



ATAR course examination, 2023

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

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	78	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 2023: 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.

1. What is the **main** consequence of the use of antibiotics in genetic modification that has led to increased concern among scientists and public health authorities?
 - (a) increased efficiency of the modification process
 - (b) development of antibiotic-resistant strains
 - (c) enhanced stability of the modified genome
 - (d) decreased potential for environmental impact

2. Examining market trends, establishing budget requirements and identifying target markets are all components of a
 - (a) product proposal.
 - (b) consumer profile.
 - (c) product purpose.
 - (d) product specification.

3. Innovative developments of food packaging include
 - (a) containment and recycling.
 - (b) price control and recycling.
 - (c) containment and price control.
 - (d) communication and advertising.

4. Under-nutrition is a consequence of
 - (a) effective food aid programs.
 - (b) affluent societies.
 - (c) global food inequity.
 - (d) agricultural technologies.

5. Humanitarian values, such as the consumption of fair-trade produce, is an example of which influence on food consumption patterns in Australia?
 - (a) environmental
 - (b) social
 - (c) economic
 - (d) ethical

See next page

6. Select the **most** accurate explanation of how fat-soluble vitamins affect human health.
- (a) osteoporosis results from insufficient intake of fat-soluble vitamins
 - (b) fat-soluble vitamins are less vital for health than water-soluble vitamins
 - (c) excessive intake of fat-soluble vitamins may cause liver toxicity
 - (d) the body struggles to absorb fat-soluble vitamins with insufficient iron intake
7. The mineral primarily responsible for nerve transmission, muscle contraction and heart function is
- (a) iron.
 - (b) calcium.
 - (c) sodium.
 - (d) potassium.
8. The marketing mix describes strategies used to
- (a) analyse the viability of a food product.
 - (b) develop a new product for consumers.
 - (c) influence the consumer to purchase.
 - (d) manage the marketing of imports.
9. The **most** common forms of membrane technology used to develop new food products include
- (a) high-pressure processing and aseptic packaging.
 - (b) ultrafiltration and reverse osmosis.
 - (c) ultrafiltration and high-pressure processing.
 - (d) reverse osmosis and aseptic packaging.
10. The consumption of commercially processed foods may have an adverse effect on health because of the
- (a) addition of additives to create marketable quality products.
 - (b) fortification of iron and B vitamins in cereal and grain products.
 - (c) removal of saturated lipids in milk and other dairy products.
 - (d) modification of pasta and bread to produce gluten free varieties.
11. Which of the following is the primary contributing factor to the process of rancidity in food?
- (a) oxidation
 - (b) radiation
 - (c) clarification
 - (d) hydrogenation

12. A common chemical change in preserved food is
- (a) colour change when canning.
 - (b) coagulation when heating.
 - (c) ice crystal formation when freezing.
 - (d) concentration of sugar when dehydrating.
13. In the food industry, microorganisms are used frequently for
- (a) processing of canned goods.
 - (b) crystallisation to produce sugar.
 - (c) dehydration of meat.
 - (d) fermentation to produce pickles.
14. An Asian diet including soy products is likely to contain high levels of
- (a) omega-3 fatty acids.
 - (b) phytoestrogens.
 - (c) probiotics.
 - (d) antioxidants.
15. To ensure fermented foods are safe to consume, their pH level should be
- (a) between 4.6 and 7.
 - (b) neutral 7.
 - (c) below 4.6.
 - (d) above 10.

End of Section One

See next page

Section Two: Short answer

55% (78 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

(10 marks)

Waste disposal is a major environmental issue that impacts the sustainable production of food.

- (a) Describe **two** environmental issues associated with waste disposal that impact the sustainable production of food commodities. (4 marks)

One: _____

Two: _____

- (b) Identify **two** practices by which domestic food waste can be reduced. Describe **one** benefit of each of these practices. (6 marks)

One: _____

Benefit: _____

Two: _____

Benefit: _____

See next page

Question 17

(10 marks)

Maria who is aged 45 years, has recently been diagnosed with lactose intolerance. She is a busy working mother of two and has always enjoyed incorporating dairy products into her diet, especially as a source of protein and calcium. However, after experiencing digestive discomfort, and other unpleasant symptoms, Maria was advised by her doctor to eliminate lactose from her diet. Maria's son, Marco, suffers from coeliac disease.

- (a) Explain the difference between Maria's and Marco's conditions. (3 marks)

- (b) Explain **one** way in which Marco's condition affects his ability to digest nutrients. (3 marks)

Maria can change her diet in a number of ways to help alleviate her symptoms.

- (c) Describe **two** appropriate dietary modifications she could make. (4 marks)

One: _____

Two: _____

See next page

Question 18

(9 marks)

There is enough food produced for every person on the planet to consume a healthy and nutritious diet, but the global food supply is not equitable.

For each of the factors below, describe the influence on the distribution of global food resources and outline an achievable solution.

Population growth and distribution

Solution: _____

Food prices

Solution: _____

Demand for meat and dairy

Solution: _____

Question 19

(11 marks)

A new children's 'superfood juice' has been developed to attempt to tackle fussy eating and to help ensure children are receiving the nutrients they need for optimal growth. A marketing campaign to advertise the product has just been launched. To entice new customers, an introductory competition to create a mascot for the juice has been included in the campaign.



