Government of **Western Australia**
School Curriculum and Standards Authority

ATAR course examination, 2018

Question/Answer booklet

FOOD SCIENCE AND TECHNOLOGY

Please place your student identification label in this box

Student number: In figures | | | | | | | | |

In words _____

_____

Time allowed for this paper

Reading time before commencing work: ten minutes
Working time: three hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer booklet
Multiple-choice answer sheet

Number of additional answer booklets used (if applicable): ☐

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: non-programmable calculators approved for use in this examination

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of examination
Section One Multiple-choice	15	15	15	15	15
Section Two Short answer	8	8	95	68	55
Section Three Extended answer	3	2	70	40	30
				Total	100

Instructions to candidates

1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2018*. Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

   Section One: Answer all questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

   Sections Two and Three: Write your answers in this Question/Answer booklet.

3. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question.

4. Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

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Section One: Multiple-choice **15% (15 Marks)**

This section has **15** questions. Answer **all** questions on the separate Multiple-choice answer sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. Do not use erasable or gel pens. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 15 minutes.

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1. Manipulation as a food processing technique includes

   (a) whisking and slicing.
   (b) heating and drying.
   (c) slicing and heating.
   (d) whisking and drying.

2. Caramelisation is the process that occurs when

   (a) carbohydrates are heated to high temperatures.
   (b) sugars are heated to high temperatures.
   (c) carbohydrate and protein are exposed to dry heat.
   (d) starchy foods are exposed to heat.

3. Fat-soluble vitamins

   (a) must be consumed daily from animal foods.
   (b) can be stored in the body in significant amounts.
   (c) are excreted frequently in urine.
   (d) are commonly found in vegetables.

4. A concern about the consumption of genetically-modified (GM) foods is that

   (a) the use of antibiotics in GM foods will increase the price of these foods.
   (b) consumers may substitute GM foods for prescribed antibiotics.
   (c) the effectiveness of antibiotics in treating disease will be compromised.
   (d) antibiotics will stimulate the action of enzymes to dangerous levels.

5. A key factor that affects the reliability of the global food supply is

   (a) the provision of agricultural machinery to small-scale farmers.
   (b) grants that enable the renting of farming land.
   (c) restoration of farming lands to traditional owners.
   (d) security of tenure or ownership of farming land.

See next page

6. It is vital that sodium and potassium work together in the body to

   (a) maintain the correct amount of fluid in each cell.
   (b) assist in the production of enzymes.
   (c) release energy from macronutrients.
   (d) carry oxygen to the cells for energy production.

7. Albumin is often used as a natural food processing component because of its ability to

   (a) increase the protein content of blood.
   (b) form elastic bonds during heating.
   (c) assist in the preservation of foods.
   (d) incorporate air into products to maintain texture.

8. The manipulation of matter at the molecular level to create new food products is known as

   (a) nutrient fortification.
   (b) microencapsulation.
   (c) nanotechnology.
   (d) microbiotic action.

9. A shift in the consumption of fast food to organic and free-range products has led to the development of new food products resulting from

   (a) consumer demand for convenience products.
   (b) technological advances in food production processes.
   (c) a change in the consumer demographic.
   (d) the growing costs of food consumed outside the home.

10. A functional food that can aid in neural development is

    (a) gelatine.
    (b) tuna.
    (c) yoghurt.
    (d) soybean.

11. Phytochemicals that optimise the health of the digestive system by contributing to and supporting gut flora are known as

    (a) polyphenols.
    (b) phytosterols.
    (c) prebiotics.
    (d) probiotics.

See next page

12. The under-consumption of lipids in a person's diet can result in

(a) vitamin deficiencies, poor growth and fatigue.
(b) muscle fibre breakdown, poor growth and reduced immunity.
(c) fatigue, vitamin deficiencies and nausea.
(d) reduced immunity, nausea and muscle fibre breakdown.

13. A concentration of supermarket ownership in the retail food industry has resulted in

(a) reduced bargaining power for Australian farmers.
(b) more choice for consumers.
(c) a competitive consumer market.
(d) a greater number of independent retailers.

Question 14 refers to the information below.

Bakers use the following ratios when developing new recipes for baked products.

Baked products	Flour	Fat	Liquid	Egg	Sugar
Bread	5		3		
Piecrust	3	2	1		
Biscuits	3	2			1
Sponge cake	1	1		1	1
Muffins	2	1	2	1	

14. The amount of flour required to produce a loaf of bread that contains 375 mL of warm water is

(a) 550 grams.
(b) 575 grams.
(c) 625 grams.
(d) 650 grams.

15. The liver, pancreas and gall bladder produce or store products that

(a) are responsible for the digestion, absorption and metabolism of food.
(b) facilitate the transport and digestion of food within the gastrointestinal tract.
(c) reduce the effect of the over-consumption of alcohol.
(d) are responsible for the absorption of nutrient components into the blood.

