

## 2012 NUTRITION

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ATTACH SACE REGISTRATION NUMBER LABEL  
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QUESTION  
BOOKLET

1

12 pages, 4 questions

Tuesday 13 November: 1.30 p.m.

Time: 2 hours

### Section A of Part 1: Short-answer and Analytical Questions

Examination material: Question Booklet 1 (12 pages)  
Question Booklet 2 (11 pages)  
Question Booklet 3 (6 pages)  
one SACE registration number label

*Approved dictionaries and calculators may be used.*

#### Instructions to Students

- You will have 10 minutes to read the paper. You must not write in your question booklets or use a calculator during this reading time but you may make notes on the scribbling paper provided.
- This paper is in two parts: Section A of Part 1 is in Question Booklet 1; Section B of Part 1 is in Question Booklet 2; and Part 2 is in Question Booklet 3.  
**Part 1: Short-answer and Analytical Questions** (Questions 1 to 8)  
Answer Section A of Part 1 (Questions 1 to 4) in the spaces provided in Question Booklet 1. Answer **all** questions.  
Write on page 12 if you need more space.  
Answer Section B of Part 1 (Questions 5 to 8) in the spaces provided in Question Booklet 2. Answer **all** questions.  
Write on page 11 if you need more space.  
**Part 2: Extended-response Questions on Option Topics** (Questions 9 and 10)  
Answer **either** Question 9 **or** Question 10.  
Write your answer on the pages provided in Question Booklet 3.
- In Part 1 there is no need to fill all the space provided; clear, well-expressed answers are required. If you delete part or all of an answer, you should clearly indicate your final answer and label it with the appropriate question number.
- The allocation of marks and the suggested allotment of time are as follows:

Part 1	100 marks	90 minutes
Part 2	20 marks	30 minutes
Total	120 marks	120 minutes
- Attach your SACE registration number label to the box at the top of this page. Copy the information from your SACE registration number label into the boxes on the front covers of Question Booklet 2 and Question Booklet 3.
- At the end of the examination, place Question Booklet 2 and Question Booklet 3 inside the back cover of this question booklet.

**STUDENT'S DECLARATION ON THE USE OF  
CALCULATORS**

By signing the examination attendance roll I declare that:

- my calculators have been cleared of all memory
- no external storage media are in use on these calculators.

I understand that if I do not comply with the above conditions for the use of calculators I will:

- be in breach of the rules
- have my results for the examination cancelled or amended
- be liable to such further penalty, whether by exclusion from future examinations or otherwise, as the SACE Board of South Australia determines.

**PART 1: SHORT-ANSWER AND ANALYTICAL QUESTIONS** (Questions 1 to 8)  
(100 marks)

Answer **all** questions in this part in the spaces provided. The allocation of marks is shown in brackets at the end of each part of each question. You should spend about 90 minutes on this part.

**Section A:** Questions 1 to 4  
(50 marks)

1. A study found that pregnant women who follow a vegan diet may not have an adequate intake of folic acid (folate).

(a) State *one* risk to a pregnant woman and *one* risk to a developing foetus if the pregnant woman is deficient in folic acid.

Risk to pregnant woman: \_\_\_\_\_

\_\_\_\_\_

Risk to foetus: \_\_\_\_\_

\_\_\_\_\_ (2 marks)

(b) Suggest *one* suitable food that would provide a pregnant vegan woman with folic acid.

\_\_\_\_\_ (1 mark)

(c) Breast-fed infants who are over the age of 6 months and whose mothers are vegans are at risk of developing other micronutrient deficiencies.

(i) Name *one* micronutrient in which the infant could be deficient.

\_\_\_\_\_ (1 mark)

(ii) Name *one* food that the mother could consume to reduce the infant's risk of developing a deficiency in the micronutrient that you named in part (c)(i).

\_\_\_\_\_ (1 mark)

2. Refer to the following information on a can of tuna:

	Quantity per Serving (100g)	Percentage of Daily Intake (per serving)
Energy	532kJ	6%
Protein	16.9g	34%
Fat		
– Total	5.9g	8%
– Saturated	1.1g	4%
– Trans	0.0g	–
– Polyunsaturated	3.3g	–
– Omega 3	0.4g	–
– Monounsaturated	1.7g	–

(a) Suggest why listing quantities for different types of fat on the can of tuna may be helpful to the consumer.

