



*Rewarding Learning*

**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2024**

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## **Nutrition and Food Science**

**Assessment Unit AS 1**

*assessing*

**Principles of Nutrition**

**[SNF11]**

**WEDNESDAY 15 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 **two** fat soluble vitamins. (AO1)

- vitamin A
- vitamin D

All other valid points will be given credit

[2]

(b) Describe **two** groups of people who could have additional requirements for vitamin D in the diet. (AO1, AO2)

- infants who are breastfed; vitamin D is lacking in breast milk
- housebound; frail elderly or those who are sick or have poor mobility and are dependent on others, may have less access to sunlight
- different cultures; those of certain cultural beliefs whose custom involves wearing clothes that cover up most of their skin when outdoors
- different skin types; darker skins such as African, African-Caribbean or south Asian background have more melanin which reduces ability to synthesise vitamin D from sunlight

All other valid points will be given credit

[0]–[2] basic description

[3] competent description

[4] highly competent description

[4]

(c) Explain the importance of B group vitamins for older adults. (AO1, AO2, AO3)

- B12; older adults can be susceptible to pernicious anaemia due to a failure to produce an intrinsic factor in the stomach which makes it difficult to absorb vitamin B12. Taking certain medications for diabetes and antacids, can also interfere with vitamin B12 absorption
- folate; is important for a healthy nervous system and a lack of folate can affect mood and cognitive function in older adults. This may help alleviate symptoms associated with depression. Insufficient folate can also result in folate deficiency anaemia leaving the individual tired and lacking in energy
- B1(thiamin); this B vitamin can be deficient in older adults, particularly those with diabetes or heart failure, which can be common at this age. It can lead to muscle weakness, confusion, tingling and numbness in hands and feet which can leave an older adult vulnerable and weak

All other valid points will be given credit

[0]–[2] basic explanation

[3]–[4] competent explanation

[5]–[6] highly competent explanation

[6]

12

2 (a) Explain why there may be an increased requirement for zinc in adolescence. (AO1, AO2)

- growth; zinc is required to meet the demands of physical and sexual development during adolescence. Zinc helps cells divide which happens quickly at this stage. Therefore additional zinc may be needed to prevent poor growth, delayed sexual maturation and skeletal abnormalities
- boost immunity; zinc supports the immune system, aids wound healing and combats infections which can be beneficial for adolescents in densely populated school environments. Therefore, an increase could achieve optimal immunity and protection against inflammation

All other valid points will be given credit

[0]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation

[4]

(b) Describe the role of magnesium in the body. (AO1, AO2)

- bone; magnesium is an essential mineral present in all human tissues and contributes to the structural development of bone
- brain; magnesium is involved in healthy brain development, memory and learning. It prevents nerve cells being overstimulated and subsequent brain damage
- enzymes; magnesium is needed for the formation of many enzymes in the body which release energy from food
- cells; magnesium helps control movement of salt in and out of cells making it essential for muscle contraction, nerve conduction and triggering a regular heartbeat

All other valid points will be given credit

[0]–[2] basic description

[3] competent description

[4] highly competent description

[4]

(c) Explain the effects of a deficiency of iron on health. (AO1, AO2)

- iron deficiency anaemia; is the condition where a lack of iron in the body leads to a reduction in red blood cells (haemoglobin). Iron is used to produce these red blood cells, which help store and carry oxygen in the blood. Fewer red blood cells means the body will not get as much oxygen
- symptoms; tiredness and lack of energy (lethargy), shortness of breath; noticeable heartbeats (heart palpitations); a pale complexion

All other valid points will be given credit

[0]–[2] basic explanation

[3]–[4] competent explanation

[5] highly competent explanation

[5]

13

3 (a) Explain the term protein complementation. (AO1, AO2)

- protein complementation is when two low biological value (LBV) proteins are eaten together
- eating two LBV proteins in the same meal, makes up for the limiting amino acids in each, therefore giving a meal with a high biological value (HBV). A common example is beans on toast

All other valid points will be given credit

[0]–[1] basic explanation

[2] competent explanation

[3] highly competent explanation

[3]

(b) Classify the foods below, as examples of either high or low biological value protein (insert a tick). (AO1)

| Food       | High biological value protein | Low biological value protein |
|------------|-------------------------------|------------------------------|
| Rice       |                               | ✓                            |
| Soya beans | ✓                             |                              |
| Eggs       | ✓                             |                              |

[3]

AVAILABLE MARKS

6

4 (a) Discuss the significance for health of including more starchy foods in the diet of an adult. (AO1, AO2, AO3)

- satiety effect; wholegrain starchy foods control weight which is an issue at this stage as metabolism decreases. These foods can displace fatty/sugary foods and reduce potential snacking. Central obesity is common amongst adult males and after menopause in adult women which can increase the risk of cardiovascular disease
- high fibre; wholegrain starchy foods contain fibre which is important in promoting good bowel health and preventing bowel disorders such as diverticulitis and cancer
- less fluctuations in blood sugar levels; which helps to manage Type 2 diabetes which can be at greater risk in this age group

All other valid points will be given credit

[0]–[2] basic discussion

[3]–[4] competent discussion

[5]–[6] highly competent discussion [6]

(b) Differentiate between glycaemic index and glycaemic loading. (AO1, AO2, AO3)

- glycaemic index (GI) is a way of ranking carbohydrate foods according to the speed at which they cause blood glucose levels to rise and fall. High GI foods are those which are more quickly digested and absorbed while low GI foods break down more slowly, gradually releasing glucose into the bloodstream
- the glycaemic load (GL) takes into consideration both the GI of a food and the amount of carbohydrate in the portion of food. A food's GL is determined by multiplying its GI by the amount of grams of carbohydrate the food contains then dividing by 100

All other valid points will be given credit

[0]–[2] basic differentiation

[3] competent differentiation

[4] highly competent differentiation [4]

(c) Explain why adult males require approximately 5–10% more daily energy than females. (AO1, AO2, AO3)

- muscle mass; adult males often have about 10–20% more muscle mass than females of the same size and age
- BMR; males have a higher BMR as muscle burns more calories than fat, resulting in males requiring more energy than females

[0]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation [4]

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5 Discuss the nutritional benefits of breast milk for an infant.

- nutrient dense; breast milk is made up of almost 90% water, along with fats, proteins, carbohydrates and micronutrients in the right proportions babies need to grow and develop
- fat content; breast milk includes important long chain fatty acids. Omega 3 plays a role in the development of the central nervous system and normal brain development
- colostrum; is produced in the first few days after birth. It is rich in antibodies that play a key role in the baby's immune system
- lactose; present in breast milk promotes calcium absorption and supplies galactose for brain development
- whey protein; content in breast milk is more easily digested than casein protein in formula milk

All other valid points will be given credit

[0]–[2] basic discussion

[3]–[4] competent discussion

[5]–[6] highly competent discussion

[6]

AVAILABLE  
MARKS

6

6 Explain why Dietary Reference Values (DRVs) should not be used as nutrient goals for individual consumers. (AO1, AO2, AO3)

- DRVs are intended to be used as a general point of reference for a population group rather than a nutrient goal for an individual
- DRVs are set high to meet the needs of 97% of the population so the figure will be considerably higher than most people need
- DRVs are intended to apply to healthy people, they do not make allowance for the different energy and nutrient needs imposed by some diseases
- nutrient and energy requirements vary depending on physical activity levels and dietary habits of the individual

All other valid points will be given credit

[0]–[2] basic explanation

[3]–[4] competent explanation

[5] highly competent explanation

[5]

**Section A**

**AVAILABLE  
MARKS**

5

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## Section B

AVAILABLE  
MARKS

Answer **any two** questions in this section.

Quality of written communication is assessed in this section.

- 7 Propose and justify appropriate food choices parents could include in the diet of a pre-school child. (AO1, AO2, AO3)

### Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of appropriate food choices for a pre-school child
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to propose and justify appropriate food choices parents could include in diet of pre-school child
- quality of written communication is basic

### Mark Band ([4]–[6])

Overall impression: adequate

- adequate knowledge and understanding of appropriate food choices for a pre-school child
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to propose and justify appropriate food choices parents could include in diet of pre-school child
- quality of written communication is adequate

### Mark Band ([7]–[9])

Overall impression: competent

- competent knowledge and understanding of appropriate food choices for a pre-school child
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to propose and justify appropriate food choices parents could include in diet of pre-school child
- quality of written communication is competent

### Mark Band ([10]–[12])

Overall impression: highly competent

- highly competent knowledge and understanding of appropriate food choices for a pre-school child
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to propose and justify appropriate food choices parents could include in diet of pre-school child
- quality of written communication is highly competent

### Examples of suitable points to be proposed and justified by the candidate:

- starchy foods; the British Nutrition Foundation recommend 5 portions of starchy foods each day such as bread, potato, cooked pasta or rice, breakfast cereal. These foods provide energy, B vitamins, calcium and fibre.

Fortified breakfast cereals can also provide iron and vitamin D. Parents should limit sweetened versions, e.g. sugary cereals to reduce the risk of tooth decay. High fibre starchy foods, such as wholemeal pasta and brown rice, should be introduced gradually. Pre-school children can fill up very easily on these bulky foods and stop eating before they have eaten enough energy and nutrients for their needs

- fruit and vegetables; parents of pre-school children should aim to serve at least one portion of fruit and vegetables at each meal and at some snack times and try to include a variety of different types such as peas, broccoli, spinach, peaches, pears and mango. Trying a wide range of types can get young children used to different tastes and textures. Healthy eating habits learned early on can track into later life. Fruit and vegetables provide fibre, fluid and vitamin C
- dairy foods; 3 portions of dairy foods should be included each day in the diet of a pre-school child. Children under 2 should have whole milk or yogurt, choosing plain, unsweetened or lower sugar versions where possible. Pre-school children can start to adopt some of the principles of the Eatwell Guide but a diet which is low in fat may not provide enough energy for a younger child who is growing rapidly. Dairy foods, are a particularly good source of calcium, protein, fat and vitamins B<sub>2</sub> and B<sub>12</sub>
- protein foods; this age group should be served 2–3 portions of protein foods each day (3 for a vegetarian child). Protein foods include meat, fish, eggs and pulses. Fish should be served at least twice a week and one of these should be oily fish such as salmon, sardines, mackerel or trout. It is a good idea to limit how often processed meat (sausages and ham) is served. It is important that this age group get enough iron to avoid anaemia. Sources of iron in this group include red meat, pulses and seeds
- fats and oils; a pre-school child needs some fat in their diet from foods such as whole milk and other full fat dairy products, oily fish, spreads and some vegetable oils. Unsaturated fats, e.g. rapeseed oil, olive oil and spreads made from these can be used for cooking and spreading on bread. Fats and oils provide essential fatty acids and fat-soluble vitamins that are important for children's growth and development. High fat foods such as cakes, biscuits and fried foods should be limited to avoid weight gain and childhood obesity
- fluids; children of this age should be offered 6–8 cups of fluids a day with meals and at snack times. Fruit juice provides some nutrients but should be limited as it is high in sugar and is acidic. It can be consumed if diluted with water. Water is a good choice and milk provides calcium

All other valid points will be given credit

[12]

12

8 Discuss **three** factors that impact on hydration. (AO1, AO2, AO3)

AVAILABLE  
MARKS

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of factors that impact on hydration
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss three factors that impact on hydration
- quality of written communication is basic

**Mark Band ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of factors that impact on hydration
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss three factors that impact on hydration
- quality of written communication is adequate

**Mark Band ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of factors that impact on hydration
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss three factors that impact on hydration
- quality of written communication is competent

**Mark Band ([10]–[12])**

Overall impression: highly competent

- highly competent knowledge and understanding of factors that impact on hydration
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss three factors that impact on hydration
- quality of written communication is highly competent

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

- activity levels; when fluid levels fall due to excessive sweating there is an increase in sodium concentration which triggers a sense of thirst. Dehydration can be cumulative which means a person can become dehydrated even with a moderate exercise routine if they do not drink enough to replace what they lose on a daily basis. Those involved in physical activity need to increase the amount of fluid consumed to replace fluid lost as sweat
- poor appetite or sickness; some chronic diseases such as untreated diabetes can lead to dehydration. Any illness that results in diarrhoea or vomiting, e.g. food-borne illness can make a person susceptible to dehydration
- age; young children could be at increased risk due to the inability to recognise thirst. They are also less heat tolerant and may be more likely to become dehydrated; older adults are more susceptible to dehydration

for a number of reasons, for example, age related changes can reduce the sensation of thirst; the kidney's ability to concentrate urine decreases with age; certain medication can have a diuretic effect; incontinence and cognitive impairment can reduce fluid intake

All other valid points will be given credit

[12]

**AVAILABLE  
MARKS**

12

9 Explain how to safely include the following foods in the diet during pregnancy:

- meat
- fish
- cheese. (AO1, AO2, AO3)

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of food safety in pregnancy
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how to eat meat, fish and cheese safely during pregnancy
- quality of written communication is basic

**Mark Band ([4]–[6])**

Overall impression: adequate

- adequate knowledge and understanding of food safety in pregnancy
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how to eat meat, fish and cheese safely during pregnancy
- quality of written communication is adequate

**Mark Band ([7]–[9])**

Overall impression: competent

- competent knowledge and understanding of food safety in pregnancy
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how to eat meat, fish and cheese safely during pregnancy
- quality of written communication is competent

**Mark Band ([10]–[12])**

Overall impression: highly competent

- highly competent knowledge and understanding of food safety in pregnancy
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how to eat meat, fish and cheese safely during pregnancy
- quality of written communication is highly competent

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

**Meat**

- cook meat thoroughly to a core temperature of 72 °C/75 °C
- avoid raw or undercooked meat as there is a small risk of getting toxoplasmosis which can cause miscarriage
- liver is high in vitamin A, which in high doses, can increase foetal mortality. It is best to avoid eating liver and all products containing liver such as pâté
- cold cured meats, e.g. salami, pepperoni and chorizo should be cooked thoroughly as they may contain parasites that cause toxoplasmosis
- game meats such as goose, partridge or pheasant could have lead shot in them which could harm the unborn baby

AVAILABLE  
MARKS

**Fish**

- most fish is safe to eat, especially if it is served cooked rather than raw
- shark, swordfish and marlin may contain mercury which can affect the foetal nervous system. It is advised to avoid these fish completely during pregnancy
- oily fish such as salmon, trout and mackerel may also contain pollutants, e.g. dioxins or polychlorinated biphenyls. Pregnant women are advised to eat no more than two portions of any oily fish per week to reduce the effect on foetal development
- avoid raw shellfish during pregnancy as it could contain harmful bacteria such as campylobacter, viruses or toxins which can lead to food poisoning

**Cheese**

- cheeses which are pasteurised and cooked to a high temperature such as cheddar, edam and parmesan are deemed safe to eat
- avoid mould ripened cheeses with a white coating on the outside such as brie, camembert and chevre unless cooked until steaming hot
- avoid cheeses made with unpasteurised milk as they may contain listeria bacteria which can lead to miscarriage or stillbirth

All other valid points will be given credit

[12]

**Section B**

**Total**

**AVAILABLE MARKS**

12

24

80