

2015 HSC Food Technology Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	D
2	C
3	C
4	D
5	A
6	C
7	A
8	B
9	B
10	A
11	B
12	A
13	B
14	A
15	C
16	C
17	C
18	D
19	C
20	B

Section II

Question 21 (a)

Criteria	Marks
• Provide reason/s as to why the nominated target market is suitable for the product	2
• Nominates an appropriate target market for the product	1

Sample answer:

A teenage student would be an appropriate target market for the product. The product could be enjoyed at school where they do not have access to heating devices.

Question 21 (b)

Criteria	Marks
• Provides characteristics and features of a place and distribution system that could be used to market the product to the target market	3
• Sketches in general terms a place and distribution system that could be used to market the product to the target market	2
• Provides general information on a place and/or distribution system/s	1

Sample answer:

The product could be distributed through school canteens across the state. Students attend schools and would enjoy a hot drink at lunchtime. This would be particularly true in winter months when distribution could be increased. The manufacturer may also choose to develop a stand, which could be placed on the counter as a visual reminder.

Question 21 (c)

Criteria	Marks
• Shows a relationship between suitable strategies for the promotion of the product and the target market	4
• Provides characteristics and features of strategies for the promotion of the product to the target market	3
• Indicates the main features of a strategy for the promotion of the product to the target market	2
• Names a strategy for the promotion of the product to the target market	1

Sample answer:

The product could be promoted in teenage magazines such as *Dolly*. A celebrity such as Taylor Swift could be photographed drinking the hot chocolate. This would be a medium which teenagers would access and using a celebrity increases the attraction. Sample products could also be given out at school bus stops and train stations located near schools to generate interest.

Question 22 (a) (i)

Criteria	Marks
• Sketches in general terms a research and development activity carried out by the organisation	2
• Recognises and names a research and/or development activity	1

Sample answer:

‘Organisation A’ has conducted research and development into expanding their flavour range for their gelato products. Consumers have provided suggestions and the production team has experimented with flavour combinations.

Question 22 (a) (ii)

Criteria	Marks
• Shows the relationship between the organisation and its impact on the environment	4
• Provides characteristics and features of ways in which the organisation affects the environment	2–3
• General information on environmental impact	1

Sample answer:

[Answer will depend on the organisation selected. Environmental impact can be due to production methods, processing techniques, waste, pollution, packaging and energy consumption.]

‘Organisation A’ impacts on the environment in a number of ways. The processing techniques are highly energy dependent as heating and cooling are essential to the safe manufacture of the product. This impacts on the environment as it uses non-renewable fossil fuels to source the electricity.

Waste water is recycled and used for cleaning purposes within the factory floor and outdoors, aiming to minimise environmental impact.

Question 22 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides characteristics and features of the benefits of ecologically sustainable food production methods 	3
<ul style="list-style-type: none"> Sketches in general terms benefits of ecologically sustainable food production methods OR <ul style="list-style-type: none"> Recognises and names benefits of ecologically sustainable food production methods 	2
<ul style="list-style-type: none"> Provides general information on production methods 	1

Sample answer:

Ecologically sustainable production methods are those which will continue to preserve our environment for future generations.

For example, land can be made more fertile by using crop rotation systems to return the soil to its natural state after crops have been harvested.

Less clearing of trees will ensure crops are sheltered from the wind and assists in preventing soil erosion. Cleaner waterways can be achieved by reduced use of chemicals in farming.

Question 23 (a)

Criteria	Marks
<ul style="list-style-type: none"> Correctly defines malnutrition 	2
<ul style="list-style-type: none"> Identifies an aspect of malnutrition 	1

Sample answer:

Malnutrition is the over or under consumption of one or more nutrients in the diet.

Question 23 (b)

Criteria	Marks
<ul style="list-style-type: none"> Provides characteristics and features of the physical effects of malnutrition for a specific group 	3
<ul style="list-style-type: none"> Sketches in general terms the physical effect/s of malnutrition for a specific group 	2
<ul style="list-style-type: none"> Provides general information on physical effect/s of malnutrition 	1

Sample answer:

Name of Group: Female Adolescents

Obesity in teenagers results in strain on the body, leading to increased likelihood of developing diseases such as heart disease and diabetes. It also makes everyday tasks more difficult as there is additional adipose tissue.

