



Rewarding Learning

ADVANCED
General Certificate of Education
2025

Nutrition and Food Science

Assessment Unit A2 1

assessing

Option A: Food Security and Sustainability

or

Option B: Food Safety and Quality

[ANF11]

THURSDAY 29 MAY, AFTERNOON

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

- 1 (a) Outline the economic benefits of Fairtrade for producer countries. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of the economic benefits of Fairtrade for producer countries
- demonstrates a limited ability to apply this knowledge and understanding to the question
- demonstrates a limited ability to outline the economic benefits of Fairtrade for producer countries
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: adequate

- adequate knowledge and understanding of the economic benefits of Fairtrade for producer countries
- demonstrates an adequate ability to apply this knowledge and understanding to the question
- demonstrates an adequate ability to outline the economic benefits of Fairtrade for producer countries
- quality of written communication is adequate

Mark Band ([6]–[8])

Overall impression: competent

- competent knowledge and understanding of the economic benefits of Fairtrade for producer countries
- demonstrates a competent ability to apply this knowledge and understanding to the question
- demonstrates a competent ability to outline the economic benefits of Fairtrade for producer countries
- quality of written communication is competent

Mark Band ([9]–[10])

Overall impression: highly competent

- highly competent knowledge and understanding of the economic benefits of Fairtrade for producer countries
- demonstrates a highly competent ability to apply this knowledge and understanding to the question
- demonstrates a highly competent ability to outline the economic benefits of Fairtrade for producer countries
- quality of written communication is highly competent

Examples of suitable points to be outlined by the candidate:

- Fairtrade Minimum Price; covers the cost of sustainable production. If the market price is higher than the minimum price, then farmers and workers receive the market price and so become more income secure
- Fairtrade Premium; supports better farming, strong cooperatives and investment to improve crops and yields. The premium is the additional sum of money paid on top of the Fairtrade minimum price which is

invested in business or community projects, e.g. schools, transport and health care

- cooperative; Fairtrade empowers communities to organise into bargaining cooperatives and improve their negotiating position within the supply chain. This enables them to negotiate a higher price for their product than the conventional market price
- investment in farming practices; Fairtrade improves access to loans, agricultural services like organic training, diversification and as a result, farmers have an incentive to farm better, sell more and maximise profits
- living income; Fairtrade sets international standards in accordance with the ISEAL Code of Good Practice on Standard Setting. These include establishing decent wages in line with the Living Income Reference Price which enhances economic benefits for the producer country
- Global Living Wage Coalition; co-founded by Fairtrade. Supports the development of living wage benchmarks for specific countries. The benchmarks help to identify the gap with current wages and find solutions together with employers, workers, buyers and retailers

All other valid points will be given credit

[10]

- (b) Describe how the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme is helping to deliver sustainable food. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme
- demonstrates a limited ability to apply this knowledge and understanding to the question
- demonstrates a limited ability to describe how the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme is delivering sustainable food
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme
- demonstrates an adequate ability to apply this knowledge and understanding to the question
- demonstrates an adequate ability to describe how the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme is delivering sustainable food
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme
- demonstrates a competent ability to apply this knowledge and understanding to the question
- demonstrates a competent ability to describe how the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme is delivering sustainable food
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme
- demonstrates a highly competent ability to apply this knowledge and understanding to the question
- demonstrates a highly competent ability to describe how the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme is delivering sustainable food
- quality of written communication is highly competent

Examples of suitable points to be described by the candidate:

