FOOD SCIENCE AND TECHNOLOGY
Stage 3

Student Number: In figures

In words

Time allowed for this paper
Reading time before commencing work: ten minutes
Working time for paper: three hours

Materials required/recommended for this paper
To be provided by the supervisor
This Question/Answer Booklet
Multiple-choice Answer Sheet

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 the WACE examinations

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 notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor before reading any further.
Structure of this paper

<table>
<thead>
<tr>
<th>Section</th>
<th>Number of questions available</th>
<th>Number of questions to be answered</th>
<th>Suggested working time (minutes)</th>
<th>Marks available</th>
<th>Percentage of exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section One: Multiple-choice</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Section Two: Short answer</td>
<td>8</td>
<td>8</td>
<td>100</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Section Three: Extended answer</td>
<td>3</td>
<td>2</td>
<td>60</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the Year 12 Information Handbook 2015. 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. 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 responses to the specific questions asked and to follow any instructions that are specific to a particular question.

4. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
   - Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
   - Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.
Section One: Multiple-choice 20% (20 Marks)

This section has 20 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. 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: 20 minutes.

1. Low intake of dairy foods may lead to
   (a) anaemia.
   (b) osteoporosis.
   (c) hypertension.
   (d) malnutrition.

2. A workflow or production plan is used to
   (a) save production time, minimise food wastage and increase productivity.
   (b) increase productivity, save production time and decrease staff numbers.
   (c) minimise food wastage, increase cooking time and prevent equipment failures.
   (d) decrease staff numbers, prevent equipment failures and increase cooking time.

3. The responsibility of Food Standards Australia New Zealand for food products imported into Australia is to
   (a) develop standards for the packaging of imported products.
   (b) monitor the safety of food products packaged in Australia.
   (c) conduct inspections to identify illegally imported foods.
   (d) develop risk assessment policies for imported foods.

4. Safe use of equipment in a busy kitchen will help reduce the risk of
   (a) injuries and litigation.
   (b) cross contamination and conflict.
   (c) litigation and cross contamination.
   (d) conflict and injuries.

5. Food producers have an obligation to produce food that is
   (a) palatable and appetising.
   (b) safe and economical.
   (c) safe and palatable.
   (d) appetising and economical.
6. When using Australian metric standards ¼ cup of oil equals
   (a) 2 tablespoonsful.
   (b) 2.5 tablespoonsful.
   (c) 3 tablespoonsful.
   (d) 3.5 tablespoonsful.

7. Stewing rather than roasting meat can be justified as it
   (a) takes longer to cook.
   (b) makes the meat tender.
   (c) improves the flavour.
   (d) is more economical.

8. Wet cooking methods used to process food safely include
   (a) pickling, stewing and smoking.
   (b) fermentation, dehydration and simmering.
   (c) simmering, stewing and boiling.
   (d) boiling, fermentation and smoking.

9. Dry frying is a method of cooking in
   (a) the fat that runs from the food as it is heated.
   (b) a small amount of oil heated in a wok.
   (c) sufficient oil to submerge food.
   (d) a small amount of water added to a frying pan.

10. The impact of biotechnology on food processing increases the opportunity for
    (a) higher crop yields and improved primary production.
    (b) a wider variety and increased quality of food products.
    (c) improved primary production and a wider variety of food products.
    (d) increased quality of food products and higher crop yields.

11. Processing techniques have an impact on nutritional value as they affect the
    (a) preservation properties of foods.
    (b) sensory properties of foods.
    (c) physical properties of foods.
    (d) chemical properties of foods.

12. The Australian Association of National Advertisers Code for Advertising 2008 is a
    (a) mandatory code.
    (b) self-regulatory code.
    (c) government code.
    (d) compulsory code.
13. Vacuum packaging is a process whereby
   (a) sterility is achieved with a flash heating process.
   (b) a controlled gas blend is used to package the food.
   (c) air is removed from the package prior to sealing.
   (d) the food is protected from the external environment.

