

2003 Food and Technology GA 3: Written examination

GENERAL COMMENTS

The 2003 examination was designed to assess student knowledge and understanding of Unit 3, areas of study 1 and 2 and Unit 4, areas of study 1 and 2.

The four examination criteria were drawn from the four areas of study. The paper consisted of eight short-answer question based on the four criteria.

Areas of strength and weakness

Strengths

- explaining how social factors influence the foods that are eaten
- understanding niche markets and the foods developed for them
- explaining the role of technology in the development of modified products
- explaining the role of cook-freeze and cook-chill home meal replacements
- explaining the role of packaging in the sale of successful products
- demonstrating understanding of health and safety practices in food production
- demonstrating understanding of the reasons for modifying food products and the resulting foods

Weaknesses

- explaining key food commodities and their role in primary and secondary processing
- explaining the role of product, place, promotion and price in a marketing strategy
- explaining the advantages and disadvantages of Genetically Modified (GM) foods for consumers and/or food producers
- explaining the role of Food Standards Australia and New Zealand (formerly ANZFA) in relation to foods available to the consumer
- explaining and comparing food production systems
- explaining modified foods and the factors affecting their development
- providing answers that were irrelevant or not directly related to the questions asked

SPECIFIC INFORMATION

This information should be read in conjunction with the 2003 Food and Technology examination.

Students were required to refer to the picture of a *Dolmio* Risotto label and answer questions about its product development, target market, promotional strategies, pricing and functions of the packaging.

Many students did not include **three major steps** that could have been involved in the development of the risotto in part a of the question.

Question 1

a

| Marks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | Average |
|-------|----|---|----|---|----|---|----|-------------|
| % | 24 | 8 | 15 | 9 | 13 | 9 | 22 | 2.92 |

Suitable answers included:

Ideas/background information:

- who is the product for?
- cost restrictions
- product specifications
- environmental issues.

Market research

Design brief:

- defines new product
- establishes criteria for evaluation
- establishes considerations
- establishes constraints.

Develop prototype: planning processes for production, make sample of product

Planning marketing strategies which could include: advertising, publicity, point of sale

bi-iii

| Marks | 0 | 1 | 2 | 3 | 4 | 5 | Average |
|-------|---|---|---|----|----|----|---------|
| % | 2 | 2 | 9 | 20 | 27 | 40 | 3.88 |

bi-ii

Any market for the risotto group providing it is justified in 1bii.

- busy single people
- health conscious
- elderly
- people lacking cooking skills
- families/adolescents
- health issues

biii

Promotional Strategies: TV, posters, giveaways, magazines, leaflets, free samples, recipes and ideas.

c

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 16 | 25 | 59 | 1.43 |

Factors that may be considered in the pricing of the risotto include:

- target group – price should suit this target group
- cost of similar products – risotto should be similar or cheaper in price
- to encourage purchase
- cost of production aspects – ingredients, machinery
- features of the product.

d

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 11 | 28 | 61 | 1.50 |

Functions of the packaging of the risotto include:

- protection
- preservation
- containment
- convenience
- promotion/marketing
- refrigeration
- able to be heated/cooked.

Question 2

Students were required to select one item from the list of fresh foods provided and name and describe a processing technique that is used **commercially**. All parts of the question referred to the food selected and the technique that was described initially. Students could have referred to techniques used in their School-assessed Task from Unit 4.

ai-ii

| Marks | 0 | 1 | 2 | 3 | Average |
|-------|----|----|----|----|---------|
| % | 27 | 18 | 26 | 29 | 1.55 |

ai

Examples of responses:

Fresh tomatoes: canning, dehydration, bottling, freezing-puree, aseptic packaging.

Fish fillets: freezing, salting, smoking, pickling, canning.

Fresh strawberries: canning, bottling, freezing, jam and jelly making.

Fresh pasta: map packaging, dehydrating, freezing, vacuum packaging and drying.

aii

Examples of responses:

Some description needed to accompany each major step.

Drying: food is dried using a dehydrator and sealed in an airtight package

Freezing: cleaning, blanching, cooking and freezing

Smoking: preparation and application of smoke and heat

Jam making: preparation, cleaning, sorting, heating, addition of sugar

Cooking: gel test, sterilisation, bottling and sealing

Bottling and canning: preparation, cleaning, cooking, addition of liquid heating and sealing.

b

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 42 | 25 | 33 | 0.91 |

Students needed to refer to the technique named in 2ai, for example drying: as the water content is brought to a minimum, growth of microorganisms is reduced and food spoilage prevented.

c

| Marks | 0 | 1 | Average |
|-------|----|----|---------|
| % | 23 | 77 | 0.77 |

Best method of storing at home the processed food include, for example:

Dried pasta – in a cool dry area

Frozen fish – in the freezer

Jams and pickled products – on the pantry shelf, opened in the refrigerator.

d

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 51 | 21 | 28 | 0.76 |

Properties of the processed food that would be different from the properties of the original fresh food needed to **link** to the original fresh food selected, for example colour, shape, flavour, size, texture, mouthfeel, aroma and appearance.