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(2 marks)

(b) Describe how *one* of the 'Percentage of Daily Intake' values could be used to market the can of tuna.

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(2 marks)

(c) Discuss *one* disadvantage of percentage labelling on processed foods.

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(2 marks)

(d) The can of tuna is labelled as a product of Australia.

(i) Explain the difference between 'product of Australia' and 'made in Australia'.

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(2 marks)

(ii) Suggest why consumers may find this information useful.

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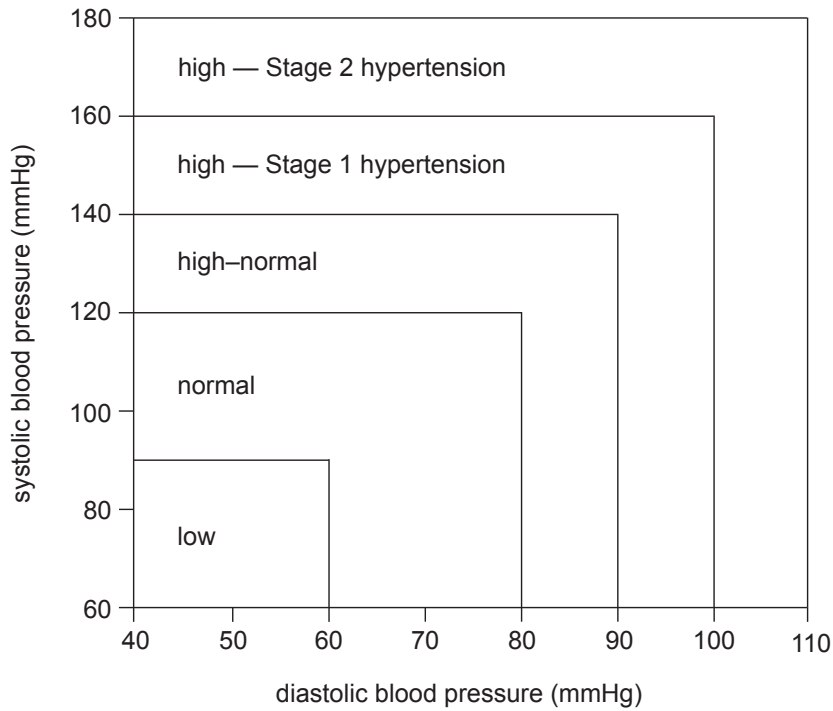
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(2 marks)

3. Refer to the following diagram, which shows the classification of blood pressure, from low to high:



(a) (i) Determine the systolic blood pressure range of a person who has normal blood pressure.

\_\_\_\_\_ (1 mark)

(ii) Determine the diastolic blood pressure range of a person who has normal blood pressure.

\_\_\_\_\_ (1 mark)

(b) The blood pressure readings of a 16-year-old boy were consistently systolic 145 and diastolic 95.

Determine the boy's blood pressure classification.

\_\_\_\_\_ (1 mark)

(c) State the name of *one* disorder for which high blood pressure (hypertension) is a major risk factor.

\_\_\_\_\_ (1 mark)

(d) Refer to the following table, which shows sodium intake levels for children aged between 1 and 16 years who took part in a survey:

Age Range (years)	Adequate Intake of Sodium (mg/day)	Recommended Upper Limit for Intake of Sodium (mg/day)	Average Actual Intake of Sodium (mg/day)
1–3	200–400	1000	1691
4–8	300–600	1400	2229
9–13	400–800	2000	2890
14–16	460–920	2300	3672

Source: Secretariat of the Australian Division of World Action on Salt and Health, AWASH Key Findings Document II, October 2008, [www.awash.org.au/www.thegeorgeinstitute.org](http://www.awash.org.au/www.thegeorgeinstitute.org)

(i) State *one* function of sodium in the human body.

