



*Rewarding Learning*

**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2018**

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## **Nutrition and Food Science**

**Assessment Unit AS 1**

*assessing*

**Principles of Nutrition**

**[SNF11]**

**WEDNESDAY 16 MAY, MORNING**

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**MARK  
SCHEME**

## **General Marking Instructions**

### ***Introduction***

The main purpose of the mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

### ***Assessment objectives***

Below are the assessment objectives for Nutrition and Food Science.

Candidates should be able to demonstrate:

- AO1** knowledge and understanding of the specified content
- AO2** the ability to apply knowledge, understanding and skills in a variety of situations and to analyse problems, issues and situations using appropriate skills
- AO3** the ability to gather, organise and select information, evaluate acquired knowledge and understanding, and present and justify an argument

### ***Quality of candidates' responses***

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity that may reasonably be expected of a 17 or 18-year-old, the age at which the majority of candidates sit their GCE examinations.

### ***Flexibility in marking***

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

### ***Positive marking***

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17 or 18-year-old GCE candidate.

### ***Awarding zero marks***

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

### ***Types of mark schemes***

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

### **Levels of response**

In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

### **Quality of written communication**

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is adequate.

Level 3: Quality of written communication is competent.

Level 4: Quality of written communication is highly competent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

**Level 1 (Basic):** The candidate makes only a limited attempt to select and use an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that the intended meaning is not clear.

**Level 2 (Adequate):** The candidate makes a reasonable attempt to select and use an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

**Level 3 (Competent):** The candidate makes a good attempt to select and use an appropriate form and style of writing. Relevant material is organised with a good degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

**Level 4 (Highly competent):** The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is succinct, well organised and displays a high degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of the highest standard and ensure that meaning is absolutely clear.

**Section A**

**AVAILABLE  
MARKS**

**1 (a)** Name **three** food sources of trans fatty acids in the diet. (AO1)

- spreads
- cakes
- milk

[1] for each correctly named food source

All other valid points will be given credit.

[3]

**(b)** Describe the structure of trans fatty acids. (AO1, AO2)

These are fatty acids with the hydrogen atoms on *geometrically opposite* sides of the *double bond*

[1] basic description

[2] competent description

All other valid points will be given credit.

[2]

**(c)** Consider the health implications of the following two food choices. (AO1, AO2, AO3)

| Food choice               | Average serving size | Saturated fat (per serving) |
|---------------------------|----------------------|-----------------------------|
| Bolognese sauce with meat | 240g                 | 10.0g                       |
| Grilled beefburger        | 100g                 | 10.9g                       |

<https://www.nutrition.org.uk>

- the beefburger is more energy dense (more fat per gram) in a smaller portion, frequent consumption could lead to obesity
- there is proportionately more saturated fat in the beefburger compared to the bigger portion of bolognese, frequent consumption could increase the risk of CVD
- Too much saturated fat can increase the amount of LDL cholesterol in our blood, which increases the risk of heart disease and stroke
- both choices contain very similar saturated fat content but the bolognese is more substantial and therefore has a higher satiety value, thus preventing further snacking and subsequent risk of over-eating.

This has implications for preventing weight gain

[1]–[2] basic consideration of data

[3]–[4] competent consideration of data

[5] highly competent consideration of data

All other valid points will be given credit.

[5]

10

2 (a) Describe the consequences for health of a low intake of antioxidant vitamins. (AO1, AO2)

- a low intake of vitamins A, C and E may result in less protection against heart disease as they play a role in the formation of fibrous plaques
- a low intake of antioxidant vitamins would result in low protection against free radical damage to the cell which can increase formation of carcinogens and DNA mutations

[1]–[2] basic description

[3]–[4] competent description

[5] highly competent description

All other valid points will be given credit.

[5]

(b) State **two** possible effects of an excessive intake of vitamin A. (AO1, AO2)

- large doses of retinol can cause liver and bone damage
- complications in pregnancy; excessive vitamin A can cause birth defects

[1]–[2] basic

[3] competent

[4] highly competent

All other valid points will be given credit.

[4]

(c) Explain why infants should receive a supplement of vitamin D. (AO1, AO2, AO3)

- decreased sunlight exposure in early months to ensure good bone formation and prevention of rickets
- infants should be given a daily supplement of vitamin D because breastmilk is low in vitamin D

[1]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation

All other valid points will be given credit.

