



South Australian
Certificate of Education

1

Nutrition 2019

Question booklet 1

Part 1: Short-answer and analytical questions

Section A of Part 1 (Questions 1 to 5) 50 marks

- Answer **all** questions in Section A
- Write your answers in this question booklet
- You may write on page 11 if you need more space
- Allow approximately 50 minutes

Examination information

Materials

- Question booklet 1 (Section A of Part 1)
- Question booklet 2 (Section B of Part 1)
- Question booklet 3 (Part 2)
- SACE registration number label

Instructions

- Use black or blue pen
- You may use a sharp dark pencil for diagrams and other representations
- Approved calculators may be used

Total time: 130 minutes

Total marks: 120

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PART 1: Section A (Questions 1 to 5)
(50 marks)

Answer **all** questions in this section.

1. The ingredients of banana bread are listed below:

- | | | |
|----------------------|---------------|-------------|
| • self-raising flour | • plain flour | • eggs |
| • brown sugar | • rolled oats | • skim milk |
| • cinnamon | • bananas | • butter |

- (a) (i) Several of the ingredients are a concern for a person who has coeliac disease.
Identify *one* of these ingredients and explain why it is a concern.

(2 marks)

- (ii) State *one* alternative to the ingredient you identified in part (a)(i) that would make the banana bread suitable for a person who has coeliac disease.

(1 mark)

- (b) (i) Explain why a person who has coeliac disease is at risk of developing nutrient deficiencies.

(2 marks)

- (ii) State *one* nutrient deficiency and the subsequent diet-related disorder that could develop in a person who has coeliac disease.

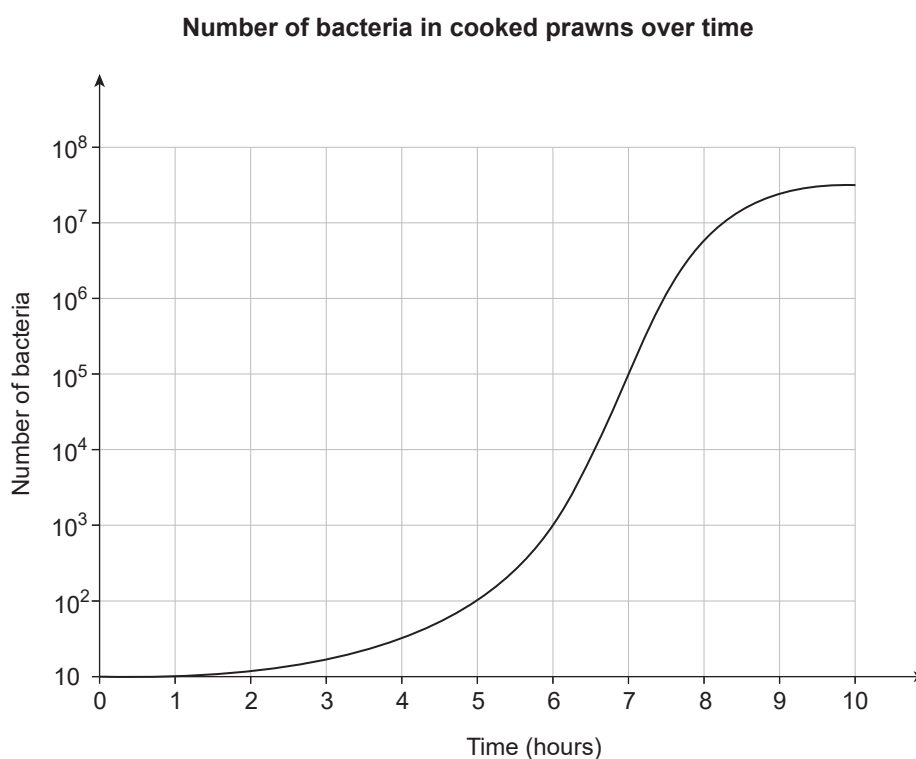
(2 marks)

2. Sally telephones Harry's Pizzeria and orders a prawn pizza to be delivered to her home. Harry's pizzas are cooked in a wood-fired oven.

(a) Explain the relationship between food poisoning and the temperature of food.

(2 marks)

(b) Refer to the following graph, which shows bacterial growth in cooked prawns, stored at 30°C, over time:



(i) With reference to the graph, describe the trend of bacterial growth in cooked prawns, stored at 30°C, over time.

(2 marks)

(ii) From the graph, identify when the number of bacteria is 10^5 .