\_\_\_\_\_ (1 mark)

(ii) With reference to the table above, write a conclusion about the children's average actual intake of sodium.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2 marks)

(iii) The 16-year-old boy mentioned in part (b) is recorded as having an actual intake of 4785 milligrams of sodium a day.

With reference to the table above, compare the boy's actual intake of sodium with the:

(1) recommended upper limit.

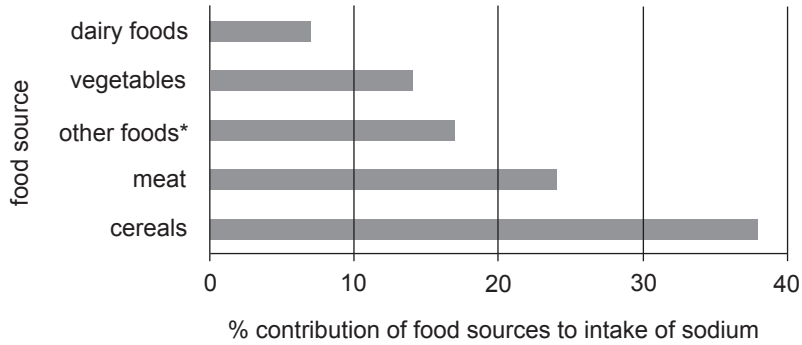
\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2 marks)

(2) average actual intake.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (2 marks)

- (e) A survey was conducted to examine the food sources of sodium among 1724 teenagers aged between 15 and 18 years. The graph below shows the percentage contribution that each food source made to the intake of sodium:

**Percentage (%) Contribution of Food Sources to Intake of Sodium in Teenagers 15 to 18 Years Old**



\*Other foods include eggs, egg dishes, fish, sugars, jams, powdered drinks, soups, and sauces

- (i) Explain the importance of surveying such a large number of teenagers aged between 15 and 18.

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(2 marks)

- (ii) Identify the food source that contributed the highest amount of sodium to the diet of the teenagers surveyed, and suggest *two* reasons for this.

(1) Food source: \_\_\_\_\_ (1 mark)

(2) Reason 1: \_\_\_\_\_

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(2 marks)

(3) Reason 2: \_\_\_\_\_

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(2 marks)



(f) The 16-year-old boy mentioned in part (b) on page 6 was advised by his dietitian to reduce his intake of sodium. His typical daily diet is shown below:

Breakfast	8.30 a.m.	Takeaway burger (beef patty, egg, bacon), French fries, a soft drink
Snack 1	11 a.m.	A muesli bar
Lunch	1 p.m.	Salami sandwich (white bread) with butter, a sports drink
Snack 2	3.30 p.m.	A packet of potato crisps
Dinner	7 p.m.	Frozen crumbed fish and chips (oven baked) with tomato sauce

(i) Identify *one* lifestyle strategy that the boy could use to reduce his intake of sodium.

\_\_\_\_\_ (1 mark)

(ii) Identify *two* nutritional modifications to the boy's diet that would reduce his intake of sodium.

(1) \_\_\_\_\_ (1 mark)

(2) \_\_\_\_\_ (1 mark)

(iii) (1) Name *one* micronutrient in which the boy's diet appears to be deficient.

\_\_\_\_\_ (1 mark)

(2) Identify *one* nutritional modification to the boy's diet that would increase his intake of this micronutrient. Justify your answer.