- ownership; the Northern Ireland Beef and Lamb Farm Quality Assurance Scheme is part of the Red Tractor food assurance scheme. Red Tractor is an independent UK whole chain food assurance scheme which guarantees traceability from farm to pack
- quality; the Northern Ireland Farm Quality Assurance Scheme is a guarantee of quality from farm to fork. It proves food meets the highest standards of food safety, animal welfare, and care for the environment
- certified; a Certification Body is appointed to independently verify that producers are adhering to the required standards of the scheme. They facilitate a Scheme Standard Setting Committee which sets and amends the standards for Northern Ireland Beef and Lamb Farm Quality Assurance Scheme to reflect the quality of production and animal health welfare
- independent experts; the Standard Setting Committee is comprised of industry representatives from the beef and lamb production and processing sectors as well as a number of independent experts to ensure the eight main elements of the Product Standard are met: animal husbandry, animal health, animal nutrition, animal traceability, housing and handling, transport, environmental care and farm procedures
- working groups; LMC are involved in several working groups and initiatives aimed at delivering a sustainable red meat industry. The Greenhouse Gas Implementation Partnership set out a framework of actions to help the agriculture sector reduce its environmental impact
- assurances; the scheme provides assurances about the farm end of the production chain of the food: farm quality and production methods, the quality of care for animals, the quality of the farm environment and producing beef and lamb which is wholesome, safe and free from unnatural substances
- revised standards; formal reviews are important to ensure standards are relevant and take into consideration any current environmental or sustainable food issues. The most recent review saw the LMC, under the guidance of the Farm Quality Assurance Scheme Standard Setting Committee, complete a review of the scheme to ensure the highest sustainable standards are met

All other valid points will be given credit

[15]

Section A

**AVAILABLE
MARKS**

25

25

2 Discuss the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- demonstrates a limited ability to apply this knowledge and understanding to the question
- demonstrates a limited ability to discuss the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- demonstrates an adequate ability to apply this knowledge and understanding to the question
- demonstrates an adequate ability to discuss the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- demonstrates a competent ability to apply this knowledge and understanding to the question
- demonstrates a competent ability to discuss the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- demonstrates a highly competent ability to apply this knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the support provided by FareShare and The Trussell Trust to reduce food poverty in the UK
- quality of written communication is highly competent

Examples of suitable points to be discussed by the candidate:

FareShare

- redistribution of food; FareShare reduce food poverty in the UK by redistributing surplus food from the food industry to charities and community groups. They save edible food destined for waste and send it to charities and community groups who transform it into nutritious meals for vulnerable people

- social provision; they are also involved in providing support through breakfast clubs, community cafes and refuges which are places that provide life changing support, as well as lunch and dinner. By making sure good food is not wasted FareShare turn an environmental problem into a social solution
- surveys; FareShare conduct surveys that are designed to help the most vulnerable communities in the UK. They have looked at the cost of living and pupils going to school hungry. FareShare is calling on the Government to fund food surplus redistribution to get good food to people, not waste
- reduce poverty; they assist people to break free from poverty by providing additional support to help resolve crises they are facing so that they do not need to use a food bank in the future
- campaigning and lobbying; it is cheaper for farmers to waste food than get it to frontline charities. Government funding that helped farmers rescue their fresh, unsold food has been axed. FareShare are campaigning to have this funding reinstated
- global movement; member of the European Federation of Food Banks and The Global Food Banking Network – FareShare are part of a global movement working to alleviate hunger by capturing surplus food and delivering it to people who need it

Trussell Trust

- support; Trussell Trust supports a nationwide network of food banks and together they provide emergency food and support to people in poverty. They also provide help with fuel costs, clothing and donating ‘Warm Homes Discount Funds’. As a result, household budgets can be focused on food
- emergency food parcels; food is donated from schools, churches, businesses and individuals. Large collections often take place as part of seasonal celebrations which are then used to provide nutritional emergency food parcels
- campaigns; changing government policy has significant and lasting effects, and can make a real difference to millions of people on the lowest incomes. The ‘Guarantee our Essentials’ calls on the UK government to ensure the basic rate of Universal Credit at least covers essentials
- social provision; through community provision of shops, a warehouse and a market. The Trussell Trust also raise income through the sale of CDs and DVDs. Profits are reinvested into working towards their mission of ending hunger and poverty in the UK
- referrals; Trussell Trust partners with a wide range of health care professionals, e.g. social workers to identify people in crisis and issue them with a food bank voucher
- working locally to create change; the Organising and Local Mobilisation team support food banks in local communities to influence and campaign for change. This is done through organising programmes, providing funding as well as training and support for local food banks. They are then able to develop influencing strategies and campaigns for change

All other valid points will be given credit

[20]