[4]

AVAILABLE  
MARKS

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- 3 (a) Complete the following table to show the current Dietary Reference Values for carbohydrate. (AO1)

| Carbohydrate  | Current recommendation |
|---|------------------------|
| Total carbohydrate (% total dietary energy)               | 50%                    |
| Free sugars (% total dietary energy)                      | 5%                     |
| Fibre/non-starch polysaccharides (NSP) (g/day for adults) | 30g                    |

[1] for each correctly completed DRV [3]

- (b) Outline some of the health benefits of eating a variety of foods rich in fibre/non-starch polysaccharides (NSP) for adults. (AO1, AO2, AO3)

- fibre can act as a bulking agent and help prevent constipation
- eating a diet low in fibre is associated with diverticulitis and bowel cancer
- some fibres eaten in large amounts can help reduce LDL blood cholesterol levels
- fibre has been shown to improve glycaemic control and a high intake can reduce the risk of developing Type 2 diabetes
- foods high in fibre tend to promote a feeling of satiety and help prevent obesity

[1]–[2] basic outline

[3]–[4] competent outline

[5] highly competent outline

All other valid points will be given credit. [5]

- (c) Describe the effect of starchy carbohydrates on blood sugar levels. (AO1)

- Starchy carbohydrates are broken down slowly and will raise sugar levels slowly
- complex structure takes longer to break down preventing fluctuations in blood sugar levels

[1] basic description

[2] competent description

All other valid points will be given credit. [2]

- (d) State **two** vitamins required to release energy from carbohydrate. (AO1)

- thiamin/vitamin B<sub>1</sub>
- riboflavin/vitamin B<sub>2</sub>
- niacin/vitamin B<sub>3</sub>
- vitamin B<sub>12</sub>

[1] for each correctly identified vitamin

All other valid points will be given credit. [2]

- (e) Explain why phytates found in wholegrains can affect the bioavailability of certain minerals. (AO1, AO2)

- phytates interfere with absorption of iron, calcium and zinc
- they bind onto the mineral to make it unavailable for absorption from intestine into the blood

[1] basic explanation

[2] competent explanation

[3] highly competent explanation

All other valid points will be given credit. [3]

AVAILABLE  
MARKS

15

|   |          | AVAILABLE MARKS |
|---|----------|-----------------|
| <p><b>4 (a)</b> Explain why drinking a glass of orange juice with fortified breakfast cereal might be beneficial. (AO1, AO2, AO3)</p> <ul style="list-style-type: none"> <li>• non-haem iron is found in fortified cereal which is not as readily absorbed as haem iron</li> <li>• vitamin C in orange juice converts the non-haem iron to a more bioavailable haem form thus increasing absorption</li> </ul> <p>[1] basic explanation<br/>           [2] competent explanation<br/>           [3] highly competent explanation<br/>           All other valid points will be given credit. [3]</p> <p><b>(b)</b> Outline <b>two</b> consequences of an inadequate intake of iron for school age children. (AO1, AO2)</p> <ul style="list-style-type: none"> <li>• a lack of iron depletes iron stores in the body and this can lead to iron deficiency anaemia</li> <li>• poor cognitive health; some evidence suggests that iron deficiency anaemia may be associated with poor cognition in school-aged children. Academic performance could be affected by inadequate iron intake</li> </ul> <p>[1]–[2] basic outline<br/>           [3] competent outline<br/>           [4] highly competent outline<br/>           All other valid points will be given credit. [4]</p> | <p>7</p> |                 |
| <p><b>5</b> Explain the importance of maintaining good energy balance during lactation. (AO1, AO2)</p> <ul style="list-style-type: none"> <li>• energy requirements increase during lactation due to the energy demands of milk production</li> <li>• if inadequate energy is consumed the mother’s own nutrient stores will be reduced. If energy intake is adequate the requirement for other nutrients is likely to be met</li> </ul> <p>[1]–[2] basic explanation<br/>           [3] competent explanation<br/>           [4] highly competent explanation<br/>           All other valid points will be given credit. [4]</p>  | <p>4</p> |                 |
| <p><b>6</b> Differentiate between dispensable and indispensable amino acids in the body. (AO1, AO2, AO3)</p> <ul style="list-style-type: none"> <li>• indispensable amino acids are not synthesized in the body and therefore must be provided in the diet whereas dispensable amino acids do not have to be provided by the diet.</li> </ul> <p>All other valid points will be given credit. [3]</p>   | <p>3</p> |                 |

7 Summarise **two** functions of water in the diet. (AO1, AO2)

- lubricant for joints and eyes
- water is a key component in saliva helping us to swallow
- it provides the medium in which all chemical reactions occur in the body, e.g. digestion
- acts as a cushion for the nervous system
- it helps get rid of waste products via the kidney and large intestine
- helps regulate body temperature by the production of sweat

[1]–[2] basic summary

[3]–[4] competent summary

[5] highly competent summary

All other valid points will be given credit.

[4]

**Section A**

**AVAILABLE  
MARKS**

4

**56**

## Section B

AVAILABLE  
MARKS

Quality of written communication is assessed in this section.

- 8 Explain the importance of eating at least **five** portions of fruit and vegetables a day for adult men. (AO1, AO2, AO3)

### Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the importance of eating at least five portions of fruit and vegetables
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the importance of eating at least five portions of fruit and vegetables a day for adult men
- quality of written communication is basic

### Mark Band ([4]–[6])

Overall impression: adequate

- adequate knowledge and understanding of eating at least five portions of fruit and vegetables
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain the importance of eating at least five portions of fruit and vegetables a day for adult men
- quality of written communication is adequate

### Mark Band ([7]–[9])

Overall impression: competent

- competent knowledge and understanding of eating at least five portions of fruit and vegetables
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain the importance of eating at least five portions of fruit and vegetables a day for adult men
- quality of written communication is competent

### Mark Band ([10]–[12])

Overall impression: highly competent

- highly competent knowledge and understanding of eating at least five portions of fruit and vegetables
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain the importance of eating at least five portions of fruit and vegetables a day for adult men
- quality of written communication is highly competent

### Examples of suitable points to be explained by the candidate:

- reduce the risk of cardiovascular disease; fruit and vegetables may contain antioxidants which have been found to be protective against heart disease as they play a preventive role in the formation of fibrous plaques
- reduce the risk of bowel cancer; fruit and vegetables may be protective because they contain vitamins and minerals. Researchers think that

antioxidant vitamins and minerals help prevent cell damage that may lead to cells becoming cancerous. Fruit and vegetables may also be protective because of their fibre content

- reduce the risk of prostate cancer; lycopene is a carotenoid abundant in red fruits such as watermelon, red grapefruit, tomatoes and tomato products. Men who have high intakes of lycopene appear to have a lower risk of developing prostate cancer
- weight management; fruit and vegetables are naturally low in calories and thus can help prevent weight gain. Carrying extra weight in the abdominal area known as central obesity is more common in men than women. This type of excessive weight puts people at increased risk of developing heart disease, some cancers and Type 2 diabetes

All other valid points will be given credit

[12]

AVAILABLE  
MARKS

12

- 9 Explain the reasons for poor hydration in older adults and the frail elderly.  
(AO1, AO2, AO3)

AVAILABLE  
MARKS

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of hydration
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain the reasons for poor hydration in older adults and the frail elderly
- quality of written communication is basic

**Mark Band ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of hydration
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain the reasons for poor hydration in older adults and the frail elderly
- quality of written communication is adequate

**Mark Band ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of hydration
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain the reasons for poor hydration in older adults and the frail elderly
- quality of written communication is competent

**Mark Band ([10]–[12])**

Overall impression: highly competent

- highly competent knowledge and understanding of hydration
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain the reasons for poor hydration in older adults and the frail elderly
- quality of written communication is highly competent

**Examples of suitable points to be considered by the candidate:**

- sensation of thirst; age related changes reduce sensation of thirst and this may be more pronounced in the frail elderly
- excretion; the ability of the kidney to concentrate urine decreases with age and therefore an increased intake of water may be required to excrete waste products from the body
- medication; certain medication such as laxatives and diuretics can result in more fluid being lost
- incontinence; this predisposes older people to dehydration as they may deliberately limit their fluid intake to avoid embarrassment
- cognitive impairment; dehydration is more common in those with cognitive impairment. Swallowing difficulties, dementia and poorly controlled diabetes are more common in older people and associated with poor hydration

All other valid points will be given credit

[12]

12

- 10 Examine the specific nutritional requirements for a pregnant woman. (AO1, AO2, AO3)

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of the specific nutritional requirements for a pregnant women
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to examine these specific nutritional needs
- quality of written communication is basic

**Mark Band ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of the specific nutritional requirements for a pregnant women
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to examine these specific nutritional needs
- quality of written communication is adequate

**Mark Band ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of the specific nutritional requirements for a pregnant women
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to examine these specific nutritional needs
- quality of written communication is competent

**Mark Band ([10]–[12])**

Overall impression: highly competent

- highly competent knowledge and understanding of the specific nutritional requirements for a pregnant women
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to examine these specific nutritional needs
- quality of written communication is highly competent

**Examples of suitable points to be examined by the candidate:**

- energy; additional energy is needed in third trimester for the formation of new tissue and maternal tissues
- folic acid; 0.4 mg is recommended up until 12th week to lower the risk of neural tube defect (NTDs). For women who have had previous NTDs the advice is 5mg per day
- vitamin D; a 10 microgram daily supplement is recommended throughout pregnancy as a lack of vitamin D during pregnancy can adversely affect fetal bone development and can also limit the accumulation of infant vitamin D stores
- iron; extra iron is needed to support fetal growth and development, growth of the placenta, expansion of maternal red blood cells and to cover the iron lost in blood during delivery. Iron deficiency anaemia during pregnancy can

increase the risk of the baby having a low birth weight and developing iron deficiency anaemia during the first few months of life

- calcium; demands on the mother are high during the latter stages of pregnancy and during lactation. The skeleton of full-term infants contains 20–30 g of calcium, most of which is accrued during the last trimester of pregnancy. A mother’s body adapts so that the baby absorbs more calcium. It is important there is adequate calcium for the growth and development of the baby’s bones and also to maintain the mother’s skeletal frame.

All other valid points will be given credit

[12]

**Section B**

**Total**

**AVAILABLE  
MARKS**

12

**24**

**80**