Modification: \_\_\_\_\_

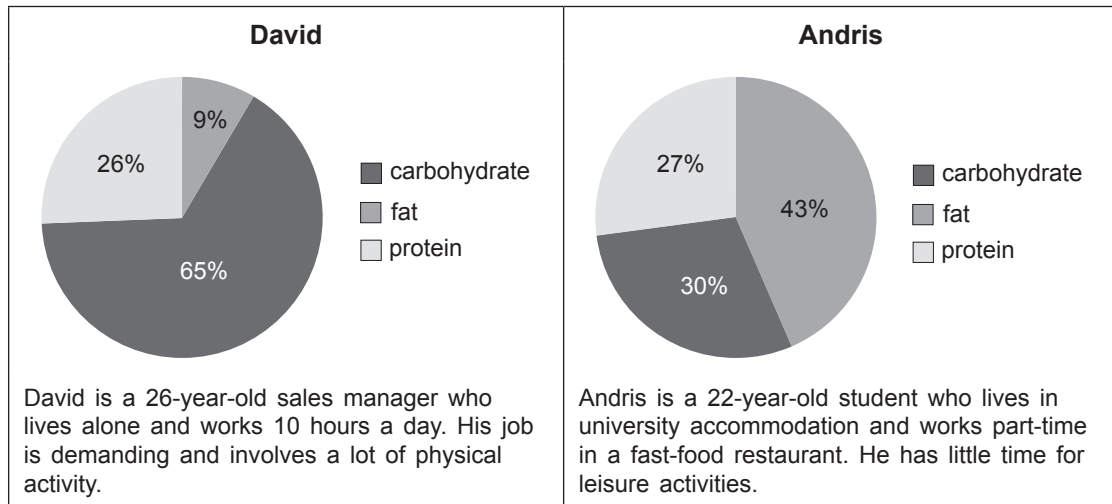
Justification: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (2 marks)

4. Refer to the following diagrams, which show the percentage macronutrient distribution in the diets of two men (David and Andris):



- (a) Refer to the following table, which shows the recommended macronutrient range (%):

<b>Recommended Macronutrient Range (%)</b>			
	<i>Carbohydrate</i>	<i>Fat</i>	<i>Protein</i>
<i>Recommended range (%)</i>	45–65	20–30	15–25

- (i) Evaluate the percentage macronutrient distribution for David and Andris against the recommended macronutrient range in the table above.

David: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

\_\_\_\_\_ (4 marks)

(ii) Explain why David and Andris should consume a wide variety of foods.

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(3 marks)

(b) With reference to the information given about *either* David *or* Andris, identify *two* factors that could negatively influence his health status, and suggest how his health status could be improved.

Tick your choice.     David      *or*     Andris

(i) Factor 1: \_\_\_\_\_  
Improvement: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(ii) Factor 2: \_\_\_\_\_  
Improvement: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)





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# 2012 NUTRITION

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<b>NUTRITION</b>						

**QUESTION BOOKLET**

2

11 pages, 4 questions

Tuesday 13 November: 1.30 p.m.

## Section B of Part 1: Short-answer and Analytical Questions

*Write your answers to Section B of Part 1 in this question booklet.*

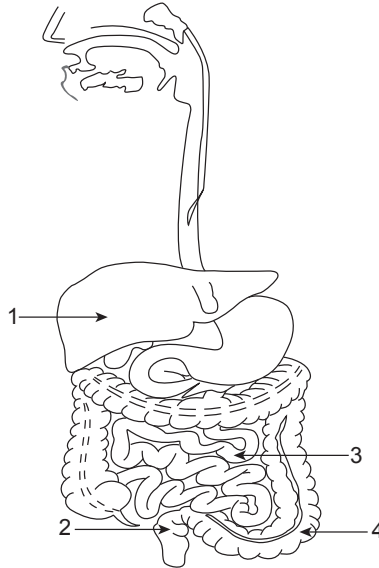
**PART 1: SHORT-ANSWER AND ANALYTICAL QUESTIONS**

**Section B** (Questions 5 to 8)

(50 marks)

Answer **all** questions in the spaces provided.

5. Refer to the following diagram, which shows the human digestive system:



(a) (i) With reference to the diagram above, write the number of the structure in which faeces are stored before their removal from the body, and state the name of the structure.

Number: \_\_\_\_\_ Name of structure: \_\_\_\_\_ (1 mark)

(ii) State *two* roles that the large intestine has in the digestive process.

(1) \_\_\_\_\_ (1 mark)

(2) \_\_\_\_\_ (1 mark)

(b) Describe the process by which material moves through the digestive system.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

- (c) There are two different types of dietary fibre: soluble and insoluble. Both types are important for health, digestion, and the prevention of diseases.

State *one* specific function and *one* specific food example for each type of fibre.