20

- 3 Explore food choices consumers could make to help improve food security and sustainability. (AO1, AO2, AO3)

AVAILABLE
MARKS

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of food choices consumers could make to help improve food security and sustainability
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explore food choices consumers could make to help improve food security and sustainability
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of food choices consumers could make to help improve food security and sustainability
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explore food choices consumers could make to help improve food security and sustainability
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of food choices consumers could make to help improve food security and sustainability
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explore food choices consumers could make to help improve food security and sustainability
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of food choices consumers could make to help improve food security and sustainability
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explore food choices consumers could make to help improve food security and sustainability
- quality of written communication is highly competent

Examples of suitable points to be explored by the candidate:

- intensively farmed meat and dairy; avoiding these will reduce emissions of methane, nitrous oxide and carbon dioxide, limiting the potential for climate change and global warming. Globally, animal farming contributes 80% of global greenhouse gas emissions. Animal farming has a large water footprint because water is used at each stage of the production process. Intensive livestock farming contributes to land degradation which is a challenge to achieving global food security
- plant-based diet; arable farming requires less water for growth. There is a reduction in the risk of water pollution and land degradation in the farming of vegetables. Shifting diets from animal-based to plant-based at a global level is important to achieve food security and sustainability

- local and seasonal products; by selecting these products consumers will protect the diversity of both plants and animals. They can also have confidence in the environmental quality of the food bought as they can get to know the farmers that supply the food. Consumers will also be contributing to local economies and sustainable livelihoods. Local land can remain as agricultural land and not commercial land which safeguards food security
- quality assured products; choosing products from an assurance scheme satisfies consumers that the food produced has met specific standards at each stage of the supply chain from 'farm to fork'. These standards include animal health and welfare, food safety and environmental protection which will in the long term enhance food security and sustainability
- organic produce; if consumers select organic produce this can have a positive impact on climate change and natural resources promoting food sustainability. Organic farming methods ensure that nutrients remain in the soil as artificial fertilisers and pesticides are not permitted. Soil quality is improved and greenhouse gas emissions are lowered, soil and water pollution are reduced. All of these have a positive effect on food security
- seafood from certified suppliers; purchasing certified seafood promotes sustainable fishing which helps maintain healthy and diverse ocean ecosystems. This will minimise impacts on endangered, threatened, and protected species
- ultra processed foods; consumers could avoid these foods as they are usually higher in sugar, salt and fat than raw ingredients. The production of these create more greenhouse gases, therefore, eating less ultra processed foods can help reduce the environmental footprint
- plant food gardening; encouraging this activity can help to reduce food waste, as only what is needed is harvested. Most home gardeners use organic, sustainable practices, which can help to reduce carbon footprint and support local ecosystems. Home growing can also reduce the reliance on grocery store produce and reduce food miles
- local independent businesses; shopping at local independent food stores reduces the consumer's carbon footprint and promotes sustainable living as carbon emissions are reduced conserving energy and preserving natural resources. Supporting sustainable practices and encouraging biodiversity
- food and plastic waste; consumer should avoid unnecessary food waste and reduce plastic waste as food and plastic waste negatively impacts the environment

All other valid points will be given credit

[20]

20

AVAILABLE
MARKS

- 4 Consider how primary producers and consumers may contribute to food waste. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of food waste
- demonstrates a limited ability to apply this knowledge and understanding to the question
- demonstrates a limited ability to consider how primary producers and consumers may contribute to food waste
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of food waste
- demonstrates an adequate ability to apply this knowledge and understanding to the question
- demonstrates an adequate ability to consider how primary producers and consumers may contribute to food waste
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of food waste
- demonstrates a competent ability to apply this knowledge and understanding to the question
- demonstrates a competent ability to consider how primary producers and consumers may contribute to food waste
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of food waste
- demonstrates a highly competent ability to apply this knowledge and understanding to the question
- demonstrates a highly competent ability to consider how primary producers and consumers may contribute to food waste
- quality of written communication is highly competent

Examples of suitable points to be considered by the candidate:**Primary producers**

