



## ATAR course examination, 2022

### Question/Answer booklet

# FOOD SCIENCE AND TECHNOLOGY

Please place your student identification label in this box

WA student number: In figures

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In words

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### 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: up to three calculators, which do not have the capacity to create or store programmes or text, are permitted in this ATAR course 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	74	55
Section Three Extended answer	3	2	70	40	30
<b>Total</b>					100

## Instructions to candidates

1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 12 Information Handbook 2022: Part II Examinations*. 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 preferably using a blue/black pen. Do not use erasable or gel pens.

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.

**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. The creation of a new flavour of potato chip represents which element of the marketing mix?
  - (a) price
  - (b) product
  - (c) place
  - (d) promotion
  
2. Diabetes can be managed through the consumption of a
  - (a) low GI diet.
  - (b) high GI diet.
  - (c) high carbohydrate diet.
  - (d) high lipid diet.
  
3. Cheesemaking is an example of
  - (a) biotechnology.
  - (b) gene technology.
  - (c) nanotechnology.
  - (d) micro-technology.

Use the ingredient list for Creamy Chicken and Prawn Pasta to answer Questions 4 and 5.

<b>Creamy Chicken and Prawn Pasta</b>
<b>Ingredients:</b> (serves 4)  3 tsp minced garlic 100 g sundried tomatoes, sliced 2 tbsp olive oil 400 g chicken breast, sliced 200 g prawns, tails removed ½ cup cream ½ cup milk 1 cup mozzarella cheese 1 tbsp plain flour 250 g pasta 1 tbsp fresh basil 2 tbsp toasted pine nuts ½ tsp dried chilli flakes

4. When considering Creamy Chicken and Prawn Pasta as a menu item that would appeal to children, the features that should be taken into account are
- (a) cost, availability of ingredients, and preparation time.
  - (b) preparation time, ease of eating, and availability of ingredients.
  - (c) pleasant flavour, colourful presentation, and ease of eating.
  - (d) colourful presentation, pleasant flavour and cost.
5. To adapt the recipe to **best** suit a person with coeliac disease, suitable alternatives should be found for
- (a) cheese and cream.
  - (b) cream and plain flour.
  - (c) pasta and cheese.
  - (d) plain flour and pasta.
6. The consumption of mineral supplements can be dangerous to health because
- (a) it is very easy to consume sufficient minerals from the diet.
  - (b) the effects of consumption have not been established scientifically.
  - (c) the body stores minerals and excess consumption can cause side effects.
  - (d) advertising makes false claims about the benefit of supplements.
7. Examples of phytochemicals that can reduce the risk of heart disease are
- (a) phytoestrogens and flavonoids.
  - (b) probiotics and flavonoids.
  - (c) probiotics and antioxidants.
  - (d) phytoestrogens and antioxidants.

8. Two litres of milk costs \$3.40, therefore 1 cup of milk costs
- (a) 34.5 cents.
  - (b) 35.5 cents.
  - (c) 42.5 cents.
  - (d) 8.5 cents.
9. The micronutrient crucial for reducing the risk of spina bifida is
- (a) riboflavin.
  - (b) folate.
  - (c) thiamin.
  - (d) ascorbic acid.
10. During digestion, peristalsis occurs in the
- (a) oesophagus, stomach and small intestine.
  - (b) mouth, liver and rectum.
  - (c) liver, small intestine and rectum.
  - (d) mouth, oesophagus and stomach.
11. The Nutrient Reference Values outline
- (a) the amount of nutrients required on an average daily basis for adequate physiological function and prevention of deficiency diseases.
  - (b) the average dietary intake that is predicted to maintain energy balance in a healthy adult of a defined age, gender, weight, height and level of physical activity, consistent with good health.
  - (c) the amount of a nutrient that is estimated to meet the requirement for a specific criterion of adequacy of half of the healthy individuals of a specific age, sex, and life-stage.
  - (d) the highest level of daily intake of most nutrients considered likely to pose no adverse health effects in the majority of human individuals of a specific age, sex, and life stage.
12. The technology used to remove the micronutrients responsible for haze and brown colour forming in apple juice is
- (a) micro-encapsulation.
  - (b) membrane technology.
  - (c) nanotechnology.
  - (d) high pressure processing.

13. Gender can influence health and wellbeing because
- (a) a family history of a disease common to females causes it to be transmitted to all subsequent generations.
  - (b) males tend to care for their health and seek medical assistance more than females.
  - (c) females are more likely to develop cardiovascular disease at an earlier age than males.
  - (d) males tend to carry fatty tissue around their vital organs, putting them at risk of diseases.
14. The intention of *The Australian Association of National Advertisers (AANA) Code for Advertising and Marketing Communications to Children* is to ensure that
- (a) consumer confidence is tested when advertisers develop material targeted at children.
  - (b) advertisers and marketers develop and maintain a high sense of social responsibility in advertising and marketing to children.
  - (c) advertisers and marketers adopt a common format when promoting food and beverage products to children.
  - (d) advertisements that do not meet community standards are removed immediately to limit the costs incurred by industry.
15. A large proportion of the world's crops is being fed to livestock; this is due partly to
- (a) insufficient machinery to harvest crops.
  - (b) an excess production of grain crops.
  - (c) the preference of consumers for meat and dairy foods.
  - (d) the lack of pasture to feed livestock.