14. Which of the following is a fortified food product?
   (a) calcium-enriched milk
   (b) fat-reduced cheese
   (c) omega-3 eggs
   (d) gluten-free flour

15. A packaging process in which the food and the package are sterilised separately is called
   (a) active packaging.
   (b) barrier-specific packaging.
   (c) modified atmosphere packaging.
   (d) aseptic packaging.

16. Natural disasters affect the food supply by
   (a) reducing the availability of food.
   (b) increasing food availability.
   (c) expanding food variety.
   (d) reducing foreign aid.

17. The ability to produce foods with improved characteristics can be achieved by
   (a) gene manufacturing.
   (b) nutrient structuring.
   (c) genetic modification.
   (d) natural selection.

18. A combination of which of the following strategies is used by soft drink manufacturers to gain a competitive edge in the market place?
   (a) promotion, price manipulation and price structure
   (b) product planning, price structure and promotion
   (c) product planning, product information and place
   (d) place, product information and price manipulation
19. The Australian Quarantine Inspection Service is responsible for

(a) regulating the sale price of food products imported into Australia.
(b) regulating the sale price of food products exported from Australia.
(c) developing legislation that controls the labelling of imported foods.
(d) management of processes that ensure food imports meet Australian standards.

20. Processed functional foods are those that

(a) have been created as line extensions of other products.
(b) have had the nutrient content altered to add health benefits.
(c) have been fortified with nutrients lost during food processing.
(d) provide the body with the sustenance needed for good health.
Question 21  (8 marks)

Ben had just completed an interview for his first job in the food industry. The employer told him he would start on the roster in one week’s time. As Ben was keen to start earning money, he was delighted when the employer phoned and asked if he could work an evening shift that same night, as an employee was sick. As the air conditioning was not working, the employer told Ben to wear light, comfortable clothing and report for the shift at 6 pm. Ben was required to clear tables and make sure the restrooms were kept clean during the evening’s service. At the end of the shift, he was required to clean the restrooms and floors thoroughly and sanitise the counters and tables. While he was cleaning the restrooms, he split a bucket containing cleaning chemicals and burned the skin on his hands and legs. He decided to wait until he got home so that his mother could tend to his injuries.

(a) Describe two employer obligations and two employee obligations that have not been met under the **Occupational Safety and Health Act 1984**.  

(4 marks)

<table>
<thead>
<tr>
<th>Obligations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer:</td>
</tr>
<tr>
<td>Employee:</td>
</tr>
</tbody>
</table>

---

See next page
Question 21 (continued)

(b) Describe four consequences for employers of not providing safe work environments. (4 marks)

______________________________________________________________________________________________

______________________________________________________________________________________________

______________________________________________________________________________________________

______________________________________________________________________________________________

______________________________________________________________________________________________
STAGE 3  FOOD SCIENCE AND TECHNOLOGY

Question 22  (12 marks)

(a) Identify **two** reasons why food is preserved.  (2 marks)

(b) Explain **two** causes of food spoilage.  (4 marks)

(c) Explain how the application of **two** food processing techniques preserves food. Provide **one** example of each technique.  (6 marks)
Question 23

Discuss three ways in which the unequal distribution of safe, quality food supplies affects remote communities in Australia.
Question 24  (8 marks)

Explain how and why two ethical and two political factors influence food consumption patterns in Australia.
An understanding of how the properties and performance of food are controlled during processing is essential when adapting and developing new food products. It is also necessary in the analysis of why recipes fail.

Read the following recipe.

### The Perfect Cake

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 g plain flour</td>
<td>1. Preheat oven to 190°C.</td>
</tr>
<tr>
<td>40 g custard powder or cornflour</td>
<td>2. Grease and flour two sponge tins.</td>
</tr>
<tr>
<td>1 teaspoon baking powder</td>
<td>3. Combine flour, baking powder and custard powder or cornflour. Sift twice.</td>
</tr>
<tr>
<td>4 eggs at room temperature</td>
<td>4. Separate eggs, beat whites in a clean bowl using an electric beater.</td>
</tr>
<tr>
<td>165 g castor sugar</td>
<td>5. Gradually add sugar, beating until whites are very stiff.</td>
</tr>
<tr>
<td>20 ml water</td>
<td>6. Add egg yolks and continue beating until mixture resembles a thick cream.</td>
</tr>
<tr>
<td></td>
<td>7. Use a metal spoon to very lightly fold in sifted flours.</td>
</tr>
<tr>
<td></td>
<td>8. Pour evenly into prepared tins.</td>
</tr>
<tr>
<td></td>
<td>9. Bake 20 minutes.</td>
</tr>
<tr>
<td></td>
<td>10. Remove from oven, remove from tins and cool on a rack.</td>
</tr>
</tbody>
</table>
Complete the following table.