Question 23 (c)

Criteria	Marks
<ul style="list-style-type: none">• Makes a judgement about the value of dietary supplements in the prevention and treatment of conditions caused by malnutrition. Includes a range of relevant examples	5
<ul style="list-style-type: none">• Provides characteristics and features of the role of dietary supplements in the prevention and/or treatment of condition/s caused by malnutrition. Includes example/s	3–4
<ul style="list-style-type: none">• Provides general information on the role of dietary supplements	1–2

Sample answer:

Supplements can be useful to address initial issues of malnutrition in the diet. For example, people who are suffering from anaemia may be advised by their doctor to consume an iron and vitamin C supplement to improve their iron intake and absorption. Further investigation of their diet may indicate that this form of malnutrition could be better improved by modifications to their diet and therefore the consumption of supplements would be a short-term management plan.

Individuals susceptible to osteoporosis, such as those with lactose intolerance, may benefit from consuming a calcium supplement to ensure maximum bone density is achieved. Food sources of nutrients are better absorbed by the body and therefore dietary modifications are always superior in treating conditions of malnutrition.

Question 24

Criteria	Marks
<ul style="list-style-type: none"> Shows a relationship between current technological developments in food packaging and their impact on both the manufacturer and consumer 	6–7
<ul style="list-style-type: none"> Provides characteristics and features of current technological developments in food packaging and their impact on the manufacturer and/or consumer 	4–5
<ul style="list-style-type: none"> Indicates the features of technological developments in food packaging and/or impacts on the food manufacturer and/or consumer 	2–3
<ul style="list-style-type: none"> Provides general information on food packaging 	1

Sample answer:

The development of new technology has significantly changed the way our food is packaged, making it lighter, more convenient, environmentally friendly, intelligent, as well as increasing the shelf-life of packaged food.

Steel alloys have resulted in can walls that are thinner and lighter, providing advantages for storage and distribution, reducing transport costs for the manufacturer and adding to ease of use for the consumer. It has also enabled the design of ring pull lids for consumer convenience.

Technologies using corn and wheat starch as well as cellulose residues are being developed. These are biodegradable therefore providing consumers with the choice to buy environmentally friendly products. It also allows the manufacturer to market their product as addressing environmental issues.

The use of perforated films and a range of gas mixes are used in modified atmosphere packaging and extend the shelf-life of products. This adds to consumer convenience and minimises waste, thereby saving money.

Sensors allow packaging to respond intelligently to changes within a package indicating ripeness or freshness of the packaged product. Radio waves relay information about conditions within the package to a database, allowing manufacturers to monitor packaged foods, reduce food waste and cost. Consumers can also reduce the number of visits to the supermarket. A greater range of packaging materials provides opportunities for manufacturers to extend the shelf-life of their products through techniques such as vacuum sealing and sous vide.

Question 25 (a)

Criteria	Marks
• Provides characteristics and features of the functions of food additives in the product	3
• Sketches in general terms the functions of food additives in the product	2
• Provides general information on food additives	1

Sample answer:

Maize thickeners are used to make a food more viscous and ensure a consistent texture. Vegetable gums are used to ensure consistency, add texture and structure to food. Flavours can be included to restore flavour and aroma lost through processing. Colours may be added to restore colour lost through processing and/or to enhance the appearance of the food.

Question 25 (b)

Criteria	Marks
• Makes evident the relationship between the canning process and the extension of the shelf-life of this type of product	4
• Provides characteristics and features of the canning process	3
• Sketches in general terms the canning process	2
• Provides general information on preservation	1

Sample answer:

Canning is a heat process which sterilises the food and excludes air resulting in a shelf-life of more than 2 years.

The canning process is effective because the temperature used destroys microorganisms and their spores. The process also eliminates air, which means that microorganisms cannot survive. The sealed can also prevents entry of microorganisms.

Some canning methods use the addition of chemicals such as sugar and salt or changes to the pH to add an additional hurdle for microorganisms thereby extending shelf-life.

Question 26

Criteria	Marks
• Makes a judgement about the effects of cultural and social practices on the nutritional status of Australians	7–8
• Provides characteristics and features of the effects that cultural and social practices have on the nutritional status of Australians	5–6
• Sketches in general terms the effects that cultural and social practices have on the nutritional status of Australians	3–4
• Provides general information on cultural and social practices and/or the nutritional status of Australians	1–2

Sample answer:

Cultural and social practices can affect a person's nutritional status. Some cultures may follow a vegetarian lifestyle, such as those practising Buddhism and Hinduism. Avoiding the eating of animal foods such as meat and dairy may increase the likelihood of developing health issues associated with low levels of iron, such as anaemia or poor growth and development related to lack of protein. However, such a diet may be beneficial due to higher consumption of whole-grains, plant foods and low saturated fat. This may result in a reduced risk of heart disease, hypertension and obesity.

In today's society we are all time poor and generally lead busy lifestyles, resulting in the increased consumption of take-away, pre-prepared and convenience foods that require less time to prepare. These types of foods are often high in salt, sugar and fat, which result in the increased likelihood of developing hypertension, diabetes, overweight and obesity.

