



FOOD SCIENCE AND TECHNOLOGY

ATAR course examination 2022

Marking key

Marking keys are an explicit statement about what the examining panel expect of candidates when they respond to particular examination items. They help ensure a consistent interpretation of the criteria that guide the awarding of marks.

Section One: Multiple-choice

15% (15 Marks)

Question	Answer
1	b
2	a
3	a
4	c
5	d
6	c
7	d
8	c
9	b
10	a
11	a
12	b
13	d
14	b
15	c

Section Two: Short answer

55% (74 Marks)

Question 16

(8 marks)

Complete the costing of the Creamy Chicken and Sundried Tomato Pasta ingredient list and calculate the costing to cater for 30 serves.

Description			Marks
For each ingredient (5 x 1 mark)			
Calculates the cost of the ingredient			1
Subtotal			5
Other costs			
Calculates the cost of ingredient list			1
Calculates the cost per serve			1
Calculates the cost to serve 30 people			1
Subtotal			3
Total			8
Ingredients to serve 4 people	Cost per package	Size of package	Cost per ingredient
16 g minced garlic	\$1.25	250 g	8c
100 g sundried tomatoes	\$4.70	250 g	\$1.88
2 tbsp olive oil	\$15.00	750 ml	80c
400 g chicken breast	\$9.50	1 kg	\$3.80
½ cup cream	\$3.20	600 ml	67c
½ cup milk	\$1.20	1 L	15c
1 cup mozzarella cheese	\$7.70	700 g	\$2.75
1 tbsp plain flour	\$1.00	1 kg	2c
250 g pasta	\$2.70	500 g	\$1.35
1 tbsp fresh basil	\$3.00	15 g	\$1.00
2 tbsp toasted pine nuts	\$4.00	50 g	\$1.20
½ tsp dried chilli flakes	\$2.20	35 g	16c
Cost of ingredient list			\$13.86
Cost per serve			\$3.47
Cost to serve 30 people			\$104.10

Question 17

(8 marks)

Describe **four** ways in which the availability of commercially processed foods impact on Tom as a consumer.

Description	Marks
For each impact (4 x 2 marks)	
Describes the impact.	2
States the impact.	1
Total	8
<p>Answers could include:</p> <p>Food safety:</p> <ul style="list-style-type: none"> • Tom wants to ensure he prepares safe meals for his family • commercially processed foods comply with HACCP and are safe to consume. <p>Food availability:</p> <ul style="list-style-type: none"> • Tom does not have a lot of time for shopping • commercially processed foods increase the range of food available to him. <p>Extend shelf life:</p> <ul style="list-style-type: none"> • commercially processed foods have an extended shelf life • this reduces the number of occasions Tom has to shop. <p>Convenience:</p> <ul style="list-style-type: none"> • commercially processed foods are usually partly or fully cooked • this reduces the time Tom has to spend on meal preparation. <p>Health:</p> <ul style="list-style-type: none"> • commercially processed foods can be fortified or value added with the nutrients lost during processing replaced • Tom has a wide range of foods from which to choose to meet the health needs of his family. <p>Price:</p> <ul style="list-style-type: none"> • the more processing a food has undergone the more expensive it is • Tom has a generous budget and can afford to purchase commercially processed food. <p>Accept other relevant answers.</p>	

Question 18

(8 marks)

- (a) Describe **two** objectives of the principal piece of legislation regulating the production and sale of food in Western Australia. (4 marks)

Description	Marks
For each objective (2 x 2 marks)	
Describes an objective.	2
States an objective.	1
Total	4
Answers could include: <ul style="list-style-type: none"> • to ensure food for sale is both safe and suitable for human consumption • includes safe food handling or a cleaning regime or using reputable suppliers or ensuring equipment is in good working order • to prevent misleading conduct in connection with the sale of food • includes describing food correctly or correct food labelling or correct allergen warnings • to provide for the application in WA of the <i>Australia New Zealand Food Standards Code</i> • which covers cleanliness or sanitation or hygiene or food serving practices or a range of other aspects that go into the preparation and provision of food. Accept other relevant answers.	

- (b) Identify the State Government department that ensures food safety laws and regulations are enforced in Western Australia. (1 mark)

Description	Marks
Identifies the department.	1
Total	1
The Western Australian Department of Health.	

- (c) Explain the role of the Environmental Health Officer in supporting local government to interpret and administer the *Food Act 2008* (WA). (3 marks)

Description	Marks
Explains the role of the EHO.	3
Describes the role of the EHO.	2
Makes a statement about the role of the EHO.	1
Total	3
Answers could include: <ul style="list-style-type: none"> • employed by local councils to enforce the Food Act • enforce the Food Act on all food businesses through inspections or carry out inspections on food and places of sale • have the power to fine or shut down businesses that do not comply with the <i>Food Act 2008</i> (WA) • monitor or enforce public health and safety regulations • carry out inspections at locations where food is kept • ensure that food is handled and stored in a safe and hygienic manner • reviews food safety management plans or occupational health and safety plans. • advises on or enforces relevant legislation • implements prevention programs or strategies for food safety. Accept other relevant answers.	

Question 19

(11 marks)

- (a) Identify the **two** groups whose members were least likely to eat fruit and state the percentages of each of these groups. (4 marks)

Description	Marks
For each group (2 x 2 marks)	
Identifies a group least likely to eat fruit.	1
Calculates the percentage they form of the group.	1
Total	4
Answers could include:	
<ul style="list-style-type: none"> • Teenage males aged 14–18 = 45% • Young adult males aged 19–30 = 38% 	

- (b) Calculate the percentage difference of fruit consumption between females aged 4–8 and females aged 51–70. Show workings. (3 marks)

Description	Marks
Identifies the consumption of the groups.	1
Calculates the overall percentage difference.	1
Shows workings.	1
Total	3
<ul style="list-style-type: none"> • 4–8 = 80% • 51–70 = 70% • 80% – 70% = 10% difference 	

- (c) Identify **two** trends relating to the consumption of fruit indicated in the graph. (2 marks)

Description	Marks
For each (2 x 1 mark)	
Identifies a trend.	1
Total	2
Answers could include:	
<ul style="list-style-type: none"> • children under the age of 8 had the highest fruit consumption • females were more likely to consume fruit beyond the age of 3 • females had a higher rate of fruit consumption than males • fruit consumption fell to its lowest amount in adolescents and young adults • fruit was consumed by six out of ten people overall • adolescent and young adult males were the least likely to eat fruit. 	
Accept other relevant answers.	

- (d) Describe **one** factor that might influence the pattern of fruit consumption shown in the graph. (2 marks)

Description	Marks
Describes how the factor influences fruit consumption.	2
Makes a statement about how the factor influences fruit consumption.	1
Total	2
<p>Answers could include:</p> <p>Social:</p> <ul style="list-style-type: none"> • fruit consumption in young children is largely dictated by older guardians or carers • guardians find fruit easy to prepare or pack or carers need to be accountable when feeding children in their care • adolescents may have more choice or follow peer behaviour • pre-prepared snacks are more readily available in social situations or strong peer pressure towards eating unhealthy food • eating healthy foods may be considered as a sign of femininity • females often bring cut up fruit to school or risked being bullied if they did not eat healthily. <p>Economic:</p> <ul style="list-style-type: none"> • fruit in season is inexpensive or readily available • consumers can purchase a lot for their money • consumers may not risk wasting money on fruit when there is no guarantee of a pleasant taste • pre-packaged snacks always taste the same • lower socio-economic groups may find fruit expensive • consumers purchase inexpensive processed foods • adolescents expect parents or guardians to purchase and provide fruit for them • adolescents do not think of buying fruit with their own money. <p>Ethical:</p> <ul style="list-style-type: none"> • older consumers may choose a vegetarian or vegan diet • increases fruit consumption when consuming an alternative diet. <p>Environment:</p> <ul style="list-style-type: none"> • seasonality means inexpensive fruit is not available in local areas at all times • consumers experience low access to fresh fruit of high quality at certain times of the year. 	
Accept other relevant answers.	

Question 20

(10 marks)

(a) Describe **one** way in which **each** of the following factors can impact on the properties of the butterfly cakes during production:

- ingredients
- equipment **or** storage.

(4 marks)

Description	Marks
For each factor (2 x 2 marks)	
Describes the impact the factor can have on the properties of food.	2
States the impact the factor can have on the properties of food.	1
Total	4
<p>Answers could include:</p> <p>Ingredients:</p> <ul style="list-style-type: none"> • use of caster sugar which is ground finer than granulated sugar for easier dissolving ability • use of 6 eggs to build volume • use of self-raising flour which has added raising agent allows leavening to occur or increases aeration • use of cream which has been chilled allows cream to whip more efficiently and effectively • use of heavy cream which has a higher fat content provides richer, creamier texture • use of butter which has a high fat content allows for steam and carbon dioxide to be trapped in the batter or improves flavour. <p>Equipment or storage:</p> <ul style="list-style-type: none"> • preheated moderate oven temperature assists immediate aeration or dextrinisation of cupcakes • use of electric beater for creaming butter and sugar increases the inclusion of air which maximises aeration • use of sieve for flour increases the inclusion of air which maximises aeration • maintain clean equipment prevents contamination • store perishable ingredients outside temperature danger zone (5–60°C) to prevent spoilage by microbial development • store non-perishable ingredients in sealed containers to prevent insect infestation or moisture absorption • cupcake baking tray lined with baking paper. 	
Accept other relevant answers.	

(b) Describe how **three** food additives impact on the properties of the cupcakes. (6 marks)

Description	Marks
For each additive (3 x 2 marks)	
Describes the purpose of additive.	2
States the purpose of additive.	1
Total	6
<p>Answers could include:</p> <p>Anti-caking agents:</p> <ul style="list-style-type: none"> prevent dry products from clumping and allows them to flow freely found in common baking products such as flour or custard powder or icing sugar. <p>Artificial sweeteners:</p> <ul style="list-style-type: none"> a substitute for sugar to reduce kilojoule content can be used in the cupcake, suitable for people on special diets or diabetics. <p>Colouring:</p> <ul style="list-style-type: none"> enhances appearance of products colourings are often used to restore colour loss due to processing, can be used in the cupcake mixture. <p>Flavouring:</p> <ul style="list-style-type: none"> enhance flavour of products used to simulate flavours such as vanilla essence or chocolate essence for the cake. <p>Humectants:</p> <ul style="list-style-type: none"> attract and absorbs moisture from the air as in icing sugar prevent food from drying out. <p>Preservatives:</p> <ul style="list-style-type: none"> extend shelf life by preventing bacterial growth in all the cup cakes delay growth of microorganisms. <p>Bleaching agents:</p> <ul style="list-style-type: none"> improves appearance or colour of products added to products such as flour to whiten. <p>Bulking agents:</p> <ul style="list-style-type: none"> starches or dextrins can be used to replace sugar in cake mixes they make up the weight and volume of the removed sugar or give texture to cakes and fruit cakes. 	
Accept other relevant answers.	

Question 21

(10 marks)

- (a) Describe how **three** product placement strategies used by supermarkets may be of concern to consumers. (6 marks)