Explain **one** way in which **each** of the following controlling factors influence the production of The Perfect Cake:
- equipment
- ingredients
- processing techniques
- environment.

<table>
<thead>
<tr>
<th>Controlling factors</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ingredients</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processing techniques</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A wide range of additives are available to commercial food producers. These additives serve a variety of purposes. However, the use of additives in domestic food production is not common.

(a) Propose one reason why additives are less commonly used in domestic cooking than in commercial cooking.

Read the recipe below.

**Cupcakes**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 g butter</td>
<td>1. Cream butter and sugar.</td>
</tr>
<tr>
<td>60 g castor sugar</td>
<td>2. Beat in egg and vanilla essence.</td>
</tr>
<tr>
<td>1 egg, beaten</td>
<td>3. Add flour and milk gradually, stir in gently.</td>
</tr>
<tr>
<td>½ teaspoon vanilla essence</td>
<td>4. Place mixture in patty pans.</td>
</tr>
<tr>
<td>3 tablespoons milk</td>
<td>5. Bake at 200 ºC for 15 minutes.</td>
</tr>
<tr>
<td>115 g SR flour, sifted</td>
<td></td>
</tr>
</tbody>
</table>

(b) Identify three additives that might be added to the ingredients when this recipe is produced commercially. Explain the purpose of each additive.
Question 27

Examine the data shown in the graph below.

(a) Discuss four ways in which Australian household spending over the period 1998–2010 did or did not reflect the recommendations of the current Australian Dietary Guidelines.

Weekly household expenditure on food and beverages, by food type

- Bread, cakes, cereals
- Meat
- Seafood
- Dairy products
- Edible oils and fats
- Fresh fruit
- Fresh vegetables
- Processed fruit and nuts
- Processed vegetables
- Non-alcoholic beverages
- Alcoholic beverages
- Meals out, takeaway food
- Other food

Per cent of household expenditure

- 1998–99
- 2003–04
- 2009–10
Question 27 (continued)

(b) Draw one conclusion from your analysis of the data shown in the graph. (2 marks)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Question 28

The main reason for the development of new technologies in the food industry is to improve and increase the range of food products available to consumers. Ingredients, production processes and packaging are often improved by the application of new technologies.

Identify one technology used to improve ingredients and one technology used to improve a production process in the food industry. Explain how and why each is used. Provide one example of a food product made using each technology.

Technology used to improve ingredients: ____________________________

<table>
<thead>
<tr>
<th>How the technology is used</th>
<th>Why the technology is used</th>
<th>Food product example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technology used to improve a production process: ____________________________

<table>
<thead>
<tr>
<th>How the technology is used</th>
<th>Why the technology is used</th>
<th>Food product example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section Three: Extended answer 20% (40 Marks)

This section contains three (3) questions. Answer two (2) questions only. Write your answers in the spaces provided following Question 31.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 60 minutes.

Question 29 (20 marks)

The national health priorities initiative in Australia is a collaborative effort endorsed by the Commonwealth, State and Territory governments.

(a) Describe the purpose of the national health priorities initiative. (2 marks)

Under-consumption and over-consumption of macronutrients and micronutrients in the body contribute to the overall burden of disease. Improving the nutritional status of Australians can play an important role in addressing the increase in many diet-related health conditions.

(b) Identify three diet-related health conditions that have been identified as national health priorities. Discuss the dietary related risk factors and the effects on health of each condition. (9 marks)

Cause of death statistics are a key to understanding Australian society and health. These statistics provide insight into diseases and factors contributing to reduced life expectancy of Australians.