- (a) Describe **four** of the codes in the *Australian Association of National Advertisers (AANA) Code for Advertising and Marketing Communications to Children*, that have implications for the marketing campaign for the superfood juice. (8 marks)

One: _____

Two: _____

Three: _____

Four: _____

See next page

Question 19 (continued)

(b) Explain an effective promotional marketing mix strategy for the superfood juice. (3 marks)

Question 20**(12 marks)**

Knowledge of food components and their properties is essential to producing high-quality products that will be well received by consumers. Protein, carbohydrates and lipids are known as natural food components.

Select **two** natural food components. Identify **two** examples of each component and describe the function of each in food processing.

Natural food component one: _____

One: _____

Two: _____

Natural food component two: _____

One: _____

Two: _____

Question 21

(11 marks)

- (a) Identify the government legislation responsible for managing work environments and describe its role in the food industry. (3 marks)

Jacob recently started a new job at a busy fast-food restaurant. He had never worked in hospitality before, nor had he ever used any commercial cooking equipment. On his second shift, Jacob was instructed by the employer to use the deep fryer to cook the potato chips. He had not yet been trained in using the equipment, but as it was very busy, and he was new, he obliged. While putting the chips into the deep fryer, the hot oil splashed onto Jacob's arm, causing serious burns that required hospitalisation.

- (b) Describe **two** economic and **two** social consequences for the employer of the fast-food restaurant. (8 marks)

Economic

One: _____

Two: _____

Social

One: _____

Two: _____

Question 22

(8 marks)

Many new technologies are being used in the food industry to improve the chemical properties of food.

- (a) Explain the process of micro-encapsulation. (3 marks)

- (b) Describe **two** advantages of micro-encapsulation. (4 marks)

One: _____

Two: _____

- (c) Identify **one** application of micro-encapsulation in the food industry. (1 mark)

Question 23**(7 marks)**

- (a) Explain the purpose of Nutrient Reference Values (NRV) in relation to dietary intake. (3 marks)

There is an abundance of dietary supplements on the market, targeting diverse demographic groups. They are marketed as an effective means of receiving all essential nutrients needed in the diet.

- (b) Outline **two** advantages and **two** disadvantages of consuming dietary supplements. (4 marks)

Advantages:

One: _____

Two: _____

Disadvantages:

One: _____

Two: _____

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)**

As consumers look for healthier and more sustainable food options, there has been a growing demand for meat alternatives made from plant-based proteins. These new products are protein rich and offer a similar taste and texture to meat. These products are now widely available in grocery stores and restaurants, and have become increasingly popular among consumers who are looking to reduce their meat consumption or follow a vegetarian or vegan diet.

- (a) Identify **one** plant-based commodity and describe why it is a suitable meat alternative. (3 marks)
- (b) Explain **one** qualitative method of analysis used to evaluate a new plant-based food product, including **two** ways of controlling conditions to ensure that the test is fair and valid. (5 marks)
- (c) Explain how each stage of the technology process could be used to create a new plant-based food product that responds to consumer needs. (12 marks)

Question 25**(20 marks)**

Ben is a 17-year-old elite swimmer. He attends swimming training most mornings before school, as well as many after-school sessions, including weight training in the gym to improve his overall strength and performance in the pool.

- (a) Describe how the consumption of **one** functional food could assist Ben's cardiovascular system by having a positive effect on his health. (2 marks)

The *Australian Guide to Healthy Eating* (AGHE) is a food selection guide that visually represents the proportion of the five food groups recommended for daily consumption.

- (b) Describe **three** ways in which the AGHE can assist Ben to reduce his risk of developing osteoporosis as he ages. (6 marks)

Below is an example of Ben's typical morning tea and lunch at school.

Morning tea	Homemade English muffin pizza with ham, cheese, tomato and pineapple
	Two chocolate biscuits
	300 ml orange juice
Lunch	Chicken, cheese, avocado and salad wrap
	Apple
	Small packet of rice crackers
	600 ml chocolate milk

- (c) Identify **one** macronutrient and its food source from Ben's morning tea and lunch. Describe **two** phases of mechanical digestion and **three** phases of chemical digestion of this macronutrient, as it moves through the digestive tract. (12 marks)

Question 26**(20 marks)**

A small catering business is planning to introduce a home delivery service for buffet barbecues. It will provide raw steak and sausages, three varieties of salad, fresh bread rolls, two cold desserts, and a fruit and cheese platter. The service will provide and deliver raw and cooked food items, supply the barbecue and set up the service areas, serve the food and clean up following the function.

- (a) Describe the food safety legislative requirements of the *Food Act 2008* (WA) for a high-risk food business. (2 marks)
- (b) Name the food safety system used in the food industry. Explain the purpose of the system and describe **two** reasons why it is of benefit to food producers. (8 marks)
- (c) Define the term 'critical control points'. Describe **three** critical control points in the production and service of the buffet barbecue. State **one** corrective action that could reduce the risk to food safety at each control point. (10 marks)

End of questions

ACKNOWLEDGEMENTS

- Question 19** Freepik. (2017). *Funny Fruit Background* [Diagram]. Retrieved June, 2023, from https://www.freepik.com/free-vector/funny-fruit-background_1133223.htm
- Question 25(b)** National Health and Medical Research Council. (2017). *Australian Guide to Healthy Eating*. Retrieved May, 2023, from <https://www.eatforhealth.gov.au/guidelines/australian-guide-healthy-eating>

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Published by the School Curriculum and Standards Authority of Western Australia
303 Sevenoaks Street
CANNINGTON WA 6107