(1 mark)

- (c) Sally does not eat all of the pizza that evening, but she plans to eat the leftovers the next day. Explain *two* ways in which she could ensure that the leftovers are safe to eat.

(i) _____

_____ (2 marks)

(ii) _____

_____ (2 marks)

- (d) Sally's pizza was delivered in a cardboard box.

(i) Explain *one* advantage to Sally of purchasing food that has been packaged in cardboard.

_____ (2 marks)

(ii) Explain *one* advantage to a manufacturer of producing food packaging made from cardboard.

_____ (2 marks)

3. Mark is a 30-year-old male who weighs 80 kg. Mark recently visited his doctor, who told him that his diet is high in energy and that he is at risk of developing diet-related disorders.

(a) Using the following formula, calculate Mark's basal metabolic rate (BMR).

Show your working.

$$\text{BMR (kJ/day)} = \text{weight (kg)} \times 1.0 \times 4.2 \text{ kJ} \times 24 \text{ hours}$$

BMR = _____ kJ/day (2 marks)

(b) Mark thought that he was being healthy by packing his own food and drink to take to work each day. Most days he eats the following:

		<i>Energy content (kJ)</i>
Snack	Pre-packaged apple muffin	1005
Lunch	White bread roll with: • fried, crumbed chicken breast • slice of cheese • tomato • lettuce • mayonnaise spread	2500
Drink	Can of cola	594

(i) Calculate the total energy content of this snack, lunch, and drink.

Total energy = _____ kJ (1 mark)

(ii) For Mark, the thermic effect of food and drink is estimated to be 10% of his kilojoule intake.

Calculate the thermic effect of his snack, lunch, and drink.

Thermic effect = _____ kJ (1 mark)

- [illegible]

- | | |
|-------|--|
| Snack | |
| Lunch | |
| Drink | |

(2 marks)

4. Refer to the following recipe and nutrition information panel for a breakfast fruit smoothie bowl:

Breakfast fruit smoothie bowl

Preparation time: 5 minutes



Ingredients

- 1 cup coconut milk
- 1 frozen banana, roughly chopped
- 1 cup frozen mango, roughly chopped
- 1 cup frozen mixed berries
- 2 tablespoons honey
- 1 fig, peeled and roughly chopped
- $\frac{1}{4}$ cup raspberries

Topping

- 2 strawberries, sliced
- 1 teaspoon chia seeds
- 2 teaspoons coconut flakes
- $\frac{1}{2}$ banana, sliced

Method

1. Blend ingredients in a food processor.
2. Serve in a breakfast bowl.
3. Top with sliced strawberries, chia seeds, coconut flakes, and sliced banana.

Nutritional information panel

	(per serve)
Protein	4 g
Fat, total	6 g
– saturated	3 g
Carbohydrate, total	45 g
– sugars	24 g

- (a) An individual's sugar intake should make up 5% of their total daily energy intake, which equates to approximately 25 g or six teaspoons of sugar per day.

- (i) Identify and explain *one* concern with the sugar content of this smoothie bowl.

(2 marks)

- (ii) Explain how the ingredients in this smoothie bowl could be modified in order to make it a healthier choice.

(2 marks)

- (b) Describe the roles of mechanical and chemical digestion of carbohydrates in the mouth.

(4 marks)

5. Pregnancy and infancy are stages in the life cycle during which health and good nutrition are particularly important.

(a) Explain *one* specific reason why pregnant women need to prepare and store food safely.

(2 marks)

(b) Identify *one* micronutrient that is important for women to consume during pregnancy.
Explain why.

(2 marks)

(c) Guideline 4 of the *Australian dietary guidelines* (NHMRC 2013) is 'Encourage, support and promote breastfeeding'.
Explain *two* benefits to an infant of breastfeeding.

(4 marks)

[illegible]





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Question booklet 2

Part 1: Short-answer and analytical questions

Section B of Part 1 (Questions 6 to 10) 50 marks

- Answer **all** questions in Section B
- You may write on page 11 if you need more space
- Write your answers in this question booklet
- Allow approximately 50 minutes

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PART 1: Section B (Questions 6 to 10)

(50 marks)

Answer **all** questions in this section.

6. Cow's milk is an excellent source of vitamins and minerals, and has been long recognised for playing an important role in human nutrition (Better Health Channel 2013).

- (a) (i) State the enzyme found in the small intestine that allows human beings to successfully digest the carbohydrates found in cow's milk.

_____ (1 mark)

- (ii) Identify the *two* simplest substances that are formed in the human gastrointestinal tract when cow's milk is digested.