**End of Section One**

**See next page**

**Section Two: Short answer****55% (74 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)**

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

<b>Ingredients to serve 4 people</b>	<b>Cost per package</b>	<b>Size of package</b>	<b>Cost per ingredient</b>
16 g minced garlic	\$1.25	250 g	
100 g sundried tomatoes	\$4.70	250 g	\$1.88
2 tbsp olive oil	\$15.00	750 ml	
400 g chicken breast	\$9.50	1 kg	
½ cup cream	\$3.20	600 ml	67c
½ cup milk	\$1.20	1 L	
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 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		
	Cost per serve		
	Cost to serve 30 people		

**See next page**

## Question 17

(8 marks)

Tom is the father in a family of four that includes two teenage boys. His wife is a landscape gardener, one son is a diabetic and the other an athlete. Tom understands the importance of providing safe, nutritious meals. He works full time, so he does not have a great deal of time to spend shopping for ingredients or for meal preparation. He does manage a generous household budget.

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

One: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

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Three: \_\_\_\_\_

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Four: \_\_\_\_\_

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## Question 18

(8 marks)

Every food business in Australia, whether a school canteen, drive-through coffee shop or five-star restaurant, is required by law to ensure that staff have been trained properly and their food is safe to eat. Food safety laws and regulations are enforced at the National, State and Local levels.

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

One: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

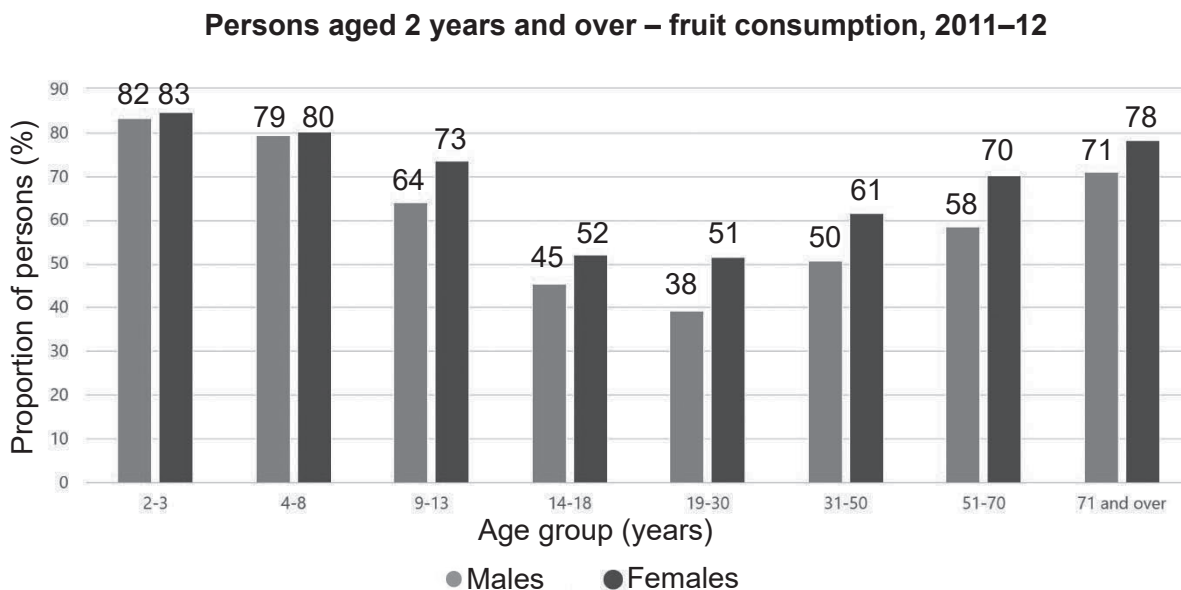
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Question 19

(11 marks)

The graph below shows the proportion of males and females who had consumed at least one piece of fruit the day prior to being interviewed.



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

One: \_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (c) Identify **two** trends relating to the consumption of fruit indicated in the graph on page 10. (2 marks)

One: \_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Question 20

(10 marks)

Read the following recipe.

For copyright reasons this text cannot be reproduced in the online version of this document, but may be viewed at the following link <https://www.christinascucina.com/butterfly-cupcakes-british-butterfly-cakes/>

(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)

Ingredients: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Equipment **or** storage: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

One: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

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Three: \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

Question 21

(10 marks)

Food is one of the most frequently promoted commodities and promoted foods are often unhealthy.

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

One: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

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Three: \_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_

A television advertisement promoting a fast-food restaurant's 'kids meal' is shown several times during a popular childrens' television show.

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

One: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Two: \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

**Question 22****(11 marks)**

People have been manipulating the genetic make-up of plants and animals for countless generations. Today's techniques use new ways of identifying specific characteristics and transferring them between living organisms.

