



*Rewarding Learning*

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

---

## **Nutrition and Food Science**

Assessment Unit AS 1

*assessing*

Principles of Nutrition

**[SNF11]**

---

## **Assessment**

**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.

### **Specific Marking Instructions for Section A AS1**

AOs to be considered vary from question to question in Section A and are identified at the end of the question. Refer to descriptions of AOs on Page 2.

Use the levels of response on Page 3 for further guidance on the use of the mark bands for each question.

Although QWC is not assessed in this section, use of appropriate vocabulary and key terms associated with AS1 is expected and can be used to differentiate between levels of response.

All answers are expected to be short and precise. They should not include irrelevant or minor details. A glossary of command words can be found on the website for GCE Nutrition and Food Science.

The command word assess requires a more in-depth and critical answer.

Section A

AVAILABLE  
MARKS

1 (a) State the amount of energy provided by 1 g of protein. (AO1)

4 kilocalories/17 Kj [1]

(b) Apart from providing energy, outline **two** functions of protein in the body. (AO1, AO2)

- protein is vital for the development and repair of body tissue, e.g. hair, skin, eyes, muscles and organs
- protein is a major element in transportation of certain molecules, e.g. haemoglobin is a protein that transports oxygen throughout the body

All other valid points will be given credit

[1]–[2] basic outline

[3] competent outline

[4] highly competent outline [4]

(c) Explain why each of the following may have additional requirements for protein. (AO1, AO2)

- school-age children; are growing rapidly and need additional protein to support proper growth and development
- pregnant women; protein helps to build up the baby's soft tissue, the placenta and red blood cells. It also helps form hair, nails, bones and organs, but it is also used to create the hormones that regulate every function in the body, especially during the second and third trimesters

All other valid points will be given credit

[1]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation [4]

(d) Outline a situation that could result in negative nitrogen balance and describe the effect of this on the body. (AO1, AO2)

- situation; during physical or emotional stress, starvation, illness or when protein or energy intake is insufficient to meet daily needs
- effect on body; protein catabolism (breakdown) will exceed protein anabolism (synthesis) resulting in tissues losing protein and muscle wastage occurring

All other valid points will be given credit

[1]–[2] basic outline and description

[3] competent outline and description

[4] highly competent outline and description [4]

(e) Compare and contrast dairy products with pulses in relation to versatility.  
(AO1, AO2, AO3)

- meal planning; both dairy products and pulses can be consumed at meals and snacks throughout the day and used as ingredients in a countless number of recipes
- shelf-life; dairy products are perishable which means they have a limited shelf-life and therefore need to be used within a relatively short time frame, whereas pulses have a long shelf-life and do not require refrigeration
- preparation; most pulses require soaking to improve digestability before they are cooked. This can range from hours to days
- catering for others; pulses are less likely to cause allergic or intolerant reactions. However, some people are allergic/intolerant to dairy products

All other valid points will be given credit

[1]–[2] basic comparison

[3] competent comparison

[4] highly competent comparison

[4]

17

AVAILABLE  
MARKS

2 (a) Explain why infants who are breastfed require a daily supplement of vitamin D. (AO1, AO2)

- the amount of vitamin D in the mother's breast milk will depend on her vitamin D intake and vitamin D stores, as a precaution, babies from birth to 1 year of age who are being breastfed should be given a daily supplement of vitamin D to make sure they get enough. This is whether or not a mother is taking a supplement of vitamin D

All other valid points will be given credit

[1]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation

[4]

(b) Describe the effects of a prolonged deficiency of niacin on health. (AO1, AO2)

Deficiency of niacin results in pellagra with symptoms of:

- dermatitis predominately in the areas exposed to sunlight
- dementia associated with confusion, disorientation, seizures and hallucinations
- diarrhoea

All other valid points will be given credit

[1] basic description

[2] competent description

[3]–[4] highly competent description

[4]

(c) List **three** micronutrients with antioxidant properties. (AO1)

vitamin A (beta carotene), vitamin C, vitamin E, selenium and zinc

All other valid points will be given credit

[3]

AVAILABLE  
MARKS

11

3 (a) Using the table below, assess the contribution of the following foods to iron in the diet. (AO1, AO2, AO3)

Food source	Iron content in 100 g
Beef rump steak	3.6 mg
Spinach boiled	1.6 mg
Almonds	3 mg

Source:www.bda.uk.com

- beef rump steak is a valuable source of iron in the diet as it provides the most iron of the three foods. In addition, the iron is haem which is more easily absorbed by the body
- 100g of almonds may be unrealistic as a portion size so therefore it is necessary to eat a much greater quantity of almonds making it a poor source of iron in the diet. Almonds contain non-haem iron which is not so easily absorbed by the body
- 100g of spinach is a more appropriate portion size but provides less than half the iron of beef rump steak. Spinach provides non-haem iron which is not so easily absorbed by the body