Question 3

Students needed to retain the fruit nature of the pie throughout the answers given again refer to the previous response when indicated.

a

| Marks | 0 | 1 | 2 | 3 | Average |
|-------|---|---|----|----|---------|
| % | 3 | 7 | 29 | 61 | 2.47 |

Students responded to this question well.

Suitable answers included:

- butter: function – flavour, colour, texture/shortening
- water: function – moisture, binding ingredients together
- baking powder: function – aerating or rising of pastry
- plain flour: function – structure from gluten, colour from dextrinisation
- castor sugar: function – flavour, sweetness, colour from caramelisation
- apples: function – filling or bulk and flavour.

bi

| Marks | 0 | 1 | Average |
|-------|----|----|---------|
| % | 10 | 90 | 0.90 |

Alternative ingredients could have included reduced fat or reduced salt margarines or butters, wholemeal or self raising or gluten free flours and alternative fruits or flavourings. The alternative did not have to be a modified ingredient.

bii

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 25 | 38 | 37 | 1.12 |

The answer needed to refer to the previous response. A suitable answer could be that the pie would have a lower salt content, be lower in saturated fat and have a less buttery flavour if a low salt vegetable margarine was used.

biii

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 22 | 34 | 44 | 1.22 |

The student needed to refer to the alternative ingredient nominated in the earlier answer, for example, a consumer may want to reduce the saturated fat and salt in their diet.

ci

| Marks | 0 | 1 | 2 | 3 | Average |
|-------|----|----|----|----|---------|
| % | 15 | 12 | 24 | 49 | 2.07 |

Students needed to compare the two food production systems that were included in the question (batch production and continuous processing). Some comparison needed to be evident.

Batch:

- uses less complex technology
- uses more humans
- lower set up costs

Continuous:

- uses more technology
- less human labour
- higher set-up costs.

cii

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 18 | 20 | 62 | 1.43 |

Comparison was required in terms of quantity and cost for consumers. Sample answers included:

- quantity: batch production produces a smaller quantity than continuous processing
- cost: batch products are more expensive for the consumer than products made by continuous production.

ciii

| Marks | 0 | 1 | 2 | Average |
|-------|----|---|----|---------|
| % | 11 | 9 | 80 | 1.69 |

Answers needed to distinguish between products most suitable for making by batch or continuous processing, for example, batch: pizza from a pizza shop; continuous: biscuits at Arnotts factory or meat pies from Patties.

di

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 24 | 40 | 36 | 1.12 |

Students were required to explain either cook-chill or cook-freeze processing.

Cook-chill: the pie is prepared and partially cooked and then rapidly chilled in a blast chiller and packaged and stored in a refrigerator.

Cook-freeze: the pie is fully cooked, rapidly frozen and stored at low temperatures in the freezer (-18 to -30C).

dii-iii

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|-------|---|----|----|----|----|---------|
| % | 8 | 12 | 25 | 29 | 26 | 2.53 |

Answer needed to link to process chosen in previous response.

Students could choose between manufacturer/consumer.

Cook-chill advantages:

- ready to use – no thawing
- no need for freezer for home storage
- texture of food is not altered from fresh product
- better colour, flavour and presentation
- less loss of nutrients
- can be stored for two to three days.

Cook-freeze advantages:

- longer shelf life
- stores well.

Cook-chill disadvantages:

- short shelf life
- requires refrigeration
- needs refrigerated transport
- special equipment required to manufacture.

Cook-freeze disadvantages:

- requires a freezer to store
- takes longer to heat
- complete product must be heated.