_____ (2 marks)

- (iii) Explain the structural difference between simple carbohydrates and complex carbohydrates.

_____ (2 marks)

- (b) Cow's milk is commonly consumed with cereal for breakfast.

Explain how wholegrain cereals improve the nutrition of this breakfast.

_____ (2 marks)

7. A family with young children aged 5–12 years, frequently consumes packaged, dehydrated instant noodles.

Refer to the following food label:

INSTANT NOODLES (dehydrated) Serving suggestion Add 200 mL of boiling water and stir. Ingredients <i>Noodles:</i> wheat flour, vegetable oil (antioxidant 320), salt. <i>Flavour sachet:</i> soy, sugar, salt, flavour enhancer (621, 635), chicken powder, hydrogenated vegetable protein, onion powder, garlic powder, vegetable oil, colour (caramel), herbs, anticaking agent (551).
--

- (a) Explain *two* benefits to a family with young children of using pre-prepared meals such as instant noodles.

(i) _____

_____ (2 marks)

(ii) _____

_____ (2 marks)

- (b) Explain the link between pre-prepared meals and hypertension, with reference to a specific Australian dietary guideline.

_____ (3 marks)

- (c) Identify *one* additive from the instant noodles ingredients list, and explain the reason for adding it to pre-prepared meals.

(2 marks)

- (d) (i) Explain *one* social or environmental factor that affects children aged 5–12 years who frequently consume pre-prepared meals.

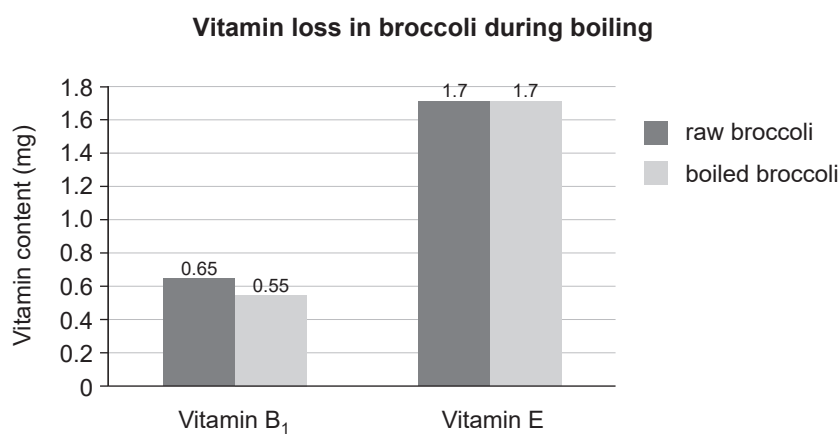
(2 marks)

- (ii) Discuss how preparing meals in the home using only fresh ingredients can benefit the health of children aged 5–12 years.

(4 marks)

8. Students investigated the effect of boiling vegetables. They compared the vitamin content of raw broccoli with that of the broccoli after it was boiled.

Refer to the following graph, which shows the amount of vitamin B₁ and vitamin E lost from broccoli during boiling:



- (a) (i) State the dependent variable.

_____ (1 mark)

- (ii) Identify *two* factors that must remain constant during this investigation, and explain why.

(1) _____

_____ (2 marks)

(2) _____

_____ (2 marks)

- (b) Using data from the graph, state the effect of boiling on the:

- (i) vitamin B₁ content of broccoli.

_____ (1 mark)

- (ii) vitamin E content of broccoli.

_____ (1 mark)

- (c) Explain why there is a difference between the amount of vitamin B₁ lost and the amount of vitamin E lost from broccoli during boiling.

(2 marks)

- (d) State how vitamin B is excreted from the human body.

(1 mark)

- (e) (i) State *one* function of vitamin E in the human body.

(1 mark)

- (ii) State *one* food source of vitamin E, other than broccoli.

(1 mark)

9. Refer to the following recipe for spaghetti bolognese:

Ingredients

1 tablespoon olive oil
500 g beef mince
1 onion, diced
2 garlic cloves, chopped
2 × 400 g cans chopped tomatoes
2½ cups cooked spaghetti
2 teaspoons salt

Method

1. Heat a large saucepan over a medium heat and add the olive oil.
2. Add the beef mince and cook until well browned.
3. Add onion, garlic, and a pinch of salt, and cook for another 2 minutes.
4. Add the tomatoes, stir, and bring to the boil; then reduce the heat and simmer gently for 45 minutes.
5. Add the cooked spaghetti to the bolognese sauce. Mix well and serve.