	<b>Soluble Fibre</b>	<b>Insoluble Fibre</b>
Specific function		
Specific food example		

(4 marks)

- (d) Suggest *two* specific dietary strategies that could be applied to a person's daily food or beverage intake to prevent constipation.

(i) \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

(ii) \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

- (e) Vegans rarely suffer from constipation but they may have other difficulties maintaining a healthy diet.

Suggest *two* of these difficulties.

(i) \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

(ii) \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

6. Refer to the following nutrition information panel on a single-serving packet of instant chicken noodle soup powder:

NUTRITION INFORMATION	
Serving per package: 1	
Serving size: 100g	
Per 100g	
Energy	<i>To be calculated</i>
Protein	0.3g
Carbohydrates	12.8g
- Sugar	2.3g
Fibre	0.9g
Total fats	1.5g
- Saturated	0.7g
Sodium	290 mg
INGREDIENTS: pasta (wheat flour, gluten), salt, chicken, maltodextrin, natural flavours, sugar, vegetable oil, parsley, onion, yeast extract, flavour enhancer, natural colour, herb and spice extracts, modified starch.	

- (a) Calculate the total energy content per serving of the instant soup powder. Show all calculations and round your answer to the nearest whole number.

Total energy content: \_\_\_\_\_ kJ (4 marks)

- (b) With reference to the nutrition information panel above, suggest why the value for the carbohydrate content of the instant soup powder is higher than the value for the sugar content.

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(2 marks)



(c) Tick the appropriate box to indicate which *one* of the following nutritional claims you would choose for the front of the packet of instant soup powder. Justify your choice.

No cholesterol     Low in fat     Low in salt     High in taste

High in dietary fibre     Satisfying snack

Justification: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (2 marks)

(d) State *one* suitable storage instruction that could be placed on the packet of instant soup powder.

\_\_\_\_\_ (1 mark)

7. Many economic, environmental, and social factors influence the purchasing decisions that a consumer makes, such as what to buy and where to buy it. Refer to the following lists of food items and shopping outlets:

**Food Items**

- Fish
- Fresh peaches
- Jam
- Loaf of wholemeal bread
- Yoghurt

**Shopping Outlets**

- 24-hour convenience store
- Farmers' market/local market
- Supermarket
- The Internet

(a) Answer this part with reference to *one* of the food items and *one* of the shopping outlets from the lists above.

Discuss *one* economic advantage and *one* economic disadvantage of using this shopping outlet for this food item.

Food item 1: \_\_\_\_\_

Shopping outlet 1: \_\_\_\_\_

(i) Economic advantage: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(ii) Economic disadvantage: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(b) Answer this part with reference to a different food item and a different shopping outlet from those that you used in part (a).

Discuss *one* environmental advantage and *one* environmental disadvantage of using this shopping outlet for this food item.

Food item 2: \_\_\_\_\_

Shopping outlet 2: \_\_\_\_\_

(i) Environmental advantage: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(ii) Environmental disadvantage: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(c) Suggest *one* social advantage of shopping regularly at the same shopping outlet.

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(2 marks)

8. The mother of two overweight sedentary children (a 10-year-old girl and a 12-year-old boy) consulted a dietitian.

(a) The girl's weight was 40 kilograms and her height was 130 centimetres.

Using the formula below, calculate her body mass index (BMI). Show all working and round to the nearest whole number.

$$\text{BMI (kg/m}^2\text{)} = \frac{\text{weight (kg)}}{\text{height (m)}^2}$$

BMI: \_\_\_\_\_ (2 marks)

(b) The dietitian explained to the mother the basic principles of a healthy diet.

(i) Name one *endorsed* food selection guide that the dietitian could recommend to help the mother to plan a healthier diet for her daughter.

\_\_\_\_\_ (1 mark)

(ii) State *two* recommendations from the endorsed food selection guide you named in part (b)(i) that could improve the girl's diet.

(1) \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

(2) \_\_\_\_\_  
\_\_\_\_\_ (1 mark)

(c) (i) The BMI of the 12-year-old boy was 27.