Increasingly, fast food outlets are catering for the greater demand from society for healthier foods. This is seen in the inclusion of fruit, salad and water on menus. This provides the consumer with options to make nutritionally sound choices when eating out.

Section III

Question 27 (a)

Criteria	Marks
• Sketches in general terms an internal factor that would have an impact on the development of the product	2
• Recognises and names an internal factor	1

Sample answer:

The health food company would need to ensure that the personnel (staff) employed by the company have the necessary skills and expertise to produce the new range of yoghurt and muesli 'breakfast-on-the-go' products. Alternatively, staff would be provided with the necessary training to produce the product.

Question 27 (b)

Criteria	Marks
• Provides characteristics and features of methods that could be used to test the prototype of the product	5
• Sketches in general terms method/s that could be used to test a prototype	3–4
• Provides general information on prototype testing	1–2

Sample answer:

At the prototype stage the product would be tested to determine storage conditions and shelf life. This would involve testing the product under a range of conditions, such as dry and cold storage.

Consumer focus groups could also be used to test packaging and label design. Panellists could provide feedback on sensory properties such as taste and texture. Refinements could be made at this stage. This could be done internally or by a market research company.

Question 27 (c)

Criteria	Marks
• Shows a relationship between the processes that transform raw materials into the manufactured food product	7–8
• Provides characteristics and features of processes that could be used to transform raw materials into the manufactured food product	5–6
• Sketches in general terms a process/processes that could be used to transform the raw materials into a manufactured food product	3–4
• Provides general information on the transformation of raw materials and/or food manufacture	1–2

Sample answer:

Muesli may contain a mixture of oats, dried fruit, seeds and nuts. Raw materials would be inspected on arrival at the factory for moisture content, rodent infestation and whether they meet product specifications. This process ensures quality of the raw materials.

The oats are then toasted. This process involves the oats passing through a heating element such as a tunnel oven. After this operation they would be inspected for uniformity of colour. Those that appeared too burnt would be withdrawn from the production line to ensure product quality. Once cooled the oats would be mixed with the seeds, nuts and dried fruit to create the muesli mix.

In the production of yoghurt, the milk needs to be pasteurised which involves heating the milk to 72°C for 15 seconds using a plate heat exchanger. The milk is then rapidly cooled to 4°C. The heating of the milk destroys the pathogenic bacteria and the cooling of the milk removes the product from the danger zone which could cause bacteria to multiply.

Lactic acid is then added to ferment and thicken the milk thus creating the yoghurt product.

The yoghurt and the muesli are each transported to separate hoppers. Hoppers are large storage facilities that then dispense the product in controlled portions into the package.

The package is moved along a conveyor belt where the label is applied and the package is sealed to ensure that the product is kept airtight, reducing the chance of food spoilage.

The label is then dated and batch stamped for identification purposes in case of a recall. The product may go through further safety checks, such as scanning through a metal detector to ensure no hazards are contained within the product.

The product is then packed into boxes and stored in a cool room at 4°C to maintain quality and food safety prior to distribution.

Section IV

Question 28

Criteria	Marks
<ul style="list-style-type: none"> Shows a strong relationship between food manufacture and food product development and how they are affected by a range of government policies and legislation Presents a logical and cohesive response using appropriate terminology and relevant examples 	13–15
<ul style="list-style-type: none"> Shows a relationship between food manufacture and food product development and how they are affected by government policy and/or legislation Presents a logical and cohesive response and/or using appropriate terminology and/or relevant examples 	10–12
<ul style="list-style-type: none"> Provides characteristics and features of ways in which food manufacture and food product development are affected by government policy and/or legislation Presents a logical and cohesive response and/or uses appropriate terminology and/or relevant examples 	7–9
<ul style="list-style-type: none"> Sketches in general terms ways in which food manufacture and food product development are affected by government policy and/or legislation 	4–6
<ul style="list-style-type: none"> Provides general information on government policy and/or legislation and/or food manufacture and/or food product development 	1–3

Sample answer:

There is a variety of government legislation and policies that relate directly to the production of food. Food manufacturers and food product developers are legally required to meet legislation and failure to do so may lead to fines, prosecution and/or loss of business. Following government policy may result in best practice and a competitive edge for producers. As a result, food producers have developed a variety of systems to ensure compliance to policy and legislation.

Food Standards Australia and New Zealand (FSANZ) was established through the *Food Standards Australia and New Zealand Act 1991* and set the standards that must be met before food is sold in Australia. In particular, it has developed and reviews the Australian and New Zealand Food Standards Code (ANZFSC) with which food manufacturers and food product developers must comply. This includes standards on labelling, classification of classes of foods including cereals, meat, fish and eggs. FSANZ also develops codes of practice to assist in the implementation of the legislation.