- (a) State and justify *one* modification to the recipe that would increase the nutrient density of the meal. The recipe must remain a spaghetti bolognese.

(2 marks)

- (b) The *Australian dietary guidelines* (NHMRC 2013) states that ½ cup of cooked pasta is one serve of the grains (cereal) food group.

- (i) Calculate the number of serves of the grains (cereal) food group that this recipe provides.

Show your calculations.

Number of serves = _____

(2 marks)

(ii) Explain the importance of serving size in maintaining a healthy weight.

(2 marks)

(c) (i) Provide *one* example from the Australian Guide to Healthy Eating of a food that should be eaten only sometimes and in small amounts.

(1 mark)

(ii) Identify and explain *one* healthy eating campaign or food model, other than the Australian Guide to Healthy Eating, that educates people about healthy food choices.

(2 marks)

10. Ariana is a 25-year-old female who is 158 cm tall and weighs 77 kg. She has a body mass index (BMI) of 30.8.

(a) Refer to the following table, which shows the classification of adults according to their BMI:

<i>BMI</i>	<i>Classification</i>
< 18.5	underweight
18.5–24.9	normal weight
25.0–29.9	pre-obese
≥ 30.0	obese

Data source: WHO Consultation on Obesity 1999, 'Obesity: preventing and managing the global epidemic', *WHO Technical Report Series 894*, World Health Organization, Geneva, p 9 ([CC BY 3.0 IGO](#))

State Ariana's BMI classification.

_____ (1 mark)

(b) Identify and explain *one* strategy that Ariana could use to improve her BMI classification.

_____ (2 marks)

(c) (i) State *one* advantage of using BMI as a diagnostic tool.

_____ (1 mark)

(ii) State *one* reason why the BMI classification of athletes is often pre-obese or obese.

_____ (1 mark)

(iii) Identify and explain *one* diagnostic tool, other than BMI, that is used to evaluate health.

_____ (2 marks)

[illegible]



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Question booklet 3

Part 2: Extended-response questions on option topics (Questions 11 and 12) 20 marks

- Answer **one** question from Part 2
- Write your answer in this question booklet
- Allow approximately 30 minutes

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PART 2: EXTENDED-RESPONSE QUESTIONS ON OPTION TOPICS

(Questions 11 and 12)

(20 marks)

Answer **either** Question 11 **or** Question 12.

Write your answer on pages 3 to 6, clearly labelling it with the number of the question you choose.

You should spend about 30 minutes on this part, 5 to 10 minutes planning and 20 to 25 minutes writing. Credit will be given for clear, well-expressed answers that are well organised and relevant to the question.

Option topic 1: Global nutrition and ecological sustainability

11. Rice is the staple food of more than half the world's population. The majority of rice grown in Australia is exported. Although the rice grown in Australia requires 50% less water than the global average, it is still the most water-intensive crop in Australia.

Discuss:

- *one* environmental impact and *one* economic impact of rice production in Australia
- how genetically modified organisms (GMOs) could benefit the health of individuals
- *two* ways in which grains such as rice can be processed, packaged, and distributed to ensure a sustainable food supply
- *two* initiatives — other than GMO — that the government could implement to support farmers in providing a secure and sustainable food supply.

Option topic 2: Global hunger

12. 'The global food security challenge is straightforward: by 2050, the world must feed 9 billion people. The demand for food will be 60% greater than it is today.' (World Economic Forum 2016)

Discuss:

- *two* reasons why an unstable government may threaten its country's food security
- *two* health implications for individuals who rely on a staple food (such as rice or corn) that their community has difficulty cultivating
- *one* education initiative aimed at women, and how this initiative could lead to an increase in food production within communities
- *two* ways in which relying on a non-government organisation during a famine may have a negative impact on a community.

Question no.

[illegible]

[illegible]

[illegible]

[illegible]

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ACKNOWLEDGMENT

Question 4(a): source: World Health Organization 2015, 'Guideline: sugars intake for adults and children', *World Health Organization*, Geneva, viewed 6 September 2018, www.who.int, p 16

Question 6: source: State of Victoria, 'Milk', *Better Health Channel*, viewed 6 September 2018, www.betterhealth.vic.gov.au

Question 9: National Health and Medical Research Centre 2013, *Eat for health: Australian dietary guidelines summary*, Department of Health and Aging, Australian Government, © Commonwealth of Australia, Canberra, p 19 ([CC BY 4.0](https://creativecommons.org/licenses/by/4.0/))

Question 12: Breene, K 2016, 'Food security and why it matters', *World Economic Forum*, viewed 6 September 2018, www.weforum.org

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