



Rewarding Learning

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

Nutrition and Food Science

Assessment Unit AS 2

assessing

Diet, Lifestyle and Health

[SNF21]

TUESDAY 28 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

AVAILABLE
MARKS

1 (a) Name **two** cancers associated with smoking. (AO1)

- oral cancers
- lung cancer

All other valid points will be given credit

[2]

(b) Describe how smoking influences the development of cancer. (AO1, AO2)

- smoking introduces free radicals which cause oxidative damage to cells influencing the development of cancer
- the chemicals in tobacco smoke stop cells from repairing DNA damage and this build up of DNA damage in the same cell leads to cancer
- the cocktail of chemicals released from tobacco, e.g. benzene and polycyclic hydrocarbons are carcinogenic, they disrupt DNA and produce mutations that lead to cancers in the body

All other valid points will be given credit

[0]–[1] basic description

[2] competent description

[3] highly competent description

[3]

(c) Explain **two** dietary recommendations to reduce the risk of cancer. (AO1, AO2)

- a diet high in fruit and vegetables; fruit and vegetables contain antioxidants and phytochemicals that reduce free radicals which cause cancer in the body. They minimise oxygen damage to cells protecting against damage to DNA thus reducing the risk of cancer
- a diet low in processed meat or red meat; reducing consumption of red meat lowers N-nitroso compounds which cause DNA mutation and reduces haem content which inflames the lining of the bowel, reducing cancer risk

All other valid points will be given credit

[0]–[2] basic explanation

[3] competent explanation

[4] highly competent explanation

[4]

9

- 2 (a)** Outline how each of the following may be a risk factor for cardiovascular disease (CVD). (AO1, AO2)
- (i)** genetics; the risk of CVD is higher if there is a family history of heart attack or sudden death before the age of 55 in the father or before age of 65 in the mother
 All other valid points will be given credit
 [0]–[1] basic outline
 [2] competent outline [2]
- (ii)** low birth weight; individuals with a low birth weight have a greater risk of developing CVD in later life, they have an increased risk of high blood pressure and raised blood cholesterol levels
 All other valid points will be given credit
 [0]–[1] basic outline
 [2] competent outline [2]
- (iii)** ethnicity; there is a higher risk of developing heart disease in an individual of black or Asian origin. Asian individuals have an increased risk of Type 2 diabetes and those of black origin are most at risk of high blood pressure, both are risk factors for CVD
 All other valid points will be given credit
 [0]–[1] basic outline
 [2] competent outline [2]
- (b)** Describe the effects of saturated fatty acids on the development of cardiovascular disease (CVD). (AO2)
- high intake of saturated fatty acids increases total cholesterol and low density lipoprotein (LDL) cholesterol
 - increased LDL cholesterol is associated with an increased risk of CVD as blockages form in the arteries causing atherosclerosis
 - saturated fatty acids cause thickening of the arterial wall, loss of elasticity and reduced blood flow
- All other valid points will be given credit
 [0]–[2] basic description
 [3] competent description
 [4] highly competent description [4]

**AVAILABLE
MARKS**

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- 3 (a) Complete the following table to show the current NHS physical activity guidelines for adults aged 19–64 years. (AO1)

Number of minutes	Intensity
150 minutes	Moderate intensity
75 minutes	Vigorous intensity

[4]

- (b) Describe how regular physical activity may benefit each of the following during adulthood: (AO2, AO3)

(i) skeletal muscular health

- physical activity increases muscle size and increases blood flow to muscles improving their efficiency
- regular physical activity increases muscular strength, stamina and flexibility
- regular physical activity reduces muscle degeneration or atrophy associated with ageing

All other valid points will be given credit

[0]–[1] basic description

[2] competent description

[3] highly competent description

[3]

(ii) bone and joint health

- weight bearing activity is important for adults to achieve peak bone density, increase bone density and maintain strength
- regular physical activity reduces rate of bone loss, which occurs with ageing, lowering the risk of fractures and osteoporosis
- regular physical activity replenishes synovial fluid to lubricate cartilage around the joints, increasing joint stability and flexibility, reducing stiffness and joint pain associated with arthritis

All other valid points will be given credit

[0]–[1] basic description

[2] competent description

[3] highly competent description

[3]

AVAILABLE
MARKS

10

4 (a) Identify **two** social trends in food consumption. (AO1)

- fewer people eat three meals a day and regularly consume snacks or rely on convenience/processed foods
- a rise in coffee shops, street food and social interactions contributing to consumption of high fat, sugar, and salt foods

All other valid points will be given credit [2]

(b) “The number of people living alone in the UK has increased over the last 10 years.”