- severe weather; drought, strong winds and flooding can contribute to food waste due to a decreased yield in plant foods and injury/high mortality rates in livestock. Severe weather affects nutritional content and quality of crops reducing the marketability and increasing the risk of waste
- pests and disease; poor pest control and animal husbandry may result in damage to crops and livestock which limits produce entering the food chain and increases food waste
- inefficient harvesting; damage and loss can be experienced at this stage due to inefficient machinery contributing to food waste
- storage losses; in developing countries, fresh food and livestock products can be spoilt in warm climates due to inadequate refrigeration during transport and storage, resulting in deterioration and waste

- overproduction/forecasting demand; to ensure delivery of agreed quantities, farmers tend to produce more than is needed to exceed demand. Surplus crops are often wasted as harvesting the produce would be more expensive than the income generated by the crop sales
- high retail standards; approximately 30% of UK vegetable crops are not harvested, due to them failing to meet exacting standards based on their physical appearance. Retailers apply stringent product grading standards – if these expectations are not met, the produce is rejected and wasted

Consumers

- poor storage and rotation; incorrect storage including poor temperature control accelerates the deterioration of food, with WRAP UK suggesting that consumers are not making the most of storage information on package labels to keep food fresher for longer, e.g. resealable bags. This lack of awareness reduces the freshness and longevity of products
- leftovers; many consumers consider leftover portions insignificant and often have limited knowledge of using leftovers, e.g. reinventing or composting
- overbuying; many consumers purchase more than is needed due to a failure to plan ahead, financial incentives and the fear of food running out. Failing to write a shopping list, meal planning or purchasing unnecessary multibuy/ offers encourages consumers to buy more than is needed, which leads to food waste
- portion sizes; large portion sizes are a significant driver of food waste, especially when eating out. In the home, a poor understanding of portion size can lead to food wastage as a result of instinctive measuring, i.e. judging by eye
- food labelling; consumer confusion results in an inability to differentiate between durability date labels. WRAP states that Best Before dates remain safe, and perfectly good to eat for days, weeks, months or even years after that date
- modern attitudes; the attitude of consumers results in unnecessary food waste, as consumers believe they can 'afford' to waste food. Consumers often underestimate how much food they throw away and how much they are contributing to the problem

All other valid points will be given credit

[20]

20

AVAILABLE
MARKS

5 Discuss the impact of animal farming on the following:

- climate change
- water
- soil. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of animal farming, climate change, water and soil
- demonstrates a limited ability to apply this knowledge and understanding to the question
- demonstrates a limited ability to discuss the impact of animal farming on climate change, water and soil
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of animal farming, climate change, water and soil
- demonstrates an adequate ability to apply this knowledge and understanding to the question
- demonstrates an adequate ability to discuss the impact of animal farming on climate change, water and soil
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of animal farming, climate change, water and soil
- demonstrates a competent ability to apply this knowledge and understanding to the question
- demonstrates a competent ability to discuss the impact of animal farming on climate change, water and soil
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of animal farming, climate change, water and soil
- demonstrates a highly competent ability to apply this knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the impact of animal farming on climate change, water and soil
- quality of written communication is highly competent

Example of suitable points to be discussed by the candidate:**Climate change**

- greenhouse gases; the production of food from animal farming is a significant source of emissions especially the production of greenhouse gases: carbon dioxide; nitrous oxide and methane
- carbon dioxide; intensive farming typically uses high energy crops to feed animals which requires considerable amounts of artificial fertiliser and

fossil fuels. This generates large quantities of carbon dioxide globally. In addition to this animal carcasses have to be processed, transported and stored which is energy intensive and emits millions of tonnes of carbon dioxide. Deforestation due to land cleared for intensive farming and overgrazing reduces fertile soil and causes soil degradation which can lead to desertification and reduces sequestration of carbon

- methane; released by ruminant animals during digestion of grasses – enteric fermentation and generated in manure lagoons
- nitrous oxide; released mainly from the use of organic and inorganic fertilisers used to produce animal feed and is also associated with manure management