End of Section One

See next page

Section Two: Short answer **55% (68 Marks)**

This section has **eight** questions. Answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 95 minutes.

Question 16 **(8 marks)**

Proteins are needed for growth and the repair and maintenance of body tissue. They are essential for health and wellbeing. Proteins are found in a wide variety of foods, but the composition of proteins from different food sources may not provide the elements necessary for optimum nutrition.

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

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

Question 17 **(7 marks)**

Raising agents that cause flour mixtures to lighten and soften can be any of a number of substances. The textural sensory properties are appealing to consumers and are typical in the wide range of baked products that are produced domestically and commercially.

Read the recipe below.

White bread loaf

Ingredients	Method
2½ cups white bread flour 1½ teaspoons dried yeast ½ teaspoon salt ½ teaspoon sugar ½ teaspoon oil 1 cup warm water egg glaze	1. Sift flour and salt. Add yeast and sugar. 2. Mix in the oil and two-thirds of the warm water to make a moist dough. Add remaining water gradually if needed. 3. Knead well. 4. Place in a greased bowl. Cover with plastic wrap. Place in a warm place for dough to prove. 5. When dough has doubled in size turn onto a floured surface and knead until smooth. 6. Form dough into a loaf shape, place in a greased loaf tin. Cover and leave in a warm place to prove until doubled in size. Glaze with beaten egg. 7. Bake at 230 ºC for 15–20 minutes until golden brown.

(a) Explain how each of **two** functional properties of food cause the dough to rise. (4 marks)

See next page

Question 17 (continued)

(b) Name the ingredient found in self-raising flour that causes flour mixtures to rise. Explain how this process occurs. (3 marks)

See next page

Question 18 **(8 marks)**

Improvements in the technologies used in food manufacturing have made it possible for the food industry to expand by the development of variations to existing products or totally new, innovative products.

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

(b) Describe **two** methods used by product developers to add value to food products. (4 marks)

See next page

Question 19 **(9 marks)**

(a) Define malnutrition. (1 mark)

(b) Describe how each of **two** Australian population groups may be more likely to suffer from malnutrition than the general population. (4 marks)

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

See next page

Question 20 **(8 marks)**

It is widely recognised that climate change will have an impact on Australian farming practices and sustainable food production over the next century.

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

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

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)

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

See next page

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)

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

See next page

Question 23 **(11 marks)**

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

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

(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)

End of Section Two

See next page

Section Three: Extended answer **30% (40 Marks)**

This section contains **three** questions. Answer **two** questions only. Write your answers in the spaces provided following Question 26.

Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

Question 24 **(20 marks)**

The functional properties of food and food processing techniques determine the performance of the production, preparation, processing, storage and preservation of food products. An understanding of how these properties and techniques impact on food is essential to the creation of a safe and profitable food industry.

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

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

(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)

Question 25 **(20 marks)**

Ben works for a breakfast cereal company that wants to develop a new breakfast cereal product. His job on the development team is to present a plan to the company management for the development of the new product.

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

Ben will use the technology process to further develop the new cereal product.

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

(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)

See next page

Question 26 **(20 marks)**

The majority of processed foods contain additives. These change the properties of food products in order to make them more appealing to consumers. Some additives, such as salt, sugar and vinegars have been used for centuries. More recently many more natural and artificial additives have been included in processed foods.

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

A local pastry shop is developing a low-kilojoule version of vanilla slice, a custard powder custard, sandwiched between flaky pastry sheets and topped with pink icing.

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

Crème brulée is a popular, traditional French dessert consisting of vanilla custard topped with crisp toffee. It is light and commonly served in small portions, so is an ideal conclusion to a meal.

Read the following recipe.

Crème brulée

Ingredients	Method
2½ cups thickened cream ¾ cup caster sugar ½ vanilla bean, seeds scraped out 5 egg yolks, lightly whisked 6 tablespoons extra caster sugar	1. Preheat oven to 150 ºC. 2. In a heavy-based saucepan, over medium heat, combine cream, half of the sugar, vanilla bean seeds and pod. Stir while bringing to the boil. 3. Lightly whisk sugar and egg yolks until pale and creamy. 4. Add hot cream to the yolks, whisking constantly to combine. 5. Strain the custard mixture through a fine sieve. 6. Place six ceramic ramekins onto a deep baking tray and fill each with custard until two thirds full. 7. Pour enough hot water into the baking tray to come halfway up the sides of the ramekins. 8. Bake for 25 minutes until firm. 9. Remove from the water bath and cool for 30 minutes. 10. Sprinkle the top of each custard with extra caster sugar. 11. Use a mini blowtorch to evenly melt and brown the sugar topping.

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

- equipment
- ingredients
- storage
- processing techniques
- environment. (10 marks)

End of questions

Question number: _____

Question number: _____

Question number: _____

Question number: _____

Question number: _____

Question number: _____

Question number: _____

Question number: _____

Supplementary page

Question number: _____

Supplementary page

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