All other valid points will be given credit

[1]–[2] basic assessment

[3]–[4] competent assessment

[5] highly competent assessment

[5]

(b) Outline the function of iodine and identify **two** valuable food sources. (AO1, AO2)

- iodine is needed to make thyroid hormones. These hormones are needed for many body processes including growth, regulating metabolism
- valuable food sources include seafish, shellfish, seaweed, milk

All other valid points will be given credit

[4]

AVAILABLE  
MARKS

9

		AVAILABLE MARKS
<p><b>4</b> Summarise the potential effects of dehydration. (AO1, AO2)</p> <ul style="list-style-type: none"> <li>• there are negative effects on both mental and physical health</li> <li>• mild dehydration symptoms include a dry mouth, headaches and poor concentration</li> <li>• when the body detects that more water is needed the first thing to happen is that the kidneys reduce the amount of water lost in the urine and the colour of urine becomes darker</li> </ul> <p>All other valid points will be given credit            [1]–[2] basic summary            [3] competent summary            [4] highly competent summary</p>	[4]	4
<p><b>5 (a)</b> Describe the protein-sparing effect of carbohydrate. (AO1, AO2)</p> <ul style="list-style-type: none"> <li>• if the diet is low in carbohydrates, a greater percentage of dietary protein is used to provide glucose</li> <li>• as a result, less protein is available for the growth and repair of body tissues</li> </ul> <p>All other valid points will be given credit            [1] basic description            [2] competent description</p>	[2]	
<p><b>(b)</b> Explain how the overall glycaemic index (GI) of a meal can change when foods are combined. (AO1, AO2, AO3)</p> <ul style="list-style-type: none"> <li>• foods containing high amounts of sugar tend to have a high GI. However, if these foods also contain fat and protein these can have a lower GI</li> <li>• when foods are combined this changes the GI overall for example, a slice of white bread eaten on its own has a relatively high GI but if eaten with baked beans the GI of the meal will be reduced</li> <li>• the way a food is processed or cooked will affect the GI value of the food, e.g. roast potatoes have a different GI to boiled potatoes</li> </ul> <p>All other valid points will be given credit            [1]–[2] basic explanation            [3] competent explanation            [4] highly competent explanation</p>	[4]	
<p><b>(c)</b> Compare the nutritional significance of sugars from fruit juice and fresh fruit. (AO1, AO2, AO3)</p> <ul style="list-style-type: none"> <li>• fruit juice is processed and the sugar is considered to be ‘free sugar’ which can contribute to tooth decay and weight gain</li> <li>• whereas the sugar in fresh fruit, is within the cell structure of the fruit and not associated with adverse health effects</li> <li>• processed fruit juice are more concentrated than fresh fruit which can contribute to excessive sugar consumption</li> </ul> <p>All other valid points will be given credit            [1]–[2] basic comparison            [3] competent comparison            [4] highly competent comparison</p>	[4]	10

- 6 (a) Complete the following table to show the current Dietary Reference Value (DRV) for fat. (AO1)

DRV for fat as a percentage of energy intake	% Daily Food Energy
Total fat	Not more than 35%
<i>of which</i> Saturated fat	Not more than 11%

Source: [www.nutrition.org.uk](http://www.nutrition.org.uk)

[2]

- (b) Outline **one** example of how DRVs should be used. (AO1, AO2)

- the RNI should be used when assessing the dietary intake of a group, for example in a health care setting. The nearer the average intake of the group is to the RNI, the less likely it is that any individual within the group will have an inadequate intake

All other valid examples will be given credit

[1] basic outline

[2] competent outline

[3] highly competent outline

[3]

5

**Section A**

**56**

## Section B

AVAILABLE  
MARKS

Quality of written communication is assessed in this section.

Answer **two** questions from this section.

- 7 Discuss the needs of older adults in relation to vitamins and minerals. (AO1, AO2, AO3)

### Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the needs of older adults in relation to vitamins and minerals
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the needs of older adults in relation to vitamins and minerals
- quality of written communication is basic

### Mark Band ([4]–[6])

Overall impression: adequate

- adequate knowledge and understanding of the needs of older adults in relation to vitamins and minerals
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss the needs of older adults in relation to vitamins and minerals
- quality of written communication is adequate

### Mark Band ([7]–[9])

Overall impression: competent

- competent knowledge and understanding of the needs of older adults in relation to vitamins and minerals
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss the needs of older adults in relation to vitamins and minerals
- quality of written communication is competent

### Mark Band ([10]–[12])

Overall impression: highly competent

- highly competent knowledge and understanding of the needs of older adults in relation to vitamins and minerals
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the needs of older adults in relation to vitamins and minerals
- quality of written communication is highly competent

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

- iron; iron deficiency can be common amongst older people for various reasons, e.g. gastrointestinal blood loss. It is also associated with fatigue, cognitive dysfunction, depression, decreased muscle strength, falls, and frailty

- calcium; it is important that older people get enough calcium; an adequate supply can help to maintain bone strength and reduce age-related bone loss
- zinc; low zinc intake can contribute to poor immune function which becomes less efficient with age, deficiency leads to a greater risk of infection and poor wound healing
- vitamin D; this may be deficient due to being housebound and not getting enough natural sunlight. The ability to synthesise vitamin D by the skin decreases with age. Osteoporosis is prevalent and vitamin D is needed for the absorption of calcium for bone strength
- vitamin B12; this vitamin is especially important in conjunction with iron and folate for the formation of red blood cells and nerve function. Older people can be vulnerable to pernicious anaemia due to a failure to produce an intrinsic factor which makes it difficult to absorb vitamin B12
- vitamin C; needed for maintenance of healthy connective tissue and deficiency can result in poor wound healing and weakened immune system, also vitamin C has antioxidant properties which play a role in preventing degenerative diseases

All other valid points will be given credit

[12]

AVAILABLE  
MARKS

12

### Q7 Specific Marking Instructions

- Responses should provide evidence of all 3 AOs. However, there is a heavier weighting for AO2 and AO3 in this question. Refer to descriptions of AOs on Page 2.
- The candidate should provide evidence of their ability to follow the command word discuss. They can do this by discussing vitamins and minerals in relation to older adults specifically.
- Assess the candidate's QWC using the detailed guidance on Page 3.
- When you have decided which mark band is the 'best fit' for the response, use the levels of response on Page 3 to identify a final mark.
- Remember that the list of suitable points are examples only. The list is not prescriptive, and candidates should not be penalised for omissions. Refer to the general marking instructions on Page 2 for further guidance.

- 8 Describe the effects of polyunsaturated fatty acids (PUFAs) on blood cholesterol levels and explain how an adult could make changes to their diet to meet the current dietary guidelines for these fatty acids. (AO1, AO2, AO3)

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of the effects of PUFAs on blood cholesterol levels
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to describe the effects of PUFAs on blood cholesterol levels
- demonstrates a limited ability to explain how an adult could make changes to their diet to meet the current dietary guidelines for these fatty acids
- quality of written communication is basic

**Mark Band ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of the effects of PUFAs on blood cholesterol levels
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to describe the effects of PUFAs on blood cholesterol levels
- demonstrates an adequate ability to explain how an adult could make changes to their diet to meet the current dietary guidelines for these fatty acids
- quality of written communication is adequate

**Mark Band ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of the effects of PUFAs on blood cholesterol levels
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to describe the effects of PUFAs on blood cholesterol levels
- demonstrates a competent ability to explain how an adult could make changes to their diet to meet the current dietary guidelines for these fatty acids
- quality of written communication is competent

**Mark Band ([10]–[12])**

Overall impression: highly competent

- highly competent knowledge and understanding of the effects of PUFAs on blood cholesterol levels
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to describe the effects of PUFAs on blood cholesterol levels
- highly competent ability to explain how an adult could make changes to their diet to meet the current dietary guidelines for these fatty acids
- quality of written communication is highly competent

**Examples of suitable points to be described and explained by the candidate:**

**AVAILABLE  
MARKS**

**Description of effects of PUFAs on blood cholesterol**

- omega-3 fatty acids have an overall positive effect on blood cholesterol levels as they reduce total cholesterol and may reduce harmful LDL cholesterol
- omega-6 fatty acids are associated with lower blood levels of total cholesterol and harmful LDL cholesterol, but also with lower blood levels of the protective HDL cholesterol
- trans fatty acids have an overall negative effect on blood cholesterol levels because consumption of these fatty acids raise harmful LDL cholesterol and decrease protective HDL cholesterol

**Explanation of dietary changes**

- increase consumption of omega 3 fatty acids by eating at least one portion of oily fish per week. This will help reduce levels of LDL cholesterol in the blood. Elevated LDL cholesterol levels are associated with atherosclerosis and therefore a risk factor for CVD
- consume more corn oil, sunflower oil and soya oil, nuts and seeds to increase the intake of omega 6. This will lower total cholesterol in the blood. Raised blood cholesterol levels is a risk factor for CVD.
- reduce consumption of common sources of trans fatty acids such as pastries, cakes, biscuits, fried foods, takeaway food, hard margarines and foods that have 'hydrogenated oils or fats' or 'partially hydrogenated oils or fats' in the list of ingredients. The damaging effect of these fatty acids on blood cholesterol increase the risk of CVD

All other valid points will be given credit

[12]

12

**Q8 Specific Marking Instructions**

- Responses should provide evidence of all 3 AOs. However, there is a heavier weighting for AO1 and AO2 in this question. Refer to descriptions of AOs on Page 2.
- The candidate should provide evidence of their ability to follow the command words describe and explain. When describing the effects of PUFAs on blood cholesterol, the response needs to be factually accurate and detailed. When explaining the changes an adult could make to their diet, the candidate should make very clear to the examiner how the advice will improve the diet of the adult in relation to these fatty acids. QWC is important when judging this part of the response.
- Assess the candidate's QWC using the detailed guidance on Page 3.
- When you have decided which mark band is the 'best fit' for the response, use the levels of response on Page 3 to identify a final mark.
- Remember that the list of suitable points are examples only. The list is not prescriptive, and candidates should not be penalised for omissions. Refer to the general marking instructions on Page 2 for further guidance.

- 9 Explain the specific nutritional needs and energy requirements of a couple planning a pregnancy and suggest how to achieve these through appropriate food choices or supplements. (AO1, AO2, AO3)

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of the specific nutritional needs and energy requirements of a couple planning a pregnancy
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain these needs
- demonstrates a limited ability to suggest appropriate food choices or supplements
- quality of written communication is basic

**Mark Band ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of the specific nutritional needs and energy requirements of a couple planning a pregnancy
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain these needs
- demonstrates an adequate ability to suggest appropriate food choices or supplements
- quality of written communication is adequate

**Mark Band ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of the specific nutritional needs and energy requirements of a couple planning a pregnancy
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain these needs
- demonstrates a competent ability to suggest appropriate food choices or supplements
- quality of written communication is competent

**Mark Band ([10]–[12])**

Overall impression: highly competent

- highly competent knowledge and understanding of the specific nutritional needs and energy requirements of a couple planning a pregnancy
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain these needs
- demonstrates a highly competent ability to suggest appropriate food choices or supplements
- quality of written communication is highly competent

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

- energy; excess calories can lead to weight gain and body weight seems to have a significant affect on fertility, so if a man or woman is overweight or underweight they may have problems conceiving. Eat more wholegrain carbohydrates, plenty of fruit and vegetables, moderate amounts of meat, fish and other protein and moderate amounts of dairy products. Limit intake of energy dense foods and alcohol for both male and female
- selenium; men should ensure they include adequate intake to make healthy sperm. Pork, beef, turkey, chicken, fish, shellfish, eggs, some beans and nuts, especially Brazil nuts contain high amounts of selenium
- zinc; needed to ensure healthy testosterone levels in men which are also important for improving sperm quality. Shellfish is a good source of zinc
- folic acid; women are advised to take a supplement (400 mcg) before pregnancy and up until the 12th week of pregnancy. This will reduce the risk of the baby being born with neural tube defects. Fortified breakfast cereals, green leafy vegetables are useful sources
- calcium; important to ensure the mother has good reserves of calcium to be passed on to the baby during pregnancy. Useful sources are milk, cheese, yoghurts, dried fruit, wholegrain cereals
- vitamin B12; helps with the implantation of the fertilised egg. Useful sources include: fish, meat, poultry, eggs, milk, and milk products, fortified breakfast cereals

All other valid points will be given credit

[12]

**AVAILABLE  
MARKS**

12

**Q9 Specific Marking Instructions**

- Responses should provide evidence of all 3 AOs. However, there is a heavier weighting for AO1 and AO2 in this question. Refer to descriptions of AOs on Page 2.
- The candidate should provide evidence of their ability to follow the command words explain and suggest. Explain means to clarify a topic so candidates should demonstrate their ability to structure a clear and logically coherent response. QWC is important when judging this part of the question. Suggest is less demanding and requires the candidate to put forward appropriate food choices or supplements briefly and accurately.
- Assess the candidate's QWC using the detailed guidance on Page 3.
- When you have decided which mark band is the 'best fit' for the response, use the levels of response on Page 3 to identify a final mark.
- Remember that the list of suitable points are examples only. The list is not prescriptive, and candidates should not be penalised for omissions. Refer to the general marking instructions on Page 2 for further guidance.

**Section B**

**24**

**Total**

**80**