Water

- water footprint; animals are primary consumers of water, it also takes an enormous amount of water to grow crops for animals to eat and clean factory farms
- water pollution; poor practices in the management of manure, fertiliser and soil can result in water pollution. Animal waste can pollute water with pathogens, e.g. salmonella and E. coli making waterways a public health risk. Factory farms can produce millions of tonnes of manure which can leak into waterways. Water pollution also occurs from artificial fertilisers that are applied to crops which are mostly grown for animal feed. Nitrogen from the waste and fertiliser causes eutrophication. In intensive farming antibiotics are used which can enter water sources. Overgrazing also compacts soil and encourages run-off of fertilisers which causes further pollution

Soil

- deforestation; more than 90% of all Amazon rainforest land cleared is used for grazing livestock with entire ecosystems being destroyed. Trees play a vital role in climate stability as they sequester carbon, absorbing and storing carbon dioxide from the atmosphere in the soil. Deforestation also increases soil erosion as soil loses protection
- overgrazing; extensive grazing and compacting soil can result in land becoming waterlogged. This leads to run off and reduces nutrients in the soil
- monoculture; when the same plant for animal feed is grown annually on the land to meet demand, e.g. corn, the available nutrition in the soil is reduced over time leading to soil erosion and degradation. This can also lead to desertification and the overuse of fertilisers

All other valid points will be given credit

[20]

AVAILABLE MARKS

20

Section B

60

Section A

25

Total

85

Section A

- 1 (a) Outline the possible risks to health from consuming food contaminated with campylobacter. (AO1, AO2, AO3)

Mark Band ([0]–[2])

Overall impression: basic

- inadequate knowledge and understanding of campylobacter
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to outline the possible risks to health from consuming food contaminated with campylobacter
- quality of written communication is basic

Mark Band ([3]–[5])

Overall impression: adequate

- adequate knowledge and understanding of campylobacter
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to outline the possible risks to health from consuming food contaminated with campylobacter
- quality of written communication is adequate

Mark Band ([6]–[8])

Overall impression: competent

- competent knowledge and understanding of campylobacter
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to outline the possible risks to health from consuming food contaminated with campylobacter
- quality of written communication is competent

Mark Band ([9]–[10])

Overall impression: highly competent

- highly competent knowledge and understanding of campylobacter
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to outline the possible risks to health from consuming food contaminated with campylobacter
- quality of written communication is highly competent

Examples of suitable points to be outlined by the candidate:

- common symptoms; the most common clinical symptoms include diarrhoea (frequently bloody), abdominal pain, fever, headache, nausea, and/or vomiting. The symptoms typically last 3 to 6 days
- dehydration; this frequently occurs if water and electrolytes lost in the faeces or vomit are not replaced
- spread of infection; other parts of the body can be affected such as the bloodstream, liver and pancreas
- digestive disorders; irritable bowel syndrome can be triggered by campylobacter infection. Lactose intolerance can occur temporarily, known as 'secondary' or 'acquired' lactose intolerance

- health complications; these are more likely to occur in vulnerable groups such as the very young, pregnant women, the elderly and people with chronic conditions such as diabetes or compromised immune system. Post-infection complications may include reactive arthritis (painful inflammation of the joints), skin and eye inflammation. Neurological disorders such as Guillain-Barré syndrome, a polio-like form of paralysis, can result in respiratory and neurological dysfunction
- All other valid points will be given credit [10]

- (b) Explain how quality assurance standards improve food safety during primary production. (AO1, AO2, AO3)

Mark Band ([0]–[3])

Overall impression: basic

- inadequate knowledge and understanding of quality assurance standards
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how quality assurance standards improve food safety during primary production
- quality of written communication is basic

Mark Band ([4]–[7])

Overall impression: adequate

- adequate knowledge and understanding of quality assurance standards
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how quality assurance standards improve food safety during primary production
- quality of written communication is adequate

Mark Band ([8]–[11])

Overall impression: competent

- competent knowledge and understanding of quality assurance standards
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how quality assurance standards improve food safety during primary production
- quality of written communication is competent

Mark Band ([12]–[15])

Overall impression: highly competent

- highly competent knowledge and understanding of quality assurance standards
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how quality assurance standards improve food safety during primary production
- quality of written communication is highly competent

Examples of suitable points to be explained by the candidate:

