Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Nutrition and Food Science

Assessment Unit AS 1

assessing

Principles of Nutrition

[SNF11]

WEDNESDAY 15 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)** Circle **one** food below which is a source of free sugars in the diet. (AO1)

honey [1]

(b) Explain the term free sugars. (AO1, AO2)

- free sugars are added to foods by the manufacturer, cook or consumer
- plus sugars naturally present in honey, syrups and unsweetened fruit juices
- under this definition lactose (the sugar in milk) when naturally present in milk and milk products and the sugars contained within the cellular structure of foods (particularly fruits and vegetables) are excluded

[0]–[1] basic explanation
[2] competent explanation
[3] highly competent explanation
All other valid points will be given credit. [3] 4

2 **(a)** Identify the following type of fatty acid. (AO1)

saturated fatty acid [1]

(b) Name **one** type of fatty acid consumers are advised to decrease in the diet and describe its effect on blood cholesterol levels. (AO1, AO2)

trans fatty acids
trans fatty acids increase LDL (the 'bad') cholesterol but reduce HDL (the good) cholesterol and their effect is more detrimental than saturates
[0]–[1] basic description
[2] competent description
[3] highly competent description
Saturated fat is also acceptable. [3]

(c) Explain **two** key functions of fat as a nutrient. (AO1, AO2)

- fat is the most concentrated source of energy providing 9 kcal per 1 gram consumed, which is more than double the energy content of protein or carbohydrate (4 kcal per gram).
- source of essential fatty acids (EFAs); the body cannot produce essential fatty acids which are important in the formation of cell membranes particularly in nerve tissue

[0]–[2] basic explanation
[3] competent explanation
[4] highly competent explanation
All other valid points will be given credit. [4] 8

AVAILABLE MARKS

3 **(a)** Comment on the following recommendations for fish consumption during pregnancy. (AO1, AO2)

Type of fish	Recommendations during pregnancy
Oily fish	Limit to 2 portions a week
Marlin, shark and swordfish	Do not eat

Source: www.nutrition.org.uk

- oily fish should not exceed two portions a week as oily fish contain low levels of pollutants such as pollutants, e.g. dioxins and PCBs that can build up in the body
- pregnant women are advised to avoid marlin, shark and swordfish due to the risk of methylmercury which at high levels, can be harmful to the developing nervous system of the foetus

[0]–[2] basic comments
[3] competent comments
[4] highly competent comments
All other valid points will be given credit. [4]

(b) Explain the importance of calcium for adult women.(AO1, AO2, AO3)

- although the majority of skeleton is laid down during teenage years, bones continue to strengthen until mid-thirties to achieve peak bone mass
- after this bone is gradually lost and for women there is a marked increase in bone loss around the time of the menopause, which puts them at higher risk of osteoporosis as they get older
- an adequate calcium intake is vital in times of growth (pregnancy) and also during lactation (breastfeeding)

[0]–[2] basic explanation
[3] competent explanation
[4] highly competent explanation
All other valid points will be given credit. [4]

8

			AVAILABLE MARKS
4	**(a)**	Suggest **two** reasons why infants may suffer from dehydration. (AO1, AO2) • they are more susceptible to changes in temperature • infants cannot communicate their need for fluids All other valid points will be given credit. [2]	
	(b)	Summarise the nutritional benefits of consuming milk for teenagers. (AO1, AO2) • provides calcium for the development and maintenance of strong, healthy bones and teeth • provides protein for growth and repair function • provides vitamin B_{12} for healthy red blood cells and nerve function • provides vitamin B_2 (riboflavin) to help release energy from carbohydrate and protein [0]–[2] basic summary [3] competent summary [4] highly competent summary All other valid points will be given credit. [4]	
	(c)	Describe the effects of water intoxication in the body. (AO1, AO2) • dilutional hyponatraemia happens as a result of over hydration in a short period of time • too much water leads to a dilution of sodium in the blood, and leads to all sort of problems, especially concerning the brain • other symptoms include nausea, headache, vomiting, tiredness, dizziness, disorientation, confusion and swollen hands and feet [0]–[1] basic description [2] competent description [3] highly competent description All other valid points will be given credit. [3]	9

AVAILABLE MARKS

5 **(a)** Analyse the data below and suggest reasons for the increasing figures. (AO1, AO2, AO3)

Reference Nutrient Intakes (RNIs) for Iron		
Age	**Male (mg/day)**	**Female (mg/day)**
4–6 years	6.1	6.1
7–10 years	8.7	8.7
11–18 years	11.3	14.8