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

One: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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Two: \_\_\_\_\_

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Three: \_\_\_\_\_

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Some consumers have concerns over the possible risks associated with the use of genetically-modified processes in food production. These include the impact on health, the environment and antibiotic resistance. However, the Australian food supply remains safe.

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**See next page**

**Question 23****(8 marks)**

Enough food is produced on Earth to feed everyone adequately, if it was shared equitably. The many issues involved with the production, distribution and consumption of food influence the global food supply.

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

Government policies: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Production of biofuels: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Land ownership: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Natural disasters: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**End of Section Two**

**See next page**



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**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.

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**Question 24****(20 marks)**

The demand for food is growing globally as Australia's population increases.

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

Water is a scarce resource that is essential to farming.

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

**Question 25****(20 marks)**

A large manufacturer of snack food products has taken note of emerging food trends and is developing a new product to capture market share.

- (a) Describe **two** adaptations that might be used in developing the new product. (4 marks)
- (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)
- (c) Explain **four** factors that may influence the development of the new food product. (12 marks)

**Question 26****(20 marks)**

The performance of food is determined by its functional properties.

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

The majority of recipes rely on more than one functional property.

Read the following recipe.

<b>Eggs Benedict</b>	
<b>Ingredients</b>	<b>Method</b>
Bacon: 1 rasher bacon  Muffin: 1 English muffin, halved  Hollandaise sauce: 140 g unsalted butter 3 large egg yolks 1 tbsp lemon juice ½ tsp salt  Poached eggs: 2 eggs	<ol style="list-style-type: none"> <li>1. Heat oven to 180 °C.</li> <li>2. Boil water for poaching eggs.</li> <li>3. Grill bacon until browned. Place in oven to keep warm.</li> <li>4. Toast muffins. Place in oven to keep warm.</li> <li>5. Melt butter in a saucepan.</li> <li>6. Use a stick blender to blend the egg yolks.</li> <li>7. Add lemon juice and blend until the mixture lightens in colour.</li> <li>8. Turn blender speed to slow. Slowly drizzle in the melted butter.</li> <li>9. Continue blending until all the butter is incorporated.</li> <li>10. Crack eggs, one at a time, into a small bowl and gradually slip them into the hot water.</li> <li>11. Turn off heat, cover pan and cook for four minutes.</li> <li>12. Use a slotted spoon to remove eggs from water.</li> </ol> <p>Assemble Eggs Benedict:</p> <ol style="list-style-type: none"> <li>13. Place muffins on serving plates.</li> <li>14. Place bacon on muffins.</li> <li>15. Place eggs on top of bacon.</li> <li>16. Pour over hollandaise sauce</li> </ol>

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

**End of questions**







Question number: \_\_\_\_\_

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Question number: \_\_\_\_\_

Series of horizontal lines for writing the answer.

















## ACKNOWLEDGEMENTS

- Question 11** ... from: Dwyer, J. (2003). Dietary requirements of adults. In L. Trugo & P. M. Finglas (Eds.), *The encyclopedia of food sciences and nutrition* (2nd ed.) (pp. 1863–1868). Academic Press. Retrieved May, 2022, from <https://www.sciencedirect.com/topics/food-science/estimated-average-requirement>
- ... adapted from: National Health and Medical Research Council, Australian Government Department of Health and Ageing, & New Zealand Ministry of Health. (2006). *Nutrient reference values for Australia and New Zealand*. National Health and Medical Research Council, p. 8. Retrieved May, 2022, from <https://www.nhmrc.gov.au/about-us/publications/nutrient-reference-values-australia-and-new-zealand-including-recommended-dietary-intakes>  
Used under Creative Commons Attribution 4.0 International licence.
- ... adapted from: Otten, J. J., Hellwig, J. P., & Meyers, L. D. (Eds.). (2006). *Dietary reference intakes: The essential guide to nutrient requirements*. National Academy of Sciences, p. 8. Retrieved May, 2022, from <https://nap.nationalacademies.org/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements>
- Question 14** ... from: Australian Association of National Advertisers. (n.d.). *Children’s advertising code*. Retrieved May, 2022, from <https://aana.com.au/self-regulation/codes-guidelines/aana-code-for-advertising-marketing-communications-to-children/>
- Question 19** Adapted from: Australian Bureau of Statistics. (2014). *Persons aged 2 years and over - fruit consumption(a), 2011–12* [Graph]. Retrieved May, 2022, from <https://www.abs.gov.au/statistics/health/health-conditions-and-risks/australian-health-survey-nutrition-first-results-foods-and-nutrients/latest-release>  
Used under Creative Commons Attribution 4.0 International licence.
- Question 20** Recipe adapted from: Conte, C. (2020). *Butterfly cupcakes (British butterfly cakes)*. Retrieved May, 2022, from <https://www.christinas.cucina.com/butterfly-cupcakes-british-butterfly-cakes/>
- Question 22(a)** First paragraph from: © Food Standards Australia New Zealand. (2020). *General information about GM foods*. Retrieved May, 2022, from <https://www.foodstandards.gov.au/consumer/gmfood/gm-overview/Pages/default.aspx>  
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