

- some genetically modified foods may be able to be modified to increase their nutrient value; for example, they may contain higher levels of vitamins or protein
- crops such as tomatoes may be modified to be slower-ripening and can therefore have a longer shelf life
- foods such as potatoes may have improved sensory properties; for example, they may resist browning once they are cut
- less wastage could result; for example, the flower heads of broccoli may not yellow as quickly and will therefore last longer
- some crops will have increased yield with lower levels of herbicides
- crops can be genetically designed to be pesticide-specific
- crops can be designed for specific situations; for example, drought-tolerant
- canola plants germinate earlier, grow with more vigour and have large robust leaves, which means they can dominate the weeds. It only requires one spray of herbicide, rather than three sprays for non-genetically modified canola
- less land may need to be used for crop production if genetically modified crops have a higher yield, providing opportunity for a greater diversity of crops to be grown on less acreage
- some plants may be designed to be tolerant to drought, high-salt soils or extreme cold, therefore enabling farmers to grow crops in soils which were previously unsuitable for farming
- less use of chemicals used in farming to prevent insect pest infestation and/or growth of weeds may lead to lower levels of herbicide and pesticide use.

### Question 5d.

Marks	0	1	2	Average
%	28	45	27	<b>1</b>

Suitable explanations of the HACCP system could have included two of:

- preparation of a food safety plan identifying the potential food hazards (risks)
- ensures unsafe food is not served to consumers
- ensures food is prepared safely as hazards are identified and steps are taken to reduce areas of high risk (critical control points)
- the HACCP system is important as it is a food safety plan that will identify any potential food hazards and areas of high risk or ‘critical control points’ during the production of the food for the restaurant.

To gain two marks, students needed to provide more information than simply stating that ‘HACCP is a food safety plan’.

This question was poorly answered.

Following is an example of a good student response to this question.

*A HACCP System is when the food safety plan identifies potential hazards in the preparation and processing of food and puts in place steps to prevent or fix them to ensure safe food is delivered to the consumer.*

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## Question 5ei-ii.

Marks	0	1	2	3	4	Average
%	8	6	20	26	40	2.9

Step	Hazard	Corrective action
Delivery and storage of rice	<ul style="list-style-type: none"> <li>rice delivered past the use-by or best before date</li> <li>packaging of rice damaged during delivery or storage – possible contamination</li> <li>rice not stored in optimum conditions and may be contaminated</li> <li>rice not stored in a clean environment; for example, dust, vermin and insects can cause possible contamination</li> </ul>	<ul style="list-style-type: none"> <li>check that the rice is within the use-by or best before date</li> <li>check packaging and seals to ensure there is no damage</li> <li>store in a cool, dry storage area</li> <li>store in an air-tight container off the floor</li> </ul>
Preparation of chicken	<ul style="list-style-type: none"> <li>cross contamination due to raw meat coming into contact with cooked meat, other foods, surfaces, equipment or the food handler</li> <li>chicken which is in the danger zone is left on bench too long during preparation and before cooking</li> </ul>	<ul style="list-style-type: none"> <li>separate raw and cooked meat</li> <li>clean board after cutting chicken</li> <li>clean knife and board to do other tasks; for example, cutting vegetables</li> <li>keep work surfaces and equipment clean</li> <li>practise personal hygiene to prevent cross contamination; for example, wash hands after using the toilet, blowing nose, etc.</li> <li>store chicken below 5°C</li> <li>remove chicken from fridge just before cutting, put back into fridge after cutting/before cooking</li> </ul>
Storage of the cooked rice	<ul style="list-style-type: none"> <li>cooked rice is a high risk food as it has moist starch</li> <li>food poisoning can be caused with rice which has been in the danger zone (between 5°C and 60°C) for four hours or more</li> <li>cross contamination in the fridge</li> </ul>	<ul style="list-style-type: none"> <li>refrigerate as soon as possible</li> <li>reduce to 5°C as quickly as possible to ensure the rice is not in the danger zone</li> <li>cover with plastic wrap</li> <li>store rice above raw meats to prevent cross contamination in refrigerator</li> </ul>

The answer needed to include both a hazard and a description of a corrective action that could be taken for each of the steps selected.

## Question 6

### Question 6ai-ii.

Marks	0	1	2	3	4	Average
%	12	19	24	23	22	2.3

#### 6a.

- Modified atmosphere packaging is a system of packaging that changes or modifies the atmosphere of gas inside the packaging in order to extend the shelf life of the food.
- Modified atmosphere packaging alters the atmosphere in which the food is stored by controlling the mix of gases, usually oxygen, nitrogen and carbon dioxide, to slow down the deterioration of the food.

#### 6b.

Advantages to the consumer/manufacturer

- extends the shelf life of food, therefore minimises waste for the consumer
- maintains the sensory and nutritional properties of the food product

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- the appearance of food products can be improved for marketing
- increased convenience for consumers, therefore increased sales
- reduces the need for preservatives

This question was poorly answered.

Following is an example of a good student response to this question.

*MAP packaging is used to ensure freshness of the salad mix, therefore provides crisper salad leaves that will not wilt or become brown until the use-by date has passed.*

*Enables the salad mix to have an extended shelf life - therefore product lasts longer for both the consumer at home and the manufacturer after packaging and for delivery.*

### Question 6bi–ii.

Marks	0	1	2	3	4	Average
%	27	12	24	11	25	2

Factor	Benefit
Made from biodegradable material	Using biodegradable material ensures that packaging material breaks down in a short period of time and does not cause damage to waterways and wildlife.
Consider the use of recyclable material	There will be a reduction in the amount of material going to landfill.
Minimise the energy used in making the packaging	The use of fossil fuels is reduced and therefore saves non-renewable resources.
Reduce the weight of the packaging material	Reduces the use of fossil fuels, including gas or petroleum, in transportation of the product to market.
Avoid the use of excessive packaging material	Reduces the environmental costs associated with paper production including use of water, electricity and carbon dioxide emissions.

A suitable response could have included two of these environmental factors and their benefit to the environment.

This question was very poorly answered.

Following is an example of a good student response to this question.

Factor	Benefit
<i>Make any packaging recyclable</i>	<i>This will mean less landfill in the environment as the packaging can be recycled to be used again.</i>
<i>Biodegradable packaging</i>	<i>Living organism break down the packaging easily so it is not present in the environment for long and wont damage waterways.</i>

### Question 6ci–ii.

Marks	0	1	2	3	4	Average
%	27	14	20	17	21	1.9

#### 6ci.

One of:

- organic farming: organically grown foods are produced without using herbicides, pesticides, fungicides or synthetic fertilisers. This benefits the environment by reducing the chemical residue runoff into streams, or contamination of nearby land through wind drift
- use of water: improved water management will benefit the environment by reducing the amount of water used and therefore minimising the likelihood of land damage such as weathering and erosion occurring. Improved water management practices include:
  - drip irrigation
  - laser levelling during flood irrigation



- maintaining and repairing damage to open irrigation systems
- land management: development of improved soil management can benefit the environment by reducing the likelihood of soil degradation and erosion through wind or water erosion. Improved land management practices include:
  - crop rotation
  - minimising soil tillage
  - planting trees rather than land clearing
  - use of contour farming practices
  - ensuring plant stubble remains on the soil surface after farming to prevent soil erosion
- use of chemicals: effective management of chemicals used to promote crop growth can benefit the environment by reducing the amount of contamination through wind-drift or development of blue-green algae in nearby waterways through contamination with herbicides. These practices include:
  - accurate aerial spraying by contractors low-flying over the area to be fertilised
  - the use of satellite tracking technology to ensure fertiliser/herbicides are only applied in the desired areas
- genetic modification: genetic modification can be used to make a positive impact on the environment through the development of crops that are:
  - drought resistant, therefore requiring less watering during their production
  - able to be grown in saline soils, therefore reducing water consumption
  - modified to be resistant to herbicides, ensuring there is less herbicidal runoff into rivers, streams or groundwater.

**6cii.**

A suitable response could have included one of the following economic advantages for the primary producer related to the response in 6ci.:

- organic farming: there is growing consumer demand for organically produced food and consequently this has enabled organic farmers to increase their profits and therefore gain an economic advantage through the production of clean, green food. Farmers who produce organic products do not need to purchase herbicides and pesticides therefore reducing the expenses involved in food production, and ensuring increased profit and an economic advantage
- use of water: farmers who are able to reduce their water use through effective farming techniques will gain an economic advantage through reduced costs associated with purchasing water, and therefore increased profits should result
- land management: effective land management can produce an economic advantage for farmers as strategies such as crop rotation will minimise soil erosion, enable farmers to build up the nutrients in the soil and produce crops with a higher yield. This will result in greater profits for the farmer
- use of chemicals: the use of farming techniques that will use less chemical herbicides will provide an economic advantage by decreasing the expenses for farmers, as the amount of very expensive farming products required to produce a high yielding and healthy crop is reduced
- genetic modification: if drought-resistant or herbicide-resistant crops are grown, the cost for the farmer of purchasing water and/or herbicides will be reduced. High-yielding crops will enable the farmer to have more produce to sell.

**Question 6d.**

Marks	0	1	2	Average
%	30	37	33	1.1

Suitable answers could have included an explanation any two of the following factors and the way they influenced the development of the salad mix.

**Consumer demand**

- Health concerns: there is an increased knowledge among consumers about the link between the consumption of food and good health. Consumers will recognise the organic prepacked salad mix as a healthy food product that will help them maintain good health by reducing their intake of harmful chemical residues as well as maintaining a healthy weight.
- Convenience: the prepacked salad mix is a convenient product for consumers who have limited time or who have limited experience or skills in food preparation. The product simply needs to be opened and served without any other preparation being required.
- Quality: an increasing number of consumers want high-quality and organic produce.

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## Social pressures

- Small households or ageing population: small households or older people may not use a large quantity of salad ingredients. This product will be more economical and reduce waste involved in throwing out excess ingredients.
- Time-poor families: families where adult members are in the workforce are often time-poor and this product will be quick and easy to assemble with no additional preparation necessary.

## Industry economics

- Development of a niche market: Ladybird Organics would be endeavouring to meet the needs of a niche market of consumers seeking organic food products to establish a reputation and market within this group and ensuring a profit.

## Question 7

### Question 7ai–iii.

Marks	0	1	2	3	4	5	6	Average
%	42	6	10	11	7	8	16	2.3

Functional property of starch	Description of role	Food item
Thickening agent/gelatinisation	When starch is blended with a liquid and heated, the starch grains will swell and cause the mixture to thicken.	<ul style="list-style-type: none"> <li>• white sauce</li> <li>• lemon filling for a lemon meringue pie</li> <li>• gravy</li> </ul>
Volume, structure, texture	Starch increases the volume of the mixture and when dried out by heat, it forms the structure of the product.	<ul style="list-style-type: none"> <li>• cake</li> <li>• bread or bread rolls</li> <li>• extruded snack foods</li> <li>• pasta</li> <li>• shortbread</li> </ul>
Colour/dextrinisation	When starch is affected by dry heat, a brown crust is formed.	<ul style="list-style-type: none"> <li>• toast</li> </ul>
Binding qualities	Starch holds other ingredients together.	<ul style="list-style-type: none"> <li>• meatloaf</li> <li>• processed meats</li> </ul>

Suitable answers could have included two of the functional properties of starch listed above, a description of their role and a food item example.

This question was very poorly answered.

Following is an example of a good student response to this question.

Functional property of starch	Description of role	Food item
<i>Dextrinisation</i>	<i>When dry heat is applied to a mixture/food item where starch is present, the starch browns</i>	<i>Bread to toast</i>
<i>Gelatinisation</i>	<i>When starch is heated in a liquid and the starch granules absorb the liquid and expand, thickening the mixture.</i>	<i>Sauces, gravies</i>

### Question 7b.

Marks	0	1	2	Average
%	42	32	26	0.9

Suitable answers could have included any of the following roles of gluten:

- bread/pizza dough: when gluten is developed in a flour mixture it creates a strong network so that the mixture can be stretched and springs back. This network can trap solid particles, liquids and gases as they expand, and increases the volume of the dough
- pasta: after mixing the pasta it is important to rest the dough as this relaxes the gluten and prevents it from being over-worked, and therefore shrinking during rolling out.

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This question was poorly answered.

Following is an example of a good student response to this question.

*Bread: the gluten, when worked during kneading creates a stretchy structure that traps gases inside and allows the bread to rise while the yeast ferments.*

## Question 7c. and 7d.

Marks	0	1	2	3	4	Average
%	18	18	25	23	16	2

### 7c.

Primary processing ensures:

- food is safe for human consumption
- cereals are ready for use in other food products.

### 7d.

Benefits of secondary processing of cereals could have included two of:

- makes the food more attractive to consume
- prevents food spoilage/increases the shelf life of food
- increases the variety and availability of the food
- may reduce the preparation time involved in preparing a food product using cereals
- increased market for the product produced.

Following is an example of a good student response to Question 7d.

*There are a wide range of possible products such as breakfast cereals, snack bars which can result in profit for the producers.*

*Secondary processing can alter the sensory properties and appeal to different consumers likes and dislikes.*