- there is a significant increase for both males and females as they get older due to increased growth which results in increased blood volume
- the recommended intake of iron increases quite dramatically when girls reach puberty due to increased losses from menstruation
- there is a more dramatic increase for both males and females 11–18 years which is indicative of growth spurt

[0]–[2] basic analysis of data
[3]–[4] competent analysis of data
[5]–[6] highly competent analysis of data
All other valid points will be given credit. [6]

(b) Identify **two** valuable food sources of non-haem iron. (AO1)

- dark green leafy vegetables
- pulses

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

(c) State **two** factors that inhibit the absorption of iron.(AO1)

- phytate
- tannins

All other valid points will be given credit. [2] 10

AVAILABLE MARKS

6 **(a)** Describe the nutritional need for zinc in teenage years. (AO1, AO2)

- a reserve of zinc is required for adolescents to cope with the demands of physical development during teenage years
- zinc is needed to prevent delayed sexual maturation and skeletal abnormalities
- zinc supports the immune system and so is important to help heal wounds and combat infections, it is also used to help with treating acne

[0]–[1] basic description
[2] competent description
[3] highly competent description
All other valid points will be given credit [3]

(b) Explain why vitamin B_{12} deficiency is more likely to occur in older adults. (AO1, AO2, AO3)

- intrinsic factor; pernicious anaemia is caused by a lack of a protein called intrinsic factor that is needed to absorb vitamin B_{12} from food into the body from the gastro-intestinal tract. This condition is more common in people over 60 because the ability to produce the intrinsic factor decreases with age
- medications taken at this stage may interfere with vitamin B_{12} absorption
- any problem that causes poor absorption in the stomach or small intestine, such as Crohn's disease will impact on vitamin B_{12} absorption

[0]–[2] basic explanation
[3]–[4] competent explanation
[5] highly competent explanation
All other valid points will be given credit [5]

(c) Summarise the possible effects of an excessive intake of sodium on health. (AO1, AO2)

- sodium raises blood pressure (hypertension) which is a major factor for strokes, heart failure and heart attacks
- there is also increasing evidence of a link between high salt intake and stomach cancer, osteoporosis, obesity, kidney stones, kidney disease and vascular dementia and water retention

[0]–[1] basic summary
[2] competent summary
All other valid points will be given credit [2]

(d) State **two** symptoms of a deficiency of vitamin B_2 in the diet.(AO1)

- dryness and cracking of skin around the mouth and nose
- painful tongue that is red and dry

All other valid points will be given credit [2] 12

		AVAILABLE MARKS
7	Explain the functions of magnesium and suggest **two** valuable food sources. (AO1, AO2, AO3)	
	Functions • magnesium is an essential mineral present in all human tissue, especially in bone • needed for the activation of many enzymes including those concerned with the replication of DNA and the synthesis of RNA • needed for muscle and nerve function [0]–[1] basic explanation [2] competent explanation [3] highly competent explanation [3]	
	Sources • green leafy vegetables • nuts All other valid points will be given credit [2]	5
	Section A	**56**

Section B

AVAILABLE MARKS

Quality of written communication is assessed in this section.

Answer **two** questions from this section.

8 Describe the needs of a school-age child (5–12 years) in relation to energy and explain how to achieve these needs through healthy food choices.
(AO1, AO2, AO3)

Mark Band ([0]–[3])
Overall impression: basic
- inadequate knowledge and understanding of the energy needs of a school-age child
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to describe the energy needs of a school-age child and explain how these requirements can be achieved through appropriate food choices
- quality of written communication is basic

Mark Band ([4]–[6])
Overall impression: adequate
- adequate knowledge and understanding of the energy needs of a school-age child
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to describe the energy needs of a school-age child and explain how these requirements can be achieved through appropriate food choices
- quality of written communication is adequate

Mark Band ([7]–[9])
Overall impression: competent
- competent knowledge and understanding of the energy needs of a school-age child
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to describe the energy needs of a school-age child and explain how these requirements can be achieved through appropriate food choices
- quality of written communication is competent

Mark Band ([10]–[12])
Overall impression: highly competent
- highly competent knowledge and understanding of the energy needs of a school-age child
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to describe the energy needs of a school-age child and explain how these requirements can be achieved through appropriate food choices
- quality of written communication is highly competent

Examples of suitable points to be explained by the candidate:

AVAILABLE MARKS

Energy needs

- growth; children need energy for growth. They have relatively high energy needs for their size
- activity; children generally become more active when starting school. More active children will have greater energy needs