- improving standards; the leading food assurance schemes aim to define the standards that most primary producers in the sector should meet. Over time, the schemes aim to improve the overall quality and safety

- of the entire sector. They are mainly voluntary arrangements; however, many primary producers are incentivised to join a scheme as it provides a guarantee that food has been produced to a high specification
- inspections; farms are inspected by independent auditors to ensure that the food is being produced in accordance with the specified standards. The inspection is conducted at regular intervals to ensure compliance and high standards are maintained
 - compliance; a panel of independent experts compile a range of food safety standards that primary producers must comply with. The panel focus on food safety and hygiene, traceability and safe use of veterinary medicines and chemicals at farm level. Requirements are updated to ensure the standards set take account of changes in legislation and improvements in best practice. The FSA also make best practice recommendations
 - accreditation; the United Kingdom Accreditation Service (UKAS) certifies a range of inspection bodies covering audits of animal feed and inspections of farms and slaughterhouses. UKAS accreditation ensures that stringent and robust food standards are met and demonstrates the integrity of the food chain, starting with primary production
 - whole chain assurance; Red Tractor Assurance (RTA) is an example of a whole chain food assurance scheme which guarantees high standards of food safety protection and traceability from farm to pack. In order for any product to carry their logo the whole supply chain must be certified by independent inspectors at every stage from farm to pack. RTA has six schemes that are approved by the Food Standards Agency: beef and lamb; crops and sugar beet; dairy; fresh produce; pigs and poultry
 - international accreditation; Lion Eggs is an assurance scheme that meets the requirements of international accreditation standard. Similar to the RTA it covers the entire production chain and includes compulsory vaccination against salmonella, a 'passport' system ensuring traceability and strict farm hygiene controls
- All other valid points will be given credit [15]

Section A

AVAILABLE MARKS

25

25

2 Discuss how consumers can reduce the risk of microbial contamination from the following foods:

- shellfish
- eggs
- fruit and vegetables
- herbs and spices. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of microbial contamination
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss how consumers can reduce the risk of microbial contamination from shellfish, eggs, fruit and vegetables, herbs and spices
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of microbial contamination
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss how consumers can reduce the risk of microbial contamination from shellfish, eggs, fruit and vegetables, herbs and spices
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of microbial contamination
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss how consumers can reduce the risk of microbial contamination from shellfish, eggs, fruit and vegetables, herbs and spices
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of microbial contamination
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss how consumers can reduce the risk of microbial contamination from shellfish, eggs, fruit and vegetables, herbs and spices
- quality of written communication is highly competent

Examples of suitable points to be discussed by the candidate:

AVAILABLE
MARKS

Shellfish

- purchase; buying from reputable sources will ensure shellfish has undergone the correct treatment. When shopping pick up shellfish last and take it straight home. Vacuum packed produce will reduce risk of cross-contamination
- storage; place in the fridge to prevent shellfish from decomposing and producing histamines which cause food poisoning. Discard damaged shellfish, e.g. mussels if their shell has a crack or if the shells are open and do not close when tapped as this indicates high risk
- preparation; wash hands thoroughly before and after handling shellfish. Do not allow the shellfish or fluid from them to come into contact with cooked or ready-to-eat food to avoid cross-contamination. Older people, pregnant women and young children are advised to avoid eating raw or lightly cooked shellfish

Eggs

- purchase; buy quality assured eggs, British Lion Brand flocks are vaccinated against salmonella. Select those with the longest date mark and avoid eggs that have cracked shells
- storage; place in the fridge or in a cool, dry place. If in the fridge use the egg tray, this helps to keep eggs separate from other ready-to-eat foods and avoid cross-contamination, alternatively keep them in their carton. Discard after the use-by date
- preparation; when handling eggs, always make sure that hands, surfaces and utensils that come into contact with raw egg or shells are washed thoroughly. Food made with raw or lightly cooked eggs should be consumed immediately or stored in the fridge for no more than 2 days