Question 4

a

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|-------|----|----|----|----|----|---------|
| % | 25 | 21 | 25 | 13 | 16 | 1.73 |

This question asked students to explain two reasons for the development of genetically modified (GM) food and was poorly answered. Students needed to **explain** reasons for development not just give key words. The answers given were often not relevant for GM foods. Answers could have included two of:

- longer shelf life
- resistance to pests so less pesticides are used
- increased crop yields mean the same amount of land produces more crops
- less wastage therefore higher profits
- drought tolerant therefore less crop loss in dry season
- improved sensory and physical properties giving a better product
- increased nutritional value.

b

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|-------|----|----|----|----|----|---------|
| % | 27 | 24 | 26 | 11 | 12 | 1.58 |

This question was very poorly answered. Responses were often not related to GM foods. Students needed to explain why the areas they nominated were a concern that people may have genetically modified foods. Some possible responses were:

- long-term effects of eating GM foods are unknown
- new allergies may result from using GM foods
- possible cross-contamination of crops may result
- effectiveness of antibiotics may reduce.

c

| Marks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | Average |
|-------|----|---|----|----|----|---|----|---------|
| % | 22 | 9 | 17 | 18 | 14 | 9 | 11 | 2.62 |

This question asked students about two roles of Food Standards Australia and New Zealand and was very poorly answered. FSANZ is not involved at all in policing the Food Standards Code as suggested by many students. Students needed to identify and explain the importance of two roles that FSANZ is responsible for. Answers could include:

- protect public health and safety
- consumer information
- prevent fraud and deception
- promote fair trading
- promote trade and commerce
- consistency between domestic and international standards
- coordinating food recalls
- labeling – GM foods
- research new ingredients.

Question 5

The question was about types of product development and the benefits this creates for the manufacturer and consumer. Students were required to read an article about a new product to provide some direction for their answers.

a

| Marks | 0 | 1 | 2 | 3 | Average |
|-------|----|---|----|----|---------|
| % | 40 | 9 | 14 | 37 | 1.47 |

The type of product development outlined in the article is a line extension because an existing product is being altered.

b

| Marks | 0 | 1 | 2 | Average |
|-------|---|----|----|---------|
| % | 9 | 28 | 63 | 1.54 |

Benefits for consumer:

- increased variety of products
- more choice
- brand loyalty.

Benefits for manufacturer:

- increased market share
- increased profits
- retain present customers through offering variety.

c

| Marks | 0 | 1 | Average |
|-------|----|----|---------|
| % | 35 | 65 | 0.65 |

The product suggested needed to be another line extension and a similar product to that identified in part 5a. Examples could be:

- bite size chocolates
- change of flavour
- different coating
- additional or different ingredients
- health conscious emphasis.

d

| Marks | 0 | 1 | 2 | 3 | Average |
|-------|----|---|----|----|---------|
| % | 65 | 6 | 10 | 19 | 0.83 |

Students were asked to name and describe another type of product development. Many students used line extensions. Some responses were Me Too or Direct Copy, a copy of an existing product made by a competitor, for example honeycomb bar covered with chocolate.

Question 6

Students were provided with a description of PhysiCAL milk and UHT packaging. The questions referred to this information and asked students to provide factors that influenced the development of the PhysiCAL milk.

a

| Marks | 0 | 1 | Average |
|-------|----|----|---------|
| % | 90 | 10 | 0.10 |

Students only partly answered this question which asked what is a modified food product.

A sample response was:

A modified food product is where the physical/chemical properties of an existing product have been changed by the use of technology.

b

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|-------|----|---|----|----|----|---------|
| % | 13 | 9 | 30 | 17 | 31 | 2.42 |

From the factors listed, students were required to select two and explain how they influenced the development of the PhysiCAL milk.

For example:

- social pressures – body image, health benefits, cost
- consumer demands – economical, added nutrients, suitable for travel
- industry economics – longer shelf life, easy to transport, increased market share, stacks well
- technology – UHT processing, improved packaging.

c

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 18 | 17 | 65 | 1.46 |

A niche market for PhysiCAL milk could be health conscious people who wish to increase their calcium intake and reduce their fat consumption.

d

| Marks | 0 | 1 | 2 | Average |
|-------|---|----|----|---------|
| % | 6 | 22 | 72 | 1.65 |

Advantages for the consumer in using PhysiCAL rather than regular full fat milk could include increased nutrient content, higher calcium intake, increased shelf life, reduced fat and lighter in taste.

e

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|---------|
| % | 34 | 38 | 28 | 0.94 |

Sensory evaluation could involve providing samples of PhysiCAL milk for consumers to taste and evaluate the properties. Substituting PhysiCAL in milk-based recipes; for example, white sauce or egg custard, and evaluate properties, making a cappuccino to test frothing and evaluate.

Question 7

| Marks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Average |
|-------|----|---|----|----|----|----|----|----|---------|
| % | 24 | 8 | 10 | 11 | 12 | 12 | 11 | 12 | 3.20 |

Students were required to select one of the nominated packaging techniques and explain its features by filling in the table supplied. This question (similar to Question 4 in the 2002 examination) was poorly answered with students not choosing from the list provided or giving unrelated answers.

Sample responses are outlined below:

Aseptic – packaging of sterile liquid or semi-liquid food into a sterile container. Filling and sealing is done in a sterile environment, for example milk, fruit juices, custards and soups.

Reasons for development: extended shelf life, convenient, safe to consume and easy to transport.

Environmental considerations: package is biodegradable creating less long-term landfill.

Modified atmosphere packaging – a packaging system that changes or modifies the atmosphere or gas inside a package from air in order to extend the shelf life of food. This is sometimes described as ‘controlling the gaseous environment’, for example potato crisps, salad mixes, fresh pastas and fresh meats, cheese, fruit and vegetables.

Reasons for development: reduces microbial activity, preserves colour, prevents browning, controls ripening and mould growth, extends shelf life and retains moisture.

Environmental considerations: biodegradable packaging and reduces food waste.

Active packaging – use of either a plastic barrier film that allows transfer of gases into the food or a scavenging sachet that absorbs gas, for example this packaging type is used for fresh fruits and vegetables, packaged cured meats.

Reasons for development: controls condensation inside packaging, less mould, better quality product, reduces rancidity in vegetable oils and extends export life of fruits and vegetables.

Environmental considerations: minimal waste and less packaging is used.

Question 8

Students were required to name a key food commodity and its origins. They then had to use the commodity to answer the remaining parts of the question to identify the main steps in primary processing of this commodity. Fruits and

vegetables, cereals, fats and oils, milk, eggs, meat and poultry and fish are all key commodities and students could nominate specific foods, for example wheat, apple, eggs, butter, chicken or milk. Many students answered this question incorrectly or did not attempt all or part of this question. This area was also poorly attempted on last year's examination.

ai-ii

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|-------|----|---|----|----|----|-------------|
| % | 25 | 9 | 20 | 26 | 20 | 2.06 |

Suitable answers included:

Key food commodity: chicken or wheat or milk.

Origin: poultry or wheat plant or cow.

Primary processing: raw foods after harvest or slaughter are prepared for consumption individually or for turning into other food products. Wheat is cleaned, ground, sifted and packaged. Cows are milked; milk is checked, transported to dairy, pasteurised, homogenised, packaged and transported.

aiii

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|-------------|
| % | 65 | 16 | 19 | 0.54 |

Students were asked to explain an environmental implication of the primary processing of this key food commodity. For example, an environmental implication of the primary processing of the key food could be waste products if product is packaged, by-products produced, use of energy during processing or amount of pollution created.

aiv

| Marks | 0 | 1 | 2 | Average |
|-------|----|----|----|-------------|
| % | 38 | 31 | 31 | 0.93 |

Health and safety issues that need to be considered during primary processing of the key food commodity could be: need to ensure a clean environment, use of suitable equipment to avoid contamination, establishing a safe work area, correct storage temperatures and placement and prevention of possible contamination of foods from traces of chemicals or rodents.

bi

| Marks | 0 | 1 | 2 | 3 | Average |
|-------|----|----|----|----|-------------|
| % | 31 | 20 | 25 | 24 | 1.42 |

A food which results from the secondary processing of the original key food commodity was required and the main steps in secondary processing listed, for example bread – ingredients are mixed, allowed to prove or rise, shaped or formed, allowed to prove again, then baked and packaged; milk – is churned, heated and rennet and additives are added, the mixture is cut, drained, shaped and packaged as cheese.

bii-iii

| Marks | 0 | 1 | 2 | 3 | 4 | Average |
|-------|----|----|----|----|----|-------------|
| % | 38 | 18 | 19 | 11 | 14 | 1.44 |

An environmental implication of the secondary processing of the key food commodity could be: waste products produced during manufacture, whether the packaging used is biodegradable or can be recycled, use of energy in processing and storing, keeping pollution to a minimum, use of renewable packaging material, use of minimal packaging and use of reusable packaging-glass.

Health and safety issues that need to be considered during secondary processing of the key food commodity could be: ensure clean environment, use of clean equipment to avoid contamination, safe work area – location of benches, appliances and equipment.

The height of benches and correct lighting and ventilation also need to be considered along with correct storage temperatures and placement in sealed containers. A Hazard Analysis of Critical Control Points (HACCP) plan should be in place; stock rotation, personal hygiene of workers, use of gloves to prevent cross contamination and correct labeling of products could also be mentioned.

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41 St Andrews Place, East Melbourne 3002

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