How to achieve energy needs through healthy food choices

- bread, pasta, rice, potatoes, breakfast cereals;
  - these provide a nutrient-dense source. It is important at this stage in life-cycle as appetites may be small
  - healthy source of energy which have a good satiety value helping to keep children feeling fuller and less likely to snack between meals
  - wholegrain versions can provide fibre and promote good bowel health as constipation can be common at this age
- Cakes, biscuits, confectionery, fizzy drinks, if eaten in excess can lead to weight gain so consumption should be reduced/monitored as a source of energy
- healthy snacks such as bread, cheese, yoghurts and fruit; these can help ensure energy needs are met at this age if appetites are small or the child is very active

All other valid points will be given credit [12]

9 Compare the nutritional value and health benefits of fish and pulses. (AO1, AO2, AO3)

AVAILABLE MARKS

Mark Band ([0]–[3])
Overall impression: basic
- inadequate knowledge and understanding of the nutritional value and health benefits of fish and pulses
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to compare the nutritional value and health benefits of fish and pulses
- quality of written communication is basic

Mark Band ([4]–[6])
Overall impression: adequate
- adequate knowledge and understanding of the nutritional value and health benefits of fish and pulses
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to compare the nutritional value and health benefits of fish and pulses
- quality of written communication is adequate

Mark Band ([7]–[9])
Overall impression: competent
- competent knowledge and understanding of the nutritional value and health benefits of fish and pulses
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to compare the nutritional value and health benefits of fish and pulses
- quality of written communication is competent

Mark Band ([10]–[12])
Overall impression: highly competent
- highly competent knowledge and understanding of the nutritional value and health benefits of fish and pulses
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to compare the nutritional value and health benefits of fish and pulses
- quality of written communication is highly competent

Examples of suitable points to be considered by the candidate:
- protein; fish is a source of high biological value protein whereas pulses are low biological value. However, if pulses are eaten along with grains they can be a very useful complementary food for vegetarian diets to ensure adequate growth and development
- omega 3 fatty acids; fish oils are the richest source of omega 3 fatty acids vital for normal brain development in unborn babies and infants. These omega 3 fatty acids help to maintain a healthy heart by lowering blood pressure and reducing the risk of sudden death, heart attack, abnormal heart rhythms, and strokes. Pulses do not provide omega 3 fatty acids
- low fat; pulses and some fish are low in fat, this makes them both useful for managing weight
- iron; pulses have a higher iron content than fish making them useful in preventing iron deficiency anaemia. However the iron in fish is haem iron which is easier to absorb

- fibre; fish contains no fibre whereas pulses are an excellent source of fibre making them useful for lowering bad 'LDL' cholesterol and the possible development of CVD
- vitamins; oily fish is an excellent source of the fat soluble vitamins A and D whereas pulses are not considered a valuable source of fat or water soluble vitamins

All other valid points will be given credit [12]

AVAILABLE MARKS

10 Discuss the nutritional significance of starchy carbohydrates. (AO1, AO2, AO3)

AVAILABLE MARKS

Mark Band ([0]–[3])
Overall impression: basic
- inadequate knowledge and understanding of starchy carbohydrates
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the nutritional significance of starchy carbohydrates
- quality of written communication is basic

Mark Band ([4]–[6])
Overall impression: adequate
- adequate knowledge and understanding of starchy carbohydrates
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss the nutritional significance of starchy carbohydrates
- quality of written communication is adequate

Mark Band ([7]–[9])
Overall impression: competent
- competent knowledge and understanding of starchy carbohydrates
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss the nutritional significance of starchy carbohydrates
- quality of written communication is competent

Mark Band ([10]–[12])
Overall impression: highly competent
- highly competent knowledge and understanding of starchy carbohydrates
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the nutritional significance of starchy carbohydrates
- quality of written communication is highly competent

Examples of suitable points to be discussed by the candidate:
- regulating blood glucose levels; choosing carbohydrate foods with a lower GI regularly is a good idea as these tend to be higher in fibre. Low GI diets can be recommended for people with diabetes as they can help them to keep their blood glucose levels more stable and prevent post meal blood sugar spikes
- high satiety value; starchy carbohydrates are digested more slowly than refined carbohydrates which makes them more filling and a good option for weight control as they displace other fatty sugary snacks
- nutrient-dense; starchy foods provide energy and possibly calcium, iron and B vitamins; wholegrain choices will provide fibre
- reduce cholesterol; carbohydrate foods high in soluble fibre may slightly reduce the level of cholesterol in the blood
- weight gain; carbohydrate provides less energy than fat and gives a feeling of fullness and satiety.

All other valid points will be given credit [12]

Section B **24**

Total **80**