Source: www.ons.gov.uk/familiesandhouseholds/2020

Consider the impact this demographic has on eating patterns and food consumption. (AO2, AO3)

- eating out; many people living on their own eat outside the home and purchase food from a wider variety of food outlets
- informal eating patterns; less structured meal times when living alone can result in flexible meal times and food consumed
- less motivation; individuals may be less inclined to cook for one, leading to greater reliance on convenience foods, ready meals and takeaways

All other valid points will be given credit

[0]–[2] basic consideration

[3] competent consideration

[4] highly competent consideration [4]

Section A

**AVAILABLE
MARKS**

6

35

Section B

AVAILABLE
MARKS

Quality of written communication is assessed in this section.

Answer **three** questions from this section.

5 Describe the relationship between alcohol and each of the following:

- obesity
- cardiovascular disease (CVD)
- cancer. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of obesity, CVD and cancer
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to describe the relationship between alcohol and obesity, CVD and cancer
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of obesity, CVD and cancer
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to describe the relationship between alcohol and obesity, CVD and cancer
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of obesity, CVD and cancer
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to describe the relationship between alcohol and obesity, CVD and cancer
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of obesity, CVD and cancer
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to describe the relationship between alcohol and obesity, CVD and cancer
- quality of written communication is highly competent

Examples of suitable points to be described by the candidate:

obesity

- weight gain; alcohol is energy dense with 1 gram providing 7 kcal, which may contribute to positive energy balance and weight gain
- reduction in the amount of fat released for energy; alcohol passes from

the stomach and intestines into the blood to the liver. In the liver alcohol is converted to acetate, which cannot be stored so the body metabolises it first before burning fat

- alcohol consumption; linked to increased food consumption and in some cases over-eating as it stimulates appetite leading to an increase in BMI over time

CVD

- fatty material in the arteries; alcohol increases total cholesterol, low density lipoproteins (LDL) and triglycerides
- increase blood pressure; drinking excessive alcohol may raise blood pressure, which is a risk factor for heart disease or stroke
- weakened heart muscle; alcohol consumption may weaken the heart muscle meaning the heart doesn't pump oxygenated blood as efficiently
- abdominal/central obesity; body fat accumulating around the waist increases risk of heart disease as it puts pressure on the heart. 'Apple' shaped individuals are at greater risk than 'pear' shaped as the fat accumulates and puts pressure on the lungs and heart, increasing the risk of a heart attack

cancer

- cell damage; alcohol damages DNA causing abnormal cell division and mutations, this damage prevents cells in the body repairing the damage caused by acetaldehyde
- changes to hormones; alcohol increases the level of oestrogen and insulin in the body. These chemical messengers make cells divide more often raising the risk of some types of cancer, e.g. breast, testicular
- inflammation; alcohol and its by-products damage the liver, leading to inflammation and cirrhosis. As the liver tries to repair the damage, DNA may be affected that could lead to some types of cancer, e.g. liver, oral

All other valid points will be given credit

[15]

15

AVAILABLE
MARKS

- 6 Explain how advertising may prevent consumers from making healthy food choices. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of food advertising
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how advertising may prevent consumers from making healthy food choices
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of food advertising
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how advertising may prevent consumers from making healthy food choices
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of food advertising
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how advertising may prevent consumers from making healthy food choices
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of food advertising
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how advertising may prevent consumers from making healthy food choices
- quality of written communication is highly competent

Examples of suitable points to be explained by the candidate:

- eating habits and food choices; taste preferences are acquired through repeated exposure to messages in food advertisements. Individuals exposed to television over time are influenced to choose foods from the advertisements. Most adverts promote food in a biased manner as they aim to sell products
- advertising strategies: cartoon characters, billboards, celebrities, product placement and video games are used to market food and beverages, which are high in calories, fat and added sugars. These repeated messages encourage consumers to purchase less healthy foods
- energy dense foods; a high number of advertisements on television, shown during programmes, are for foods high in fat, salt or sugar (HFSS) promoting poor food choices
- fruit and vegetables; a very low percentage of food advertising is devoted to this food group, which prevents consumers making healthy food choices

as consumers are exposed to food products which are energy dense rather than nutrient dense

- fast foods and takeaways; advertisements for fast food and takeaway are very common compared to other adverts. They also have sponsorship links to television shows. These repeated messages influence consumers to purchase foods or make food choices from these outlets, preventing healthy choices
- supermarket advertising; online marketing techniques have increased. Once a consumer purchases a product it is more likely to be suggested or recommended again turning a one time treat for an unhealthy food into a routine purchase
- advertising on social media and websites; consumers spend an increased amount of time on social media exposed to digital marketing. Consumers react more positively to online adverts for unhealthy foods as they view them longer and share on their feed. These adverts for high fat, sugar and salt foods prevents healthy food choices
- influencers; social media influencers have a strong impact on food choices particularly amongst young people. Influencers often advertise unhealthy food products which prevent consumers from making healthy food choices

All other valid points will be given credit

[15]

AVAILABLE
MARKS

15

7 Explain **three** factors that increase the risk of Type 2 diabetes. (AO1, AO2, AO3)

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MARKS

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of Type 2 diabetes
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain three factors that increase the risk of Type 2 diabetes
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of Type 2 diabetes
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain three factors that increase the risk of Type 2 diabetes
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of Type 2 diabetes
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain three factors that increase the risk of Type 2 diabetes
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of Type 2 diabetes
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain three factors that increase the risk of Type 2 diabetes
- quality of written communication is highly competent

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

- fat cells are more resistant to insulin than muscle cells, and if an individual has more fat cells due to being overweight, the insulin becomes less effective and increases the risk of developing Type 2 diabetes. A BMI over 25 is a risk factor for overweight and increasing the risk of Type 2 diabetes
- individuals who carry excess weight around the waist are at a higher risk of Type 2 diabetes as the fat that builds up in the abdomen raises the risk of insulin resistance. There is an increased risk of hypertension and cardiovascular disease due to the pressure on the heart. These are risk factors for Type 2 diabetes

excess alcohol

- excess alcohol intake is linked to an increase in Type 2 diabetes as it reduces the body's sensitivity to insulin

- alcohol is energy dense, 1g providing 7 kcal, which may lead to weight gain which is a risk factor. Alcohol may cause inflammation of the pancreas impairing the ability to secrete insulin causing glucose levels to build up in the bloodstream

stress

- when the body is stressed it releases the stress hormone cortisol causing a surge in the blood glucose levels. Constant stress makes controlling blood glucose levels very difficult increasing the risk of Type 2 diabetes
- stress can impact on sleeping patterns. Lack of sleep affects insulin resistance; tiredness increases snacking on sugary foods

All other valid points will be given credit

[15]

AVAILABLE
MARKS

15

8 Discuss the possible barriers to achieving a healthy weight. (AO1, AO2, AO3)

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Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of barriers to achieving a healthy weight
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the possible barriers to achieving a healthy weight
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of barriers to achieving a healthy weight
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss the possible barriers to achieving a healthy weight
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of barriers to achieving a healthy weight
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss the possible barriers to achieving a healthy weight
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of barriers to achieving a healthy weight
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the possible barriers to achieving a healthy weight
- quality of written communication is highly competent

Examples of suitable points to be discussed by the candidate:

- food availability; the quantity and nature of food is a barrier to achieving a healthy weight as there is a greater range of energy dense food on sale around the clock in a variety of outlets
- technological advances; fewer physically demanding jobs, increase in computer driven technology and widespread availability of electronic devices in the home reduce energy output which is a barrier to achieving a healthy weight
- larger portion sizes; individuals eating larger portions is a barrier as it increases food intake contributing to energy intake exceeding energy expenditure and positive energy balance
- eating meals away from the home; individuals who eat at restaurants may

have more food as they eat a starter and/or dessert or eat foods higher in fat and sugar that are a barrier to achieving a healthy weight

- snacking and grazing; consumption of snack foods and soft drinks throughout the day is a barrier to achieving a healthy weight as they increase fat and sugar intake
- increased consumption of convenience, fast food, or ready meals; these foods have a higher energy density than homemade meals and when consumed frequently may be a barrier to achieving a healthy weight
- psychological aspects; attitudes and beliefs have a major impact on food intake; a low mood, mental state or self-image may impact food intake acting as a barrier due to the high energy content of foods consumed to help improve the frame of mind
- limited resources and skills; individuals who have a lack of cooking time or limited income may not achieve a healthy weight as they do not have the resources to purchase or cook homemade, nutritious food
- lack of physical activity; reduced participation in leisure activities, increased sedentary lifestyles, use of the car and safety fears have reduced outdoor activity and energy expenditure increasing the risk of positive energy balance

All other valid points will be given credit

[15]

**AVAILABLE
MARKS**

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Section B

45

Total

80