Fruit and Vegetables

- purchase; avoid bruised or damaged produce as this can create openings in the skin allowing harmful bacteria to contaminate the food. Inflated bags of salad or juices which leach from salad leaves should be avoided as this is a clear indication of decomposition
- storage; soiled vegetables should be kept away from other produce to avoid cross-contamination. When salad vegetables have been washed keep in a clean container with a lid. Store away from other raw foods, e.g. not below meat in the fridge where juices may drip
- preparation; fruit and vegetables that are not ready-to-eat require adequate washing and/or processing treatment (for example peeling or cooking). Soil on root crops and leafy vegetables can become contaminated with bacteria such as E. coli. Disinfect sink after washing these vegetables

Herbs and Spices

- purchase; when buying fresh herbs choose those that are free from soil as this may be a source of E. coli. Buy spices in small amounts and use them quickly as they contain oils so will be susceptible to contamination from pests, bacteria and mould
- storage; the safest option when storing spices is to grind whole spices when needed as this will keep them safer for longer. Dried herbs and spices should be kept in a cool dry place as moisture will encourage growth of bacteria

- preparation; add spices at the start of cooking as any bacteria are likely to be killed by the high heat. If using fresh herbs in a dish that is prepared cold such as basil in pesto, they should be washed carefully beforehand as they can harbour E. coli. Bruised stems and leaves should be discarded
- All other valid points will be given credit

[20]

AVAILABLE
MARKS

20

- 3 Explain how Good Manufacturing Practice (GMP) is used by food manufacturers to ensure safe food production. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of GMP
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how GMP is used by food manufacturers to ensure safe food production
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of GMP
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how GMP is used by food manufacturers to ensure safe food production
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of GMP
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how GMP is used by food manufacturers to ensure safe food production
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of GMP
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how GMP is used by food manufacturers to ensure safe food production
- quality of written communication is highly competent

Examples of suitable points to be explained by the candidate:

- quality control; GMP is a detailed set of guidelines that define management and handling procedures required to produce safe food. This ensures that ingredients, products and packaging are handled safely and processed in a suitable environment
- effective management programme; appropriately experienced and well qualified individuals should be managing the GMP system, developing effective food controls and specifications that address the safety and legality of the food product. GMP will not be effective unless policies are clearly and directly stated and are an integral part of the food business which are continually enforced by management
- highly trained workforce; current GMP training must be provided to all employees so they fully understand their roles and responsibilities, as a result they will be motivated to carry out procedures correctly. They should be provided with documented instructions in clear unambiguous language.

Periodically staff should undertake formal reviews to ensure that training and instructions are fit for purpose

- effective manufacturing operations; GMP requires that every aspect of the manufacturing process is fully defined in advance of production and that all resources and facilities are specified. For example: critical control points have been identified; equipment is appropriate and adequately maintained; correct storage and transport facilities and premises including manufacturing areas have been suitably designed
- operating procedures; the desired properties of the final product are planned and obtained by conducting Standard Operating Procedures (SOPs) that guarantee the desired safety and quality of the product at every production step. If an entire production chain is following this the demands for GMP are met
- current GMP; manufacturers should have knowledge of current food safety hazards and technology. Systems and equipment require regular reviewing and updating to comply with current standards
- accurate records; these must be completed during production to demonstrate that specified procedures were complied with. This allows for ease of traceability
- defective food; complaints about food must be examined and the cause investigated with a system in place for recalling any batch of food that has defects. Appropriate measures are taken to prevent any future recurrence

All other valid points will be given credit

[20]

AVAILABLE
MARKS

20

4 Evaluate the use of the following additives in food:

- preservatives
- flavour enhancers. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of preservatives and flavour enhancers
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to evaluate the use of preservatives and flavour enhancers in food
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of preservatives and flavour enhancers
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to evaluate the use of preservatives and flavour enhancers in food
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of preservatives and flavour enhancers
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to evaluate the use of preservatives and flavour enhancers in food
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of preservatives and flavour enhancers
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to evaluate the use of preservatives and flavour enhancers in food
- quality of written communication is highly competent

Examples of suitable points to be evaluated by the candidate:**Preservatives**

- food safety and quality; preservatives help to control and prevent the deterioration of food providing protection from micro-organisms, life-threatