



FOOD SCIENCE AND TECHNOLOGY

ATAR course examination 2018

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

Section Two: Short answer

55% (68 Marks)

Question 16

(8 marks)

- (a) Define complete and incomplete proteins. Identify the main food source of each type of protein. (4 marks)

Description		Marks
Defines a complete protein		1
Defines an incomplete protein		1
Subtotal		2
For each type of protein:		
Identifies the main food source		1–2
Subtotal		2
Total		4
Complete proteins	Incomplete proteins	
Proteins that contain all of the essential amino acids	Proteins that lack one or more of the essential amino acids	
Food source: animal foods, soy, quinoa	Food source: plant foods	

- (b) Describe **two** ways in which vegetarians can obtain an adequate supply of dietary protein. (4 marks)

Description		Marks
For each way in which vegetarians can obtain an adequate supply of dietary protein:		
Describes clearly how vegetarians can obtain an adequate supply of dietary protein		2
States briefly how vegetarians can obtain an adequate supply of dietary protein		1
Total		4
Answers may include but are not limited to the following:		
<ul style="list-style-type: none"> • consume a balanced diet that includes a wide variety of foods • include grains, cereals and nuts that contain protein 		
<ul style="list-style-type: none"> • include soy based foods in the diet • soy foods contain complete protein 		
<ul style="list-style-type: none"> • include soy protein supplements • soy contains complete protein 		
<ul style="list-style-type: none"> • include complementary foods • between them these contain all of the essential amino acids 		
<ul style="list-style-type: none"> • include dairy foods • dairy contains complete proteins 		

Question 17

(7 marks)

(a) Explain how each of **two** functional properties of food cause the dough to rise.

(4 marks)

Description	Marks
For each functional property:	
Explains how the property causes the dough to rise	2
States a fact about how the dough rises	1
Total	4
Answers may include but are not limited to the following:	
<ul style="list-style-type: none"> yeast produces carbon dioxide through the process of fermentation carbon dioxide trapped in the dough expands when heated forcing the dough to rise through the process of leavening 	
<ul style="list-style-type: none"> air is trapped in the dough during sifting or kneading air trapped in the dough expands when heated forcing the dough to rise through the process of aeration 	
<ul style="list-style-type: none"> when the liquid in the dough is heated it converts to steam steam will expand and cause the dough to rise through the process of aeration 	

(b) Name the ingredient found in self-raising flour that causes flour mixtures to rise. Explain how this process occurs.

(3 marks)

Description	Marks
Names the ingredient found in self-raising flour that causes flour mixtures to rise	1
Subtotal	1
Explains how this process occurs	2
States briefly how this process occurs	1
Subtotal	2
Total	3
Ingredient	How the process occurs
Baking powder	<ul style="list-style-type: none"> baking powder contains an acid and an alkali or bicarbonate of soda and cream of tartar when these chemicals are heated in the presence of water they produce carbon dioxide which causes rising
	<ul style="list-style-type: none"> when a liquid is added the acid and the base are able to combine and produce carbon dioxide. when heated the carbon dioxide expands and causes rising

Question 18

(8 marks)

- (a) Explain the difference between value-added foods and functional foods. (4 marks)

Description		Marks
Explains the difference between value-added foods and functional foods, 2 marks for full explanation of value-added foods and 2 marks for a full explanation of functional foods.		1–4
States a difference between value-added foods and functional foods, 1 mark for statement of value-added foods and 1 mark for a statement of functional foods.		1–2
Total		4
Answers may include, but are not limited to the following:		
Value-added foods	Functional foods	
<ul style="list-style-type: none"> a value-added product is one that has undergone an increased amount of processing this is done in order to increase the selling price of the product 	<ul style="list-style-type: none"> foods that provide health benefits beyond the traditional nutrition they contain developed to enhance the health of population groups 	

- (b) Describe
- two**
- methods used by product developers to add value to food products.

(4 marks)

Description	Marks	
For each method used by product developers to value-add to food products:		
Describes a method	2	
Identifies a method	1	
Total		4
Answers may include, but are not limited to the following:		
Packaging <ul style="list-style-type: none"> altering the packaging to improve shelf life or for added convenience or to provide product information 		
Portion size <ul style="list-style-type: none"> altering the size of portions to reduce waste or cost 		
Product improvement <ul style="list-style-type: none"> reduction in components harmful to health to cater for the health needs of consumers 		
Partial preparation <ul style="list-style-type: none"> some preparation is completed prior to sale for added convenience 		
Line extensions <ul style="list-style-type: none"> introduction of additional features to those already on the market to increase market share or profits 		
Decorating <ul style="list-style-type: none"> adding decorations or garnishes to foods to improve appearance and customer appeal 		

Question 19

(9 marks)

(a) Define malnutrition.

(1 mark)

Description	Marks
Defines malnutrition	1
Total	1
Answers may include, but are not limited to the following:	
<ul style="list-style-type: none"> deficiency or excess or imbalance of energy, protein and other nutrients inadequate nutrient intake that causes measurable adverse effects on body tissue or body form or function or clinical diseases can encompass both over-nutrition and undernutrition 	

(b) Describe how each of **two** Australian population groups may be more likely to suffer from malnutrition than the general population.

(4 marks)

Description	
For each Australian population group:	
Describes how the group is more likely to suffer from malnutrition	2
States briefly how group is more likely to suffer from malnutrition	1
Total	4
Answers may include, but are not limited to the following:	
Population group	Explanation
Elderly	<ul style="list-style-type: none"> depression in the elderly leads to the elderly not wanting to consume food
	<ul style="list-style-type: none"> poor dentition such as loss of teeth or inability to chew food physically unable to chew food and unable to consume a diet of a wide variety of food which limits them to a soft or liquid diet
	<ul style="list-style-type: none"> side effects of medication such as nausea or vomiting or decreased sense of taste or constipation or diarrhoea or impaired swallowing side effects decrease the ability to absorb the nutrients from food
	<ul style="list-style-type: none"> suffering from compromised immune system malabsorption can occur due to chronic illness, patients are unable to absorb nutrients from the food they are consuming
	<ul style="list-style-type: none"> social isolation such as the loss of a partner or living alone or eating alone lack of social support network to assist elderly person who may have an inability to cook meals or feed themselves
	<ul style="list-style-type: none"> restricted accessibility or mobility living in a location where they are unable to gain access to public transport or have assistance to shop for food or physically unable to walk for long periods of time in order to shop for food
	<ul style="list-style-type: none"> diseases such as anorexia nervosa or bulimia nervosa are more prevalent in this population group the body is deprived of essential nutrients
Adolescents	<ul style="list-style-type: none"> overconsumption of energy dense foods body missing out on nutrient dense foods needed for growth and development during adolescence
	<ul style="list-style-type: none"> increased focus on body image results in a limited consumption of essential nutrients or restriction of food consumption

People living in poverty	<ul style="list-style-type: none"> • lack of accessibility to food • reliance on soup kitchens and shelters which can be unpredictable food sources
	<ul style="list-style-type: none"> • low socioeconomic factors making it difficult to afford nutritious foods • purchasing low cost foods which are not nutrient dense to satisfy hunger
People with chronic illness or terminal diseases	<ul style="list-style-type: none"> • compromised immune system e.g. cancer patients or coeliac disease • malabsorption due to the illness or disease
People living in rural or remote communities	<ul style="list-style-type: none"> • more likely to suffer the effects of food insecurity • lack of access to affordable fresh fruit and vegetables which may result in poor quality diets of mainly calorie dense, processed foods

(c) Describe how each of **two** Australian Dietary Guidelines could be used to assist Australians at risk of malnutrition. (4 marks)

Description	
For each Australian Dietary Guideline:	
Describes how the Australian Dietary Guideline can assist Australians at risk of malnutrition	2
States briefly how the Australian Dietary Guideline can assist Australians at risk of malnutrition	1
Total	4
Answers may include, but are not limited to the following:	
Australian Dietary Guideline	Explanation
To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs.	<ul style="list-style-type: none"> • children and adolescents should eat sufficient nutritious foods to grow and develop normally • children and adolescents should be physically active every day and their growth should be checked regularly
	<ul style="list-style-type: none"> • elderly people should eat nutritious foods • elderly people need to keep physically active to help maintain muscle strength and a healthy weight
Enjoy a wide variety of nutritious foods from these five groups every day.	<ul style="list-style-type: none"> • to assist with malnutrition due to under consumption eat plenty of vegetables, fruit, grain foods, lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans, milk, yoghurt, cheese • consuming a diet with a wide variety of foods ensures that a large amount of nutrients are consumed and increases overall nutrient intake
Limit intake of foods containing saturated fat and added sugars.	<ul style="list-style-type: none"> • limit intake of foods high in saturated fat. Replace high fat foods with healthier fats such as oils or spreads or nut butters/pastes or avocado • over consumption of foods high in fat can lead to malnutrition later on in life, limiting these foods can assist in consuming other healthier foods
	<ul style="list-style-type: none"> • limit intake of foods and drinks containing added salt or limit intake of foods and drinks containing added sugars • consumption of high sugar foods can inhibit the absorption of adequate nutrient levels or excessive salt intake contributes to heart disease

Question 20

(8 marks)

- (a) Describe **two** current results of climate change that are impacting on the sustainability of food production in Australia. (4 marks)

Description	
For each climate change issue:	
Describes a climate change impact on sustainable food production	2
States briefly a climate change impact on sustainable food production	1
Total	4
Answers may include, but are not limited to the following:	
<ul style="list-style-type: none"> diminishing rainfall resulting in less water available for irrigation growing crops becomes dependant on ground water supply which increases salinity reduces the quality of the water supply to crops and livestock 	
<ul style="list-style-type: none"> increased acidification of the soil due to lack of water plant growth will have restricted root access to water and nutrients 	
<ul style="list-style-type: none"> land degradation and soil erosion soil becomes drier and holds less carbon, plant coverage reduces, exposing the soil to wind and water erosion 	
<ul style="list-style-type: none"> increased temperatures combined with decreased rainfall causes moisture in the soil to decrease making it harder to grow crops crops are burnt through unseasonably high temperatures 	
<ul style="list-style-type: none"> availability of some crops will diminish crops will no longer be viable or suitable for the changed conditions therefore crops may have to be grown in different regions where the weather is more suitable 	
<ul style="list-style-type: none"> rising sea levels due to increased temperatures are impacting on aquaculture fish species are moving into areas where they previously would not have lived due to acidification of the oceans or rising sea levels or storm surges 	
<ul style="list-style-type: none"> increasing occurrence of natural disasters devastates crop production due to incidents such as high rainfall causing flooding or cyclones wiping out whole plantations or bushfires burning crops and pasture used for livestock 	

- (b) Describe **two** ways in which climate change will affect the price of food. (4 marks)

Description	
For each effect of climate change:	
Describes an effect of climate change on the price of food	2
States an effect of climate change on the price of food	1
Total	4
Answers may include, but are not limited to the following:	
<p style="text-align: center;">Description</p> <ul style="list-style-type: none"> increased carbon dioxide in the atmosphere reduces the protein content in plants which significantly impacts the nutrient content of cereal crops and their functional properties or reduces levels of protein in wheat effecting bread production 	
<ul style="list-style-type: none"> increased temperatures impacting on dairy farming cows are prone to heat stress and produce less milk during high temperatures which may lead to reduced milk supplies and increased cost of milk 	
<ul style="list-style-type: none"> lack of pasture and water due to high temperatures impacts on the health of livestock quality and quantity of meat production is reduced which may result in reduced supply of meat to consumers or increased cost 	
<ul style="list-style-type: none"> availability or quality or price of fresh food following a climate change event reduces the quantity of crops supplied to the consumer and drives up the cost of the product making particular foods unavailable for several months 	

Question 21

(10 marks)

- (a) Identify **two** benefits of commercially-processed foods. Discuss how each benefit could impact on consumers who live in rural or remote communities in Australia. (6 marks)

Description	
For each benefit:	
Identifies a positive benefit of commercially-processed foods	1
Subtotal	2
Discusses the benefit of commercially-processed foods on consumers in rural or remote communities	2
States a fact about the benefit of commercially-processed foods on consumers in rural or remote communities	1
Subtotal	4
Total	6
Answers may include, but are not limited to the following:	
Positive benefits	Discussion
Food safety	<ul style="list-style-type: none"> foods that might have otherwise been unsafe to transport long distances to rural or remote communities can now be transported safely in refrigerated trucks some processed foods require refrigerated transport giving rural and remote communities greater access to safe foods
Food availability	<ul style="list-style-type: none"> consumers have more choice of products that may not be available to them processing increases availability of foods that were only available seasonally
Extended shelf life	<ul style="list-style-type: none"> consumers can buy items in bulk bulk buying in bulk reduces the need for people in remote communities having to travel to town frequently to shop
Convenience	<ul style="list-style-type: none"> ability to purchase ready-made products that don't require many additional ingredients a wide range of commodities may not always be available in remote communities
Health	<ul style="list-style-type: none"> increased health benefits by having a greater range of food available foods such as frozen or canned vegetables will help to increase intake of nutrients which may not be available in the form of fresh vegetables
Price	<ul style="list-style-type: none"> increased cost of transportation of fresh produce to rural and remote communities is passed on to the consumer processed foods may help to reduce the cost as they are easier to transport or store or distribute

- (b) Describe **two** negative impacts of commercially-processed foods on the health of Australian consumers. (4 marks)

Description	
For each impact:	
Describes a negative impact of commercially-processed foods	2
States a negative impact of commercially-processed food	1
Total	4
Answers may include, but are not limited to the following:	
Discussion	
<ul style="list-style-type: none"> • removal of fat and manufacturing processes that reduce healthy fats in products • reduction in the consumption of healthy fats in the diet which are needed for brain development 	
<ul style="list-style-type: none"> • greater availability of high saturated fat or high salt or high sugar foods • increases the risk of dietary diseases such as diabetes or obesity 	
<ul style="list-style-type: none"> • consumption of processed foods can become habitual due to cost or convenience or flavour • excess consumption can lead to dietary diseases 	
<ul style="list-style-type: none"> • often high in complex carbohydrates and refined sugars • increases the blood sugar and insulin levels in individuals 	
<ul style="list-style-type: none"> • some processed foods are low in nutrients • consumers are eating energy dense foods rather than nutrient dense foods leading to malnutrition by overconsumption of inadequate nutrients or weight gain 	
<ul style="list-style-type: none"> • processed foods can be lower in fibre due to processing techniques used to remove the fibre • consumption of low fibre foods can lead to constipation 	

Question 22

(7 marks)

- (a) Identify the organisation responsible for the recalling of food products in Australia. Describe what is meant by the term 'food product recall'. (3 marks)

Description	Marks
Identifies the organisation responsible for 'food product recalls' in Australia	1
Subtotal	1
Provides full description of the term 'food product recall'	2
Provides a brief statement about 'food product recall'	1
Subtotal	2
Total	3
Answers may include, but are not limited to the following:	
Organisation responsible for food products recalls in Australia: FSANZ or Food Standards Australia New Zealand	
Action taken to remove from sale or distribution or consumption foods that may pose an unacceptable health risk to consumers.	

- (b) Describe **two** reasons why food may be recalled. (4 marks)

Description	Marks
For each reason why food may be recalled:	
Describes a reason why food may be recalled	2
States a reason why food may be recalled	1
Total	4
Answers may include, but are not limited to the following:	
<ul style="list-style-type: none"> • goods that are incorrectly labelled and could pose a risk to health • allergens not being declared on the product 	
<ul style="list-style-type: none"> • pathogens such as listeria or salmonella found in the product • pose a health risk especially to pregnant women 	
<ul style="list-style-type: none"> • toxic chemicals or foreign bodies found in the product • pose a serious or an unknown health risk 	

Question 23

(11 marks)

- (a) Identify **two** water-soluble vitamins. For each vitamin, provide a function in the body and a food source for it. (6 marks)

Description		Marks
For each water-soluble vitamin:		
Identifies the vitamin		1
Provides a function of the vitamin in the body		1
Provides a food source of the vitamin		1
Total		6
Answers may include, but are not limited to the following:		
Water-soluble vitamin	Function in the body	Food source
Riboflavin or B2	<ul style="list-style-type: none"> • healthy skin and eyes • metabolism of fat, protein and carbohydrate • release of energy from food 	<ul style="list-style-type: none"> • wholegrain breads and cereals • dairy foods • green vegetables
Folate or B9	<ul style="list-style-type: none"> • formation of red blood cells • production of genetic material in the cells • prevention of neural tube defects 	<ul style="list-style-type: none"> • wholegrain breads and cereals • dairy foods • green vegetables
Cobalamine or B12	<ul style="list-style-type: none"> • formation of red blood cells • metabolism of fat and carbohydrate • formation of nerve material 	<ul style="list-style-type: none"> • meat products • soy products • dairy products
Ascorbic acid or Vitamin C	<ul style="list-style-type: none"> • resistance to infection • wound healing • assists iron absorption 	<ul style="list-style-type: none"> • citrus or berry foods • capsicum • spinach

- (b) Describe the dietary intake requirement for water-soluble vitamins. (2 marks)

Description	Marks
Describes the dietary intake requirement for water-soluble vitamins	2
States the dietary intake requirement for water-soluble vitamins	1
Total	2
<ul style="list-style-type: none"> • water-soluble vitamins are not stored in the body • daily intake of water-soluble vitamins is required as excess intake is excreted 	

- (c) Explain the effect of food processing techniques on the water-soluble vitamin content of foods. State how food product developers might overcome this effect. (3 marks)

Description		Marks
Explains the effect of food processing techniques on the water-soluble content of foods		2
States how food product developers may overcome this effect		1
Total		3
Processing techniques:	How the effect may be overcome:	
<ul style="list-style-type: none"> water-soluble vitamins dissolve in the water used in wet processing methods 	<ul style="list-style-type: none"> by the addition of vitamin supplements 	
<ul style="list-style-type: none"> vitamin content is lost if the liquid is disposed of or not included in the food product 	<ul style="list-style-type: none"> by avoiding the use of wet processing or preparation methods 	
<ul style="list-style-type: none"> contact with heat destroys vitamins 	<ul style="list-style-type: none"> use high pressure processing replace lost vitamins with supplements 	

• Section Three: Extended answer

30% (40 Marks)

Question 24

(20 marks)

- (a) Describe how **two** functional properties of food affect the performance of preserved food products. (4 marks)

Description		Marks
For each functional property:		
Describes how the functional property affects the performance of preserved food		2
States how the functional property affects the performance of preserved food		1
Total		4
Answers may include, but are not limited to the following:		
Functional properties	Description	
Crystallisation	<ul style="list-style-type: none"> jam making uses high concentrations of sugar heated in liquid the longer the solution is heated the more evaporation of liquid occurs making a supersaturated solution in which crystals may form 	
	<ul style="list-style-type: none"> jam making uses highly concentrated solutions of sugar and water the sugar helps to capture and preserve the flavour or colour or aroma of the fruit 	
	<ul style="list-style-type: none"> in jam making the breakdown of sucrose or sugar occurs when sugar is added to fruit containing acid and heat is applied this process helps to prevent crystallisation and produce a smooth texture 	
Denaturation	<ul style="list-style-type: none"> salt added to preserved meats will cause tenderisation salt causes denaturation of protein 	
Oxidation or Rancidity	<ul style="list-style-type: none"> meat preserved by refrigeration or freezing will oxidise, change colour and gradually become rancid this begins immediately after slaughtering due to exposure to air 	
Coagulation or Denaturation	<ul style="list-style-type: none"> acid added to protein product will cause denaturation or coagulation 	
Caramelisation	<ul style="list-style-type: none"> sugar contained in vegetables will caramelize when heated 	
Emulsification	<ul style="list-style-type: none"> the addition of acid to an egg yolk and oil emulsification causes thickening and extends the shelf life 	

- (b) Describe how **two** processing techniques preserve food. (4 marks)

Description	Marks
For each processing technique:	
Describes how the technique preserves food	2
States briefly how the technique preserves food	1
Total	4
Answers may include, but are not limited to the following:	
<ul style="list-style-type: none"> • low temperatures are applied during the process of freezing • micro-organism growth or enzyme activity that cause deterioration are reduced 	
<ul style="list-style-type: none"> • high temperatures are applied during the processes of dehydrating or canning • micro-organism growth or enzyme activity that cause deterioration cease 	
<ul style="list-style-type: none"> • acids are used in pickling or chutney making to preserve food • acids denature enzymes or draw moisture from the cells of micro-organisms eliminating deterioration 	
<ul style="list-style-type: none"> • chemicals such as salt or sugar are used in the process of pickling or jam making • these change the composition of the liquid and makes an environment that does not support the growth of micro-organisms 	

- (c) Identify **three** food preservation methods:
- **one** that alters the sensory properties of preserved food
 - **one** that alters the physical properties of preserved food
 - **one** that alters the chemical properties of preserved food.
- Explain how each property is altered by **one** identified preservation method. Provide an example of a food product preserved by each method. (12 marks)

Description	Marks
For each of three preservation method:	
Identifies a preservation method	1
Subtotal	3
Explains how one preservation method alters the sensory properties of preserved food	2
States how one preservation method alters the sensory properties of preserved food	1
Explains how one preservation method alters the physical properties of preserved food	
States how one preservation method alters the physical properties of preserved food	1
Explains how one preservation method alters the chemical properties of preserved food	
States how one preservation method alters the chemical properties of preserved food	1
Subtotal	6
For each of three:	
Provides an example of a food preserved using each method	1
Subtotal	3
Total	12

Answers may include, but are not limited to the following:		
Preservation methods	Properties	How and why one preservation method alters each property of food
Dehydration	Sensory	<ul style="list-style-type: none"> the sensory properties of dehydrated foods are altered, flavour or aroma or colour are intensified this is due to the complete or partial removal of moisture
	Physical	<ul style="list-style-type: none"> application of a form of heat is required for dehydration to occur the removal of moisture causes change to the physical properties of the food, it becomes drier or smaller in size
	Chemical	<ul style="list-style-type: none"> the removal of moisture will cause chemical changes water soluble vitamins will be removed
Food product examples: dried herbs, sundried tomatoes		
Addition of salt or vinegar or acid or sugar	Sensory	<ul style="list-style-type: none"> sensory properties such as texture or flavour are altered, food becomes more tender or sweeter sugar has a dehydrating effect, drawing water from the food or sugar into the food
	Physical	<ul style="list-style-type: none"> when sugar is added to a mixture of fruit and water and heat is applied a physical change causes the sugar, pectin and acid from the fruit to combine this causes the formation of a gel or the mixture to thicken
	Chemical	<ul style="list-style-type: none"> chemical properties are altered changing nutritional properties concentrated sugar or salt solutions are used to preserve the food or sugar or salt content is increased
Food product examples: pickles or chutneys, vegetables in brine, cured meats, olives		
Canning	Sensory	<ul style="list-style-type: none"> canning cooks the food in a sugar or salt solution sensory properties such as texture or flavour are altered, foods become more tender or absorb the flavour of the solution in which the food is canned
	Physical	<ul style="list-style-type: none"> physical properties are altered, some colour is lost or shape becomes less defined application of heat to food in solution causes these physical changes
		<ul style="list-style-type: none"> food is placed in a solution and heat is applied the physical property of structure is altered, the fibre in food softens
Chemical	<ul style="list-style-type: none"> heat is applied during the canning process heat destroys enzymes that cause food spoilage 	
Food product examples: fruits or vegetables, fish		

Question 25

(20 marks)

- (a) State the purpose of a product proposal. Identify and describe **three** components of a product proposal. (10 marks)

Description		Marks
States the purpose of a product proposal		1
Subtotal		1
For each product proposal component:		
Identifies the component		1
For three:		
Describes the component		2
States a fact about the component		1
Subtotal		9
Total		10
Answers may include, but are not limited to the following:		
Purpose		
<ul style="list-style-type: none"> explains a technical solution to the problem or product analysis of the pros and cons of the development of a potential product clearly identifies all information related to the product 		
Components		Description
Consumer profile	<ul style="list-style-type: none"> identifies the target market gathers information about the needs of the consumer, or budget of targeted consumers or health needs or lifestyle choices 	
Product purpose	<ul style="list-style-type: none"> current market trends e.g., ethically raised products identification of trends that are current informs the development process 	
Product specifications	<ul style="list-style-type: none"> creates a description of the product or ingredients or materials required to make the product ensures that all departments involved in the creation of the new product are in agreement 	
	<ul style="list-style-type: none"> establishes the budget required for production identifies whether the company has the financial resources to develop the new product 	

- (b) Describe why the technology process is effective in the development of new products. (2 marks)

Description		Marks
Describes why the technology process is effective		2
States how or why the technology process effective		1
Total		2
Answers may include, but are not limited to the following:		
<ul style="list-style-type: none"> ability to identify the needs of consumers and product constraints to ensure a greater success of the product 		
<ul style="list-style-type: none"> ensures developers consider numerous variables during the process e.g., the need for a new product or profitability or benefits to the company increases success and profitability 		
<ul style="list-style-type: none"> ensures consumers end up with the best possible product increases profitability for the developer or increases repeat sales 		

- (c) Explain **one** action that Ben will include in his plan at each of the **four** stages of the technology process to create the new cereal product. (8 marks)

Description		Marks
For each stage:		
Explains an action for each stage identified		2
States an action for each stage		1
Total		8
Answers may include, but are not limited to the following:		
Stages of the technology process	Explanation	
Investigate		
Products currently on the market	<ul style="list-style-type: none"> investigation of the current products on the market that are the same or similar determines what is needed in the new product being developed to make it stand out from current products 	
Establish a need	<ul style="list-style-type: none"> investigation of the market to see whether the new product is viable in the existing market will the new product be different enough for consumers to be drawn to purchase it 	
Wants and needs of target demographic	<ul style="list-style-type: none"> investigation of the characteristics of the target demographic identify the needs and wants of demographic 	
Cost	<ul style="list-style-type: none"> investigate the cost of developing and marketing to establish the financial viability of development and marketing 	
	<ul style="list-style-type: none"> investigate demand if the product is unsuccessful can the company withstand any financial losses that may be involved 	
Devise		
Development of ideas	<ul style="list-style-type: none"> provide change or innovation to the product by creating a need for the new product, will it be a 'me-too', 'line extension' or 'new to the world' product increases a company's success or future profitability or viability 	
Constraints to be considered	<ul style="list-style-type: none"> timeline required for the development and launch of the product timeline is established to provide parameters which all departments must work within 	
	<ul style="list-style-type: none"> develop a detailed consumer profile ensures the product meets consumer needs 	
Devise evaluation criteria	<ul style="list-style-type: none"> set of evaluation criteria is developed in the devise stage the criteria will be used to evaluate the prototype and the final product 	
Produce		
Produce prototype	<ul style="list-style-type: none"> companies will produce a test product to evaluate initial design and modify if necessary 	
Produce the final product	<ul style="list-style-type: none"> product is produced using the skills and knowledge of the production team using individual skills and expertise produces the best product 	
Evaluate		
Data gathering	<ul style="list-style-type: none"> data is gathered and analysed against the criteria developed in devising stage company determines whether the product meets the set evaluation criteria 	

	<ul style="list-style-type: none">• sales data is collected• used to determine the success of the product
Data analysis	<ul style="list-style-type: none">• analysis of the data by the company is used to make further decisions• company can determine whether the product needs to be modified and re-introduced to the market

Question 26

(20 marks)

- (a) Outline **two** conditions imposed on food manufacturers before permission is granted to include an additive in a food product. (2 marks)

Description	Marks
For each condition:	
Clearly outlines the condition	1
Total	2
Conditions	
<ul style="list-style-type: none"> the manufacturer must prove that there is no other way to achieve a satisfactory product the manufacturer must prove that the additive is absolutely essential to the product additive must be on the list approved by FSANZ 	

- (b) Identify **four** additives that would be included in the ingredients in the vanilla slice and state a function of each. (8 marks)

Description	Marks
For each additive:	
Identifies the additive	1
States a function of the additive	1
Total	8
Answers may include, but are not limited to the following:	
Additive	Function
Humectant	incorporated in the custard powder to prevent moisture from the air being absorbed
Artificial sweetener	used to replace sugar and reduce kilojoule content.
Flavouring	vanilla, used to add flavour to the custard to make it more palatable
Colouring	added to the icing to enhance the sensory properties of the slice
Thickener	used to give the custard a consistent texture
Preservatives	found in flour and custard powder used to extend shelf life or delay rancidity or maintain freshness
Anti-caking agents	found in flour, icing sugar and custard powder and used to prevent clumping, allowing ingredients to flow freely

(c) Explain how each of the following controlling factors influences the production of the crème brûlée:

- equipment
- ingredients
- storage
- processing techniques
- environment.

(10 marks)

Description		Marks
For each controlling factor:		
Explains how the factor influences production		2
States a fact about the controlling factor		1
Total		10
Answers may include, but are not limited to the following:		
Controlling factor	Explanation	
Equipment	<ul style="list-style-type: none"> • use of a cool oven • gentle heat prevents the egg mixture from separating 	
	<ul style="list-style-type: none"> • use of a blowtorch • high temperature needed to caramelize the sugar topping 	
	<ul style="list-style-type: none"> • use of ceramic ramekins • prevents the custard setting unevenly or promotes an even cooking temperature 	
	<ul style="list-style-type: none"> • use of a heavy based saucepan • to prevent the cream burning 	
Ingredients	<ul style="list-style-type: none"> • use of caster sugar • caster sugar dissolves more readily 	
	<ul style="list-style-type: none"> • use of vanilla bean • more intense flavour than essence 	
Storage	<ul style="list-style-type: none"> • needs to be served immediately • contact with the moist custard will melt the sugar topping 	
	<ul style="list-style-type: none"> • can be stored, refrigerated, without the topping • moisture will melt the toffee topping 	
Processing techniques	<ul style="list-style-type: none"> • straining the custard mixture • removes any lumps of egg or vanilla seeds 	
	<ul style="list-style-type: none"> • lightly whisking sugar and egg yolks • to prevent bubbles forming in the custard 	
	<ul style="list-style-type: none"> • cooling the brûlées before topping with sugar • sugar will be moistened by steam, damp sugar will not caramelize 	
	<ul style="list-style-type: none"> • cooling brûlées after removing from the oven • warm egg and cream mixtures are ideal conditions for bacterial growth 	
Environment	<ul style="list-style-type: none"> • use of a water bath • the brûlées will cook slowly and not shrink 	
	<ul style="list-style-type: none"> • use of a cool oven • gentle heat prevents the egg mixture from separating • and enables coagulation to occur 	

ACKNOWLEDGEMENTS

Question 19(c)

Text under 'Answers may include, but are not limited to the following adapted from: National Health and Medical Research Council. (2015). *Australian Dietary Guidelines 1–5*. Retrieved October, 2018, from <https://www.eatforhealth.gov.au/guidelines/australian-dietary-guidelines-1-5>

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