On the BMI-for-age percentile graph on the page opposite, mark with an X the point that represents the boy's BMI. (1 mark)

(ii) BMI results for children from 2 to 18 years may be organised into the following four categories:

<i>BMI Category</i>	<i>Percentile Range</i>
underweight	< 5th percentile
healthy weight	5th–85th percentile
overweight	85th–95th percentile
obese	>95th percentile

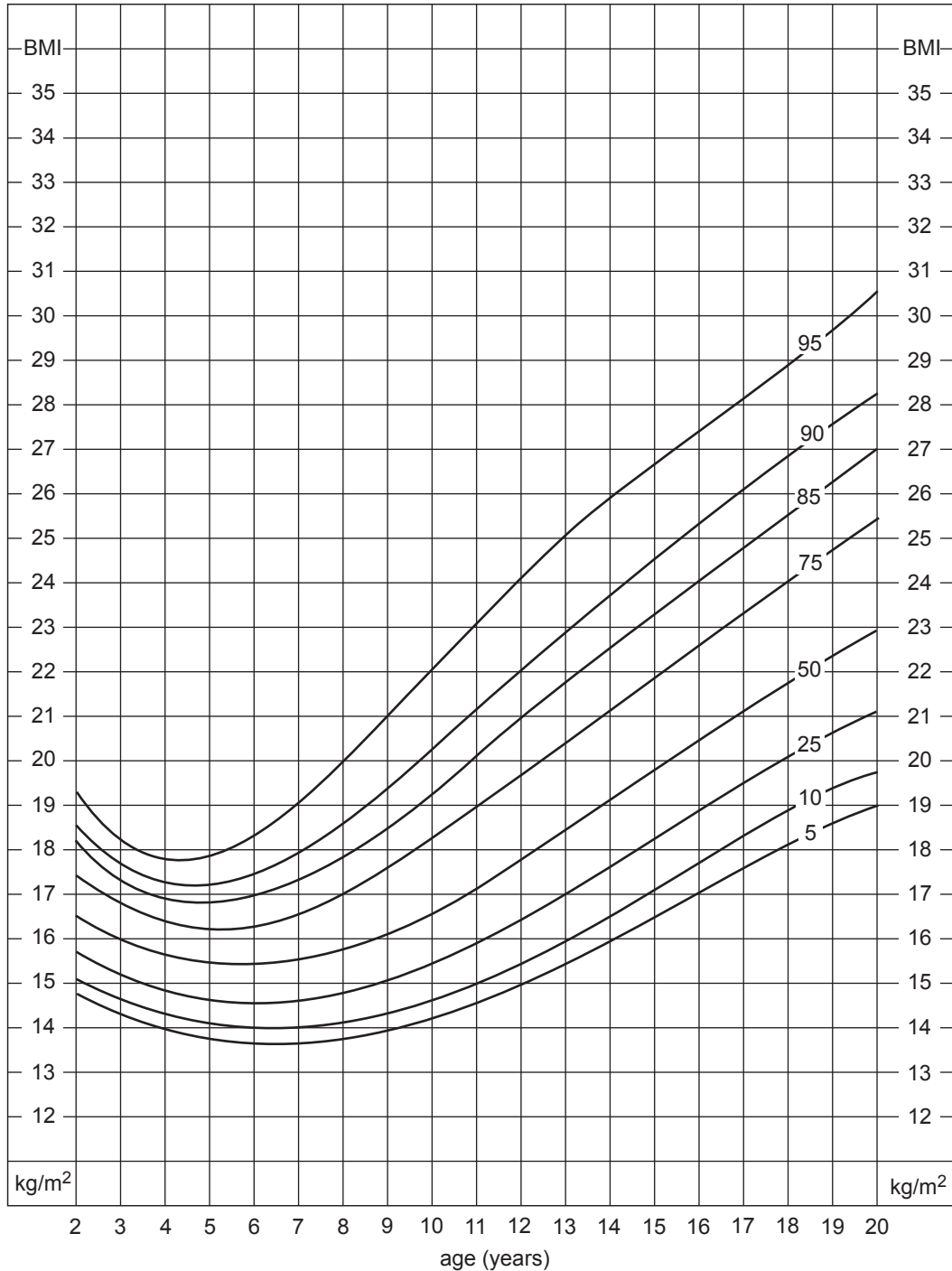
Source: [www.health-calc.com/body-composition/bmi-children-us](http://www.health-calc.com/body-composition/bmi-children-us)

With reference to the graph on the page opposite and to the BMI table above, state the BMI category to which the 12-year-old boy belongs.

\_\_\_\_\_ (1 mark)

Refer to the following graph, which shows BMI-for-age percentiles for boys aged between 2 and 20 years:

**BMI-for-Age Percentiles: Boys, 2 to 20 years**



Source: Adapted from [www.ket.org/kidshealth/wellness/obesity\\_statistics.htm](http://www.ket.org/kidshealth/wellness/obesity_statistics.htm)

(iii) List *two* possible long-term health consequences for the boy if, when he reaches adulthood, his BMI remains in the category you stated in part (c)(ii).

(1) \_\_\_\_\_ (1 mark)

(2) \_\_\_\_\_ (1 mark)

(d) The dietitian recognised that the children's family needed to adjust their lifestyle and recommended a family approach to the treatment of the children's weight issues.

(i) Suggest *one* way in which the family could adjust their lifestyle to reduce the children's BMI.

\_\_\_\_\_ (1 mark)

(ii) Explain how this lifestyle change may help to reduce the children's BMI.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(e) Describe the basic principles of a recent social marketing program that would help the mother to encourage *behavioural* change in her children, and improve their health and well-being.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(f) The dietitian explained to the mother that her daughter's dietary needs would change as the girl grew older.

Name *two* micronutrients for which the dietary needs of the girl would be different in 4 years' time, and explain why.

(i) Micronutrient 1: \_\_\_\_\_

Explanation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)

(ii) Micronutrient 2: \_\_\_\_\_

Explanation: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2 marks)









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<b>NUTRITION</b>						

**QUESTION BOOKLET**

3

6 pages, 2 questions

Tuesday 13 November: 1.30 p.m.

## Part 2: Extended-response Questions on Option Topics

*Write your answer to Part 2 in this question booklet.*

## PART 2: EXTENDED-RESPONSE QUESTIONS ON OPTION TOPICS

(Questions 9 and 10)

(20 marks)

Answer **either** Question 9 **or** Question 10.

**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

9. The *OECD-FAO Agricultural Outlook 2008-2017* ([www.oecd.org](http://www.oecd.org)) predicts that developing countries, many of which now struggle to meet domestic demand for food, will be major suppliers of food globally in the future. More efficient methods of food production that increase yields could help these countries to ensure a sustainable and secure food supply that would meet both domestic and global demands.

Discuss:

- the basic principles of *one* food production method that has the potential to reduce agricultural or aquacultural yields
- the basic principles of *one* environmentally sustainable food production method that has the potential to increase agricultural or aquacultural yields
- how a non-government organisation in a developing country can ensure a secure food supply for refugees and displaced persons who cannot afford to buy food
- how governments can ensure a sustainable and secure food supply for remote and isolated communities.

### Option Topic 2: Global Hunger

10. Despite the impact of environmental disaster and changing weather patterns, the global output of food is more than adequate to feed the world population: this view is expressed by David Nally in 'The Biopolitics of Food Provisioning' (in *Transactions of the Institute of British Geographers*, 2010, p. 49). This suggests that other factors are also involved in the persistence of chronic hunger experienced by millions of people.

Discuss:

- the impact on communities of deficiency diseases caused by chronic hunger
- *one* agricultural strategy that could be used to ensure a secure food supply in order to prevent hunger and famine
- the role of government in ensuring fair access to food supplies, using a specific example
- how non-government aid programs can address chronic hunger and improve future food security, using a specific example.









## NUTRITION 2012

### ACKNOWLEDGMENT

Chart for question 8 on page 9 was developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Prevention and Health Promotion (US)(2000) (<http://www.cdc.gov/growthcharts/data/set1/all.pdf>)

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