Description	Marks
For each product placement strategy (3 x 2 marks)	
Describes a product placement strategy.	2
Identifies a product placement strategy.	1
Total	6
<p>Answers could include:</p> <p>Generic products:</p> <ul style="list-style-type: none"> generic products are not placed at eye level makes it difficult for consumers to find the cheaper products. <p>Rear of the store:</p> <ul style="list-style-type: none"> staples are placed at the rear of the store customers must pass other products to reach staples, induces them to impulse purchase or causes inconvenience. <p>Shelf stacking:</p> <ul style="list-style-type: none"> the most recent products are placed to the back of shelves with those with an earlier use-by-date at the front consumers automatically choose from the front of shelves and choose the least fresh products. <p>Volume of product:</p> <ul style="list-style-type: none"> discretionary foods often have a high number of facings which can increase sales due to visibility non-essential food items high in saturated fat, sodium and sugar which may lead to diet related diseases such as cardiovascular disease, type 2 diabetes or obesity. <p>Checkout extras:</p> <ul style="list-style-type: none"> add impulse sales. While a customer waits, of foods that are high in saturated fat, sodium and sugar or encourages pester power which may lead to diet related diseases such as cardiovascular disease, type 2 diabetes or obesity. <p>Eye level:</p> <ul style="list-style-type: none"> discretionary foods are often placed at eye level as this is 'buy level' leading to purchasing of products which are not essential or more expensive or the consumer did not intend to purchase. <p>Entrance to supermarket:</p> <ul style="list-style-type: none"> first products consumers see when entering store, often include stands displaying discretionary products which are often large or colourful or have multiple facings of each product causes increased visibility to consumers, which can increase sales of energy dense foods. 	
Accept other relevant answers.	

- (b) Discuss **two** reasons why advertising directed at children is of concern to consumers. (4 marks)

Description	Marks
For each reason (2 x 2 marks)	
Discusses reason for concern.	2
States a reason for concern.	1
Total	4
<p>Answers could include:</p> <ul style="list-style-type: none"> • advertising is very persuasive, it plays an important role in shaping children's eating habits • fast food is energy dense or high in saturated fat or sodium or sugar this can lead to diet related diseases in the long term, such as obesity or cardiovascular disease or type 2 diabetes • the advertisement is being promoted during a time when many children may be watching TV which may increase 'pester power' • some parents may not possess the nutritional knowledge to counteract misleading marketing messages this may lead to parents believing they are purchasing nutrient rich foods for their children • advertising and marketing to children is self-regulatory so brands may push boundaries of the code it is unlikely an inappropriate advertisement would be removed unless there are multiple complaints • due to the high buying power, popular brands will often pay for their advertisement to be played multiple times during high viewing times for children the repetition builds brand loyalty or increases pester power • celebrities and other idols may be used when promoting fast-food increasing the desire from children to want the product or they should eat the product to become an elite sports player too • fast-food aimed at children often has competitions or premiums or toys that can be collected if you purchase • the product may require multiple purchases of the energy dense food or can cause increased pester power from children in order to get parents to purchase the food products. 	
Accept other relevant answers.	

Question 22

(11 marks)

- (a) Identify and describe
- three**
- benefits of genetic modification in food production. (9 marks)

Description	Marks
Identifies a benefit of genetic modification.	1
Subtotal	3
For each identified benefit (3 x 2 marks)	
Describes a benefit of genetic modification.	2
Makes a statement about a benefit of genetic modification.	1
Subtotal	6
Total	9
<p>Answers could include:</p> <p>Improved yield:</p> <ul style="list-style-type: none"> ability to be able to control the growth of crops in different conditions produces increased crops in difficult to cultivate areas. e.g. drought resistant crops, crops tolerant to high salt soils increases the ability to feed more people globally increase in the efficiency of how plants take up nutrients for growth means a shorter growing period increases the number of harvest periods in a yearly cycle. <p>Improved nutrition:</p> <ul style="list-style-type: none"> soybeans genetically modified to produce less trans fats and more mono-unsaturated fats improve health outcomes GM has been used to develop a new canola with high levels of omega-3 fatty acids Omega-3 fatty acid is an important nutrient that keeps us healthy Golden rice produces beta-carotene Golden bananas (beta-carotene) which helps to fight against Vitamin A deficiency and the serious health impacts that can result GM foods are as nutritious as non-GM foods in some cases the nutrient content can be increased. <p>Resistance to environmental conditions:</p> <ul style="list-style-type: none"> drought resistant crops reduce the need for extensive irrigation systems insect resistant GM crops reduce the need for pesticides reduced use of pesticides reduces runoff of pesticides into waterways. <p>Improved sensory properties:</p> <ul style="list-style-type: none"> soybeans with a modified fatty acid content that makes the oil better suited for frying. <p>Lower commodity prices for the consumer:</p> <ul style="list-style-type: none"> less reliance on chemical fertilisers or savings spent on pesticides or fertilisers reduces cost to producers which is passed on to consumers increased productivity of GM crops reduces the price of staple foods consumed in developing countries <div style="border: 1px dashed black; padding: 5px; text-align: center;"> <p>For copyright reasons this text cannot be reproduced in the online version of this document.</p> </div>	
Accept other relevant answers.	

- (b) Describe **one** way in which the risks of genetic modification are managed in Australia. (2 marks)

Description	Marks
Describes how risks are managed.	2
Makes a statement about how risks are managed.	1
Total	2
<p>Answers could include:</p> <ul style="list-style-type: none"> • government regulators overseeing the use of genetically modified (GM) technologies and products have a mandate to base their decisions on the best available scientific evidence • assessments are conducted on a case-by-case basis or the regulators are confident that any food products approved are as safe as their conventional counterparts • GM food has been in our food supply for over 20 years or research around the world and by <i>Australia New Zealand Food Standards Code</i> has shown that GM foods are as safe to eat as non-GM foods • before GM foods can be sold, they undergo a thorough assessment to confirm they are just as safe as non-GM foods and offer the same or improved nutritional benefits • when GM food is assessed any new proteins are studied for their potential to be allergenic • determines whether or not the GM food can be approved for sale • GM food products are regulated by <i>Australia New Zealand Food Standards Code</i> • GM products are subject to at least as much scientific scrutiny as other foods. <p>Accept other relevant answers.</p>	

Question 23

(8 marks)

Describe the influence of **each** of the following on the global food supply.

- government policies
- production of biofuels
- land ownership
- natural disasters.

Description	Marks
For each influence (4 x 2 marks)	
Describes the influence.	2
Makes a statement about an influence.	1
Total	8
<p>Answers could include:</p> <p>Government policies:</p> <ul style="list-style-type: none"> • free trade agreements have led to a gradual reduction in taxes added to imported goods has led to greater competition from overseas markets and access to more foods • fair trade promotes fair and honest business practices that protect both consumers and traders it enforces sanctions against a wide range of unfair trading practices rising cost of fuel caused by wars in other countries (Ukraine) leads to increase in food prices/transport costs etc. • embargos are a complete ban on exports or imports reduces variety of food products available • tariff are an increase cost added to the price of product reduce availability to some consumers • subsidies are temporary financial payments to farmers when market prices are below production costs ensure farmers continue producing, thus maintaining the availability of products <p>Production of biofuels:</p> <ul style="list-style-type: none"> • when biofuels are produced from crops that could have been used for food, they directly reduce food supplies when the crop is used to produce biofuels the land it is grown on is land that could produce a food crop. <p>Land ownership:</p> <ul style="list-style-type: none"> • security of tenure is key to improving living standards for people who depend on the land for their food and livelihood without such security there is little incentive to improve soil or irrigation or livestock • land ownership is usually highly concentrated with a small number of people controlling the way land is used when land ownership is concentrated with multinational organisations they control markets, pricing and resources. <p>Natural disasters:</p> <ul style="list-style-type: none"> • natural disasters can destroy infrastructure such as transport systems without these infrastructures food cannot be transported around the globe • natural disasters such as floods or bushfires destroy crops and stock this reduces the available supply floods can cause land degradation, destroy crops and push commodity prices (especially fruits/vegetables) up. 	
Accept other relevant answers.	

Section Three: Extended answer

30% (40 Marks)

Question 24

(20 marks)

(a) Identify and describe **two** sustainable farming practices used in Australia. (6 marks)

Description	Marks
For each farming practice (2 x 3 marks)	
Describes the farming practice.	2
Identifies the farming practice.	1
Total	6
<p>Answers could include:</p> <p>Prevent soil erosion:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Management of pollution and use of chemicals:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Pest management:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Reduce crop disease:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Animal welfare:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Water use:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Renewable energy resources:</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Organic farming</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>GM farming</p> <ul style="list-style-type: none"> • <input type="text" value="For copyright reasons this text cannot be reproduced in the online version of this document"/> <p>Use of technology:</p> <ul style="list-style-type: none"> • drones to measure rainfall, soil density • apps on phones for rainfall, soil density <p>Accept other relevant answers.</p>	

- (b) Define the term 'land degradation' and describe **two** influences it has on primary food production in Australia. (6 marks)

Description	Marks
Defines the term land degradation.	2
Makes a statement about land degradation.	1
Subtotal	2
For each influence (2 x 2 marks)	
Describes the influence on primary food production.	2
States the influence on primary food production.	1
Subtotal	4
Total	6
<p>Answers could include:</p> <p>Definition:</p> <ul style="list-style-type: none"> the deterioration and loss of productive land due to environmental and human impacts soil becomes depleted of nutrients and limits capacity to grow crops effectively. <p>Influence on primary food production:</p> <ul style="list-style-type: none"> land clearing for agriculture allows wind and water to cause erosion, removing rich topsoil topsoil allows the land to be productive as it contains essential nutrients, removal of topsoil reduces yield and crop quality over grazing by livestock causes land degradation as it removes natural vegetation which can lead to erosion food security is threatened as the land becomes less productive for agriculture as soil quality reduces deforestation or land clearing reduce soil fertility as there is less organic matter to build high quality soil crop quality and yield are threatened due to poor soil fertility land clearing causes water table to rise, increasing salinity in soil, which makes land unproductive for agriculture reduces the ability of the land to produce pasture for livestock and this can reduce food supply unproductive land due to land degradation can reduce export potential for Australia, causing wealth of country to diminish less productive land can cause food insecurity. <p>Accept other relevant answers.</p>	

- (c) Identify and explain how farmers manage **two** water availability concerns to ensure the sustainable production of food in Australia. (8 marks)

Description	Marks
For each water availability concern (2 x 1 mark)	
Identifies a water concern.	1
Subtotal	2
For each explanation (2 x 3 marks)	
Explains how to manage a water concern.	3
Describes how to manage a water concern.	2
States how to manage a water concern.	1
Subtotal	6
Total	8
<p>Answers could include:</p> <p>Drought:</p> <ul style="list-style-type: none"> rotate stock in multiple paddocks to prevent livestock overgrazing use sustainable irrigation systems such a drip irrigation that require less water to grow crops capture water run-off in channels and dams and reuse water seek relief funding support from government during drought periods ensure sustainable and thorough planning in case of drought, rather than reacting once it occurs homing or agisting livestock on neighbouring properties when drought occurs. <p>Salinity:</p> <ul style="list-style-type: none"> test or monitor water quality or salinity levels heavy clay soils will reduce irrigation water seeping into water table and increasing salinity levels in soil soil sensors that monitor moisture levels will prevent over or under irrigation which can increase salinity sustainable irrigation plans and layouts that prevent over watering which can increase salinity prevent evaporation by using pipelines or enclose open-channel irrigation systems or drip-irrigation systems controlled by sophisticated computer systems to deliver precise water quantities for optimal growth maintain all equipment to prevent increased soil salinity complete repairs efficiently to prevent increased soil salinity use GPS laser levelling that flood paddocks quickly and prevent run off. <p>Contamination of groundwater supply:</p> <ul style="list-style-type: none"> natural and organic pesticides or herbicides can leach into groundwater and cause contamination limit use of pesticides or herbicides on crops as they are a major contaminant source or use groundwater monitoring systems to detect contamination levels use natural or organic pesticides or herbicides to prevent contamination safe disposal of chemicals is essential to prevent contamination store chemicals safely to prevent accidental contamination. 	
Accept other relevant answers.	

Question 25

(20 marks)

- (a) Describe **two** adaptations that might be used to produce the new product. (4 marks)

Description	Marks
For each adaptation (2 x 2 marks)	
Describes the adaptation.	2
Makes a statement about the adaptation.	1
Total	4
<p>Answers could include:</p> <p>Commodities:</p> <ul style="list-style-type: none"> change in flavour or texture or nutrition can lead to food products with improved sensory or health properties. using less or low fat or sugar or salt in processing can lead to products with health benefits or improved nutrition. <p>Processing techniques:</p> <ul style="list-style-type: none"> using techniques that require less fat or sugar or salt can lead to food products with improved nutrition. <p>Presentation of packaging:</p> <ul style="list-style-type: none"> altering packaging materials or sizes or artwork can appeal to new segments of the market or meet the new needs of existing customers. <p>Technologies:</p> <ul style="list-style-type: none"> packaging technologies such as modified atmosphere or aseptic or vacuum increase shelf life of products microencapsulation or high-pressure processing or ultra- filtration or nanotechnology can lead to products with health benefits or improved sensory properties. <p>Quantities:</p> <ul style="list-style-type: none"> adjusting portion sizes can lead to higher profit margins or increase consumer base. <p>Accept other relevant answers.</p>	

- (b) Identify **one** product development strategy that the manufacturer might use to capture market share. Why is this strategy an effective means of improving market share. (4 marks)

Description	Marks
Identifies the product development strategy.	1
Subtotal	1
Justification	
Justifies why it is an effective way to achieve market share.	3
Discusses briefly why it is an effective way to achieve market share.	2
States why it is an effective way to achieve market share.	1
Subtotal	3
Total	4
<p>Answers could include:</p> <p>Line extension:</p> <ul style="list-style-type: none"> • changing an existing product line slightly • creates new interest in an established product or is a safe way to extend product offerings • can lead to owning more shelf space or excites consumers or becomes an established product. <p>'Me too' product:</p> <ul style="list-style-type: none"> • investigate competitors' products • exploit the current success of competitors and design a similar product to be able to compete with current market leaders • this technique relies on aggressive marketing, or advertising or promotion around the 'me-too' product which increases profitability or takes market share already established by competitors. <p>Innovative product:</p> <ul style="list-style-type: none"> • creation of an entirely new food product for consumers • features such as value-added foods or functional foods or packaging • can be derived from innovations in technology which may make production more efficient or cheaper or environmentally sustainable. <p>Brand extension:</p> <ul style="list-style-type: none"> • create an entirely new product for the brand to target other market segments, e.g. snack foods to milk drink • identify sections in the market that are popular and use the strength of the brand to create a new product which diversifies the product range • the image of the 'parent brand' is enhanced by appealing to consumer's needs and the ability for consumers to seek more variety. <p>Accept other relevant answers.</p>	

Question 25 (continued)

- (c) Explain **four** factors that may influence the development of the new food product. (12 marks)

Description	Marks
For each factor (4 x 3 marks)	
Explains a factor that influences the development of new food products.	3
Describes a factor that influences the development of new food products.	2
Makes a statement about a factor that influences the development of new food products.	1
Total	12
<p>Answers could include:</p> <p>Population growth:</p> <ul style="list-style-type: none"> • migration has increased the range of cultures in the population • developers have responded by producing a variety of snack foods appropriate to a range of cultures • the local population has responded to these new snack foods. <p>Changing demographics:</p> <ul style="list-style-type: none"> • the population is ageing or there is an increase in the number of single person households or there is a change in time spent in the home • people want snack foods in single portion or smaller serve sizes in easily opened or sustainable packaging • demand for products to suit restricted lifestyles or change in eating habits such as healthy eating. <p>Health:</p> <ul style="list-style-type: none"> • awareness of diet and health related issues is increasing or increase in climate health awareness • consumers are looking for foods that will improve their health or contain functional ingredients or have environmental credence • demand for healthier versions or nutritional advice or health ratings or carbon labelling on snack foods. <p>Convenience:</p> <ul style="list-style-type: none"> • consumers are time poor or becoming more tactical or adapting meal patterns • consumers are looking for food that can be prepared with little time or skill or resources or home delivered • demand for products to easily prepare home cooked foods or super snacks. <p>Cost:</p> <ul style="list-style-type: none"> • snack food products must be priced to suit the target market • varied package sizing would enable a range of pricing to suit a range of incomes • food products must allow the producer to make a profit. <p>Technology:</p> <ul style="list-style-type: none"> • processing or packaging opportunities including efficient or economic or appeal or acceptability to consumers or decreased environmental impact • new snack food products with greater shelf life or better quality or consistency or health benefits • demand for plant-based proteins or bush foods or sustainable packaging. <p>Accept other relevant answers.</p>	

Question 26

(20 marks)

- (a) Identify the protein found in eggs and explain how it performs to produce a foam. Provide **one** example of where this occurs in food production. (5 marks)

Description	Marks
Identifies the protein found in eggs.	1
Subtotal	1
Explanation	
Explains how the protein performs to produce a foam.	3
Describes how the protein performs to produce a foam.	2
Makes a statement about the production of a foam.	1
Subtotal	3
Example	
Provides one example of where this occurs in food production.	1
Subtotal	1
Total	5
<p>Answers could include:</p> <p>Protein found in eggs:</p> <ul style="list-style-type: none"> albumin <p>Explanation:</p> <ul style="list-style-type: none"> when egg white is beaten the protein is denatured and air bubbles form the protein forms an elastic framework around the air bubbles the air bubbles expand when exposed to heat until the temperature of the mixture is hot enough to set the egg protein. <p>Food examples:</p> <ul style="list-style-type: none"> meringues or souffle or sponge cakes. <p>Accept other relevant answers.</p>	

- (b) Explain the difference between the functional properties of aeration and leavening. (3 marks)

Description	Marks
Explains the difference between the functional properties of aeration and leavening.	3
Describes the difference between the functional properties of aeration and leavening.	2
Makes a statement about aeration or leavening.	1
Total	3
<p>Answers could include:</p> <ul style="list-style-type: none"> aeration is caused by the incorporation of air into a mixture leavening is caused by the production of carbon dioxide during the fermentation of yeast leavening is caused by the combination of an acid and an alkali added to a mixture and heated in the presence of water to produce carbon dioxide when exposed to heat the air or carbon dioxide expand and cause leavening or aeration or raising. <p>Accept other relevant answers.</p>	

- (c) Identify and explain how **three** functional properties of food determine the performance of the Eggs Benedict. (12 marks)

Description	Marks
Functional property (3 x 1 mark)	
Identifies the functional property	1
Subtotal	3
For each explanation (3 x 3 marks)	
Explains the functional property.	3
Describes the functional property.	2
States a fact about the functional property.	1
Subtotal	9
Total	12
<p>Answers could include:</p> <p>Dextrinisation:</p> <ul style="list-style-type: none"> • bread contains starch • when starch is exposed to dry heat it is broken down into dextrins • this results in a change in colour or flavour. <p>Denaturation:</p> <ul style="list-style-type: none"> • bacon contains protein • the shape of the protein can be altered by applying heat which causes the amino acid chains to uncoil • this causes the bacon to shrink or change texture or flavour or become moist and tender. <p>Coagulation:</p> <ul style="list-style-type: none"> • applying heat will cause the protein in the egg to create a network which traps the liquid • this network traps the liquid and forms a gel or starts to thicken • both the white and the yolk will become firm and change colour. <p>Emulsification:</p> <ul style="list-style-type: none"> • butter is gradually added to the sauce • the egg yolk has the ability to prevent the fat and liquid from separating • the mixture becomes a stable emulsion of oil and liquid. <p>Accept other relevant answers.</p>	

ACKNOWLEDGEMENTS

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