An increasing number of these deaths are caused by poor lifestyle factors.

(c) Explain how three lifestyle factors cause health issues in present day Australian society. Identify a diet-related health conditions for each lifestyle factor. (9 marks)

Question 30 (20 marks)

The way in which food is produced has an increasing influence on consumers. A range of ethical and environmental issues creates awareness of how crops and livestock are grown and raised. This, in turn, translates into the way consumers make food choices.

(a) Describe briefly each of the following farming systems:
   - intensive farming
   - biological or organic farming
   - genetically modified farming
   - sustainable farming. (4 marks)
(b) Discuss two ways in which secondary food processing techniques affect food consumption. (4 marks)

(c) Discuss two impacts on the food supply of each of the following primary food production practices:
- land degradation
- water use
- the use of chemicals. (12 marks)

Question 31 (20 marks)

Legislation has established processes that regulate standards of food hygiene. Food safety programs are based on the Hazard Analysis Critical Control Point (HACCP) system.

(a) Identify who is required to have a HACCP system in place and describe three reasons why the system is necessary. (4 marks)

(b) Describe two ways in which legislation regulates standards of food hygiene in Western Australia and outline two ways in which the standards are monitored. (4 marks)

Read the following scenario.

Food on the Run is a small cafe in the Perth business district. It provides a range of hot and cold takeaway food items and has a small area where customers can dine-in. The menu is to be expanded with the addition of several pasta dishes. One will be the Penne and Chicken Bake, the recipe for which is provided below. It will be offered as an individual-sized hot takeaway, a family-sized frozen takeaway and dine-in customers will be served from a bain marie. Dine-in purchases will be accompanied by a salad. As a new product range is being introduced, the cafe’s HACCP plan will need to be revised.

Penne and Chicken Bake (individual serve)

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 g butter</td>
<td>1. Preheat oven to 180 °C, grease foil container or bain marie tray.</td>
</tr>
<tr>
<td>½ onion finely chopped</td>
<td>2. Melt butter, add onion and cook until tender.</td>
</tr>
<tr>
<td>60 g plain flour</td>
<td>3. Add flour, stir until smooth.</td>
</tr>
<tr>
<td>500 ml milk</td>
<td>4. Add half of the milk and stir until smooth.</td>
</tr>
<tr>
<td>100 g chopped, cooked chicken</td>
<td>5. Add remainder of milk and stir until mixture boils and thickens.</td>
</tr>
<tr>
<td>160 g cooked penne</td>
<td>6. Add chicken, peas, pasta and cheese.</td>
</tr>
<tr>
<td>1 cup cooked frozen peas</td>
<td>7. Place in a foil container or bain marie tray.</td>
</tr>
<tr>
<td>100 g grated tasty cheese</td>
<td>8. Bake 25 minutes until browned and heated through.</td>
</tr>
<tr>
<td>60 g grated parmesan cheese</td>
<td></td>
</tr>
</tbody>
</table>

(c) Identify four food hygiene practices that should be considered as critical control points in the production and service of the Penne and Chicken Bake. Explain why each must be monitored to ensure the food is safe to consume. (12 marks)

End of questions
Question number: ____________
Question number: ______________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________

______________________________________________________________________
Question number: ______________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Additional working space

Question number: ____________
ACKNOWLEDGEMENTS

Section Two

Used under the Creative Commons Attribution 3.0 Australia licence.

Section Three


This document – apart from any third party copyright material contained in it – may be freely copied, or communicated on an intranet, for non-commercial purposes in educational institutions, provided that it is not changed and that the School Curriculum and Standards Authority is acknowledged as the copyright owner, and that the Authority’s moral rights are not infringed.

Copying or communication for any other purpose can be done only within the terms of the Copyright Act 1968 or with prior written permission of the School Curriculum and Standards Authority. Copying or communication of any third party copyright material can be done only within the terms of the Copyright Act 1968 or with permission of the copyright owners.

Any content in this document that has been derived from the Australian Curriculum may be used under the terms of the Creative Commons Attribution-NonCommercial 3.0 Australia licence.