FSANZ has developed two mandatory fortification standards with which producers of bread must comply. Wheat flour and iodised salt used in the manufacture of bread must be fortified with folic acid and salt. Bread products that do not meet the fortification standards cannot be sold commercially.

In NSW food producers must follow the *Food Act 2003* (NSW). The Act provides for the application of the ANZFSC. The main aim of this Act is to ensure that food for sale is both safe and suitable for human consumption. Food manufacturers ensure that they are meeting the requirements of the Act by having quality assurance procedures in place. To ensure that food is being handled in a safe manner, food manufacturers would provide staff training and

personal protective equipment. For example, the use of hairnets and regular hand washing or use of gloves would reduce the risk of food contamination.

Under the Food Act, food manufacturers and producers also need to ensure that food provided for sale is known to be safe by responding to concerns. For example if there has been a threat that food has been contaminated with glass the manufacturer, with the assistance of FSANZ, would organise a recall of any product that may be affected.

The ANZFSO also sets out requirements for labelling. Food product developers need to ensure that all the legal requirements are included on the product label before the product can be sold in Australia. Policy around health star ratings for product labels is currently being negotiated and may become another compliance issue for food producers.

The *Work Health and Safety Act 2011* (NSW) must also be implemented by food producers. An example of this is the fitting of guards on machinery with moving parts, a second example of this is rotation of workers who are involved in repetitive tasks, which may lead to fatigue and ultimately injury. Failure to comply with this legislation may result in legal action through WorkCover.

Food producers may respond to health and nutrition policy such as the Australian Dietary Guidelines. While compliance with this policy is not mandatory, manufacturers may choose to design foods based on the guidelines with the aim to increase market share. For example, it is now common for many foods to be promoted as reduced salt.

Australia's trade policy has led to free trade agreements with many countries. This creates opportunities for new food product development so that producers can remain competitive in a global economy.

2015 HSC Food Technology Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	AFI — Sectors	H1.2
2	1	AFI — Career opportunities	H1.2
3	1	Nutrition — Functional foods	H2.1
4	1	FPD — Feasibility study	H4.1
5	1	Nutrition — Nutritionally modified foods	H2.1
6	1	Nutrition — Active non-nutrients	H2.1
7	1	FPD — Steps in food product development	H4.1
8	1	AFI — Advisory groups	H1.2
9	1	FPD — SWOT	H1.3
10	1	FPD — Types of FPD and profitability	H1.3
11	1	AFI — Biotechnology	H1.2
12	1	Nutrition — Physical effects of over and under nutrition	H2.1
13	1	AFI — Levels of operation	H3.1
14	1	FPD — Price structures	H1.3
15	1	Food Manufacture — Production systems	H1.1
16	1	Food Manufacture — Functions of packaging	H1.1
17	1	Nutrition — Allergies	H2.1
18	1	Food Manufacture — Raw materials	H1.1
19	1	Food Manufacture — Causes of food spoilage	H4.2
20	1	Food Manufacture — Causes of food spoilage	H4.2

Section II

Question	Marks	Content	Syllabus outcomes
21 (a)	2	FPD — Marketing plan – Target market	H1.3
21 (b)	3	FPD — Marketing plan – Place and distribution	H1.3
21 (c)	4	FPD — Marketing plan – Promotion	H1.3
22 (a) (i)	2	AFI — Research and development	H3.1
22 (a) (ii)	4	AFI — Organisational and environmental impacts	H1.4
22 (b)	3	AFI — Ecological sustainable production	H1.2
23 (a)	2	Nutrition — Malnutrition	H2.1
23 (b)	3	Nutrition — Dietary needs of specific groups	H3.2
23 (c)	5	Nutrition — Role of supplements	H2.1
24	7	Food Manufacture — Technological developments – packaging	H1.1
25 (a)	3	Food Manufacture — Additives	H1.1
25 (b)	4	Food Manufacture — Preserving and canning	H4.2
26	8	Nutrition — Cultural and social practices	H2.1

Section III

Question	Marks	Content	Syllabus outcomes
27 (a)	2	FPD — Internal factors	H1.3
27 (b)	5	FPD — Steps in production –Prototype testing	H4.1
27 (c)	8	Food Manufacture — Processes	H1.1

Section IV

Question	Marks	Content	Syllabus outcomes
28	15	Manufacturing — Quality management consolidations to provide safe food AFI — Policy and legislation Food Product development – External factors including political environment	H1.1 H1.2 H1.3