



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019**

Nutrition and Food Science

Assessment Unit AS 2

assessing

Diet, Lifestyle and Health

[SNF21]

WEDNESDAY 22 MAY, MORNING

**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

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1 (a) Define the term obesity. (AO1)

Definition: an excessive accumulation of body fat as adipose tissue.
All other valid points will be given credit [1]

(b) (i) State **one** reason why the body needs energy. (AO1)

- physical activity and growth
- All other valid points will be given credit [1]

(ii) Explain the term energy balance. (AO1, AO2)

- energy balance is concerned with the intake and expenditure of energy by the body
- when an individual's energy intake is equal to their energy expenditure, there is energy balance so there is no weight gain or loss
- negative energy balance occurs when energy intake or food intake is less than energy expenditure
- positive energy balance occurs when energy intake is greater than energy expenditure

All other valid points will be given credit

[0]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation [4]

(c) (i) Describe the physical activity guidelines for adults. (AO1)

Guidelines

- 150 minutes of moderate aerobic activity such as cycling or walking each week. Strength exercises on two or more days a week

or

- 75 minutes of vigorous aerobic activity such as running or a game of singles tennis every week. Strength exercises on two or more days a week

or

- a mix of moderate and vigorous aerobic activity every week [3]

(ii) Consider the benefits of physical activity for older adults in relation to bone and joint health. (AO1, AO2, AO3)

- improves flexibility, coordination and balance; this reduces the risk of hip fractures in older people
- bone strength/loss; reduces the rate of natural bone loss and helps reduce the risk of fractures as individuals get older. Helps reduce risk of osteoporosis
- limits the effects of degeneration arthritis by reducing inflammation, lubricating joints and maintaining range of movement and flexibility
- resistance is added to movement and makes bones work harder and become stronger; weight bearing activity helps reduce risk of injury in older person

All other valid points will be given credit

[0]–[2] basic consideration

[3]–[4] competent consideration

[5] highly competent consideration [5]

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2 (a) Explain how excessive alcohol consumption may affect the following:
(AO1, AO2)

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Weight gain

- alcohol is energy dense providing 7 calories per gram [1]

Fat metabolism

- alcohol reduces the amount of fat the body burns for energy
- alcohol is not stored so must be metabolised right away, having a detrimental effect on other metabolic processes
- alcohol promotes accumulation of fat in the liver because it substitutes ethanol for fatty acids [4]

Iron status

- excessive alcohol may reduce iron status leading to anaemia
- low iron status may be a result of internal bleeding due to damaged intestinal linings
- alcohol, depending on the type consumed, may cause the body to store additional iron in the organs and tissues which can lead to iron-induced toxicity
- iron toxicity can damage liver and other organs

All other valid points will be given credit

[0]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation [4]

(b) State **two** health problems associated with Fetal Alcohol Syndrome (FAS).
(AO1)

- distinctive facial features
- learning difficulties
- behavioural problems

All other valid points will be given credit [2]

11

- 3 (a)** Describe the possible influence of sun exposure in the development of cancer. (AO1, AO2)
- too much ultraviolet radiation from the sun damages the DNA in cells
 - over time DNA damage can cause cells to grow out of control leading to skin cancer
- [0]–[1] basic description
[2] competent description [2]
- (b)** Explain how smoking causes cancer. (AO1, AO2, AO3)
- smoking increases the number of free radicals in the body which are known to cause oxidative damage to the body
 - smoking causes cancer by chemicals in cigarettes damaging the DNA, e.g. benzene
 - chemicals such as arsenic and nickel interfere with pathways for repairing damaged DNA. This makes it more likely that damaged cells will turn cancerous
 - chemicals in cigarettes make it harder to neutralise or remove toxins
- All other valid points will be given credit
[0]–[2] basic explanation
[3] competent explanation
[4] highly competent explanation [4]
- (c)** Describe the possible role of fruit and vegetables in the prevention of cancer. (AO1, AO2, AO3)
- fruit and vegetables provide antioxidants which protect against free radical damage and oxidation in cells
 - fruit and vegetables are low in calories helping to maintain a healthy weight. Being overweight is a risk factor for certain cancers
 - fruit and vegetables provide fibre which increases faeces bulk and can protect against digestive cancers
 - fruit and vegetables also contain lycopene and flavonols which are believed to help stop carcinogens from attacking cells
- All other valid points will be given credit
[0]–[2] basic description
[3] competent description
[4] highly competent description [4]

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Section A

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Section B

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Quality of written communication is assessed in this section.
Answer three questions from this section.

- 4 Explain how limited resources may prevent some consumers making healthy food choices. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of limited resources affecting healthy food choices for some consumers
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how limited resources prevent healthy food choice for some consumers
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of limited resources affecting healthy food choices for some consumers
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how limited resources prevent healthy quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of limited resources affecting healthy food choices for consumers
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how limited resources prevent healthy food choice for consumers
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of limited resources affecting healthy food choices for some consumers
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how limited resources prevent healthy food choice for some consumers
- quality of written communication is highly competent

Examples of suitable points to be proposed by the candidate:

- limited income; food choices are heavily influenced by price. Consumers may purchase cheaper items, e.g. processed foods and fewer fresh fruit and vegetables due to their greater expense. Some consumers have a lower disposable income yet a range of costs, they are unable to make drastic changes to their budget so must make reductions in their food choices to save money. This may mean lower nutritional value products are purchased

- limited cooking utensils/facilities; some consumers may have limited access to cooking equipment so may rely heavily on convenience foods or takeaways that are high in energy
- limited time; consumers may lack time to plan, purchase and prepare nutritious meals, relying on ready meals or fast food
- limited knowledge and skills; consumer choices may be limited by poor nutritional knowledge and food preparation skills
- limited accessibility; some consumers may not have access to large outlets selling foods at competitive prices. Consumers may live near independent stores that are more expensive and sell a smaller range of healthy products
- limited access to transport; may limit consumers' ability to purchase foods in larger, more economical outlets

All other valid points will be given credit

[15]

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- 5 Discuss the lifestyle advice recommended to prevent Type 2 diabetes. (AO1, AO2, AO3)

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Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the lifestyle advice to prevent Type 2 diabetes
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss lifestyle advice to prevent Type 2 diabetes
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of the lifestyle advice to prevent Type 2 diabetes
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss lifestyle advice to prevent Type 2 diabetes
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of the lifestyle advice to prevent Type 2 diabetes
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss lifestyle advice to prevent Type 2 diabetes
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of the lifestyle advice to prevent Type 2 diabetes
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss lifestyle advice to prevent Type 2 diabetes
- quality of written communication is highly competent

Examples of suitable points to be outlined and discussed by the candidate:

lifestyle advice

- take regular physical activity
 - physical activity is important in preventing Type 2 diabetes as it helps blood sugar control or lower blood glucose levels
 - exercising regularly reduces the risk of Type 2 diabetes by 50% as it helps insulin work more effectively
 - adults should take part in 150 minutes a week as this helps maintain weight or lose weight and to keep blood sugar levels balanced

- maintain a healthy weight
 - reducing body weight by 5% helps prevent or reduce Type 2 diabetes by 50% by helping to control blood sugar levels
 - a BMI within the healthy range should be achieved (19–24) as being overweight is a risk factor
 - by reducing waist circumference less fat builds up around the organs, e.g. pancreas. This lowers the risk of insulin resistance, preventing high blood glucose
- reduce stress
 - helps prevent Type 2 diabetes as it helps reduce the body’s response to releasing stress hormones. This reduces a surge in blood sugar levels
- reduce/stop smoking
 - smoking can double the likelihood of heart disease, stroke and circulatory problems
 - smoking is a risk factor for insulin resistance. Individuals who are insulin resistant cannot use insulin properly
- reduce alcohol consumption
 - important to avoid heavy drinking as this reduces the body’s sensitivity to insulin and helps prevent Type 2 diabetes
 - alcohol has a high calorific value, reduction of intake may help prevent diabetes as it reduces the risk of the individual becoming overweight

All other valid points will be given credit

[15]

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- 6 Describe the possible health problems associated with overweight and obesity in childhood. (AO1, AO2, AO3)

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Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of health problems associated with overweight and obesity in childhood
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to describe these health problems
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of health problems associated with overweight and obesity in childhood
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to describe these health problems
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of health problems associated with overweight and obesity in childhood
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to describe these health problems
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of health problems associated with overweight and obesity in childhood
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to describe these health problems
- quality of written communication is highly competent

Examples of suitable points to be proposed by the candidate:

- psychological problems; children who are overweight or obese may have low confidence, low self esteem and feel isolated. Relationships with family and friends may be affected negatively. Children may develop anxiety or depression
- Type 2 diabetes; being overweight or obese may affect the risk of developing Type 2 diabetes as it means insulin is not working effectively and it increases insulin resistance
- breathlessness; children may have difficulty with daily activities and may feel very tired
- bone and joint pain; being overweight and obese in childhood puts strain on the joints particularly those that bear most of the weight, e.g. knees and hips. This may cause pain and children may have difficulty moving about. It may lead to orthopaedic problems in adulthood
- increased risk of obesity in adulthood; a child who is overweight and obese is more likely to be obese as an adult

- difficulty completing physical activity; children who are overweight or obese may reduce their ability to participate in physical activities. This increases the risk of remaining overweight or obese
 - increased risk of health problems; children who are overweight or obese may have long term health concerns. This may lead to sleep problems, hypertension or heart problems later in life
- All other valid points will be given credit

[15]

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7 Discuss the effects of the following on the development of cardiovascular disease. (AO1, AO2, AO3)

- saturated and unsaturated fatty acids
- hypertension
- overweight and obesity

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the development of cardiovascular disease
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the effects of fatty acids, hypertension and overweight/obesity on development of cardiovascular disease
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of the development of cardiovascular disease
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss the effects of fatty acids, hypertension and overweight/obesity on development of cardiovascular disease
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of the development of cardiovascular disease
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss the effects of fatty acids, hypertension and overweight/obesity on development of cardiovascular disease
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of the development of cardiovascular disease
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the effects of fatty acids, hypertension and overweight/obesity on development of cardiovascular disease
- quality of written communication is highly competent

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Examples of suitable points to be proposed by the candidate:

Saturated and unsaturated fatty acids

- too much saturated fats in the diet; this can raise low density lipoprotein (LDL) in the blood, which can increase the risk of heart disease. If there is too much LDL in the cells it can build up in the artery walls, leading to atherosclerosis, narrowing of the arteries. This restricts blood flow making the heart work harder to pump blood and oxygen around the body
- saturated fats should be replaced with monounsaturated fats or polyunsaturated fats; this is to help lower LDL cholesterol. Monounsaturated fats help reduce the development of cardiovascular disease as they maintain HDL cholesterol while reducing LDL cholesterol. Polyunsaturated fats also help reduce the development as they help lower LDL cholesterol

Hypertension

- hypertension increases with age; increasing blood pressure puts added force against the artery walls
- hypertension stresses blood vessels, damaging the lining and increases clots. The artery walls become less flexible and thicker but the space inside the arteries becomes narrower and vulnerable to plaque build up associated with atherosclerosis. This causes the heart to work harder to pump blood around the body increasing the development of strokes or heart disease
- hypertension is one of the most important risk factors for cardiovascular disease. If the blood pressure is consistently too high, it can damage the blood vessels

Overweight and obesity

- being overweight increases the risk of developing hypertension and Type 2 diabetes which is a risk factor for cardiovascular disease
- abdominal adiposity; excess fat increases LDL cholesterol that increases the risk of atheroma.
- BMI/waist ratio determines body fat; BMI over 25 increases the risk of cardiovascular disease
- Being overweight also increases blood pressure and risk of developing Type 2 diabetes, these are both risk factors for cardiovascular disease

All other valid points will be given credit

[15]

15

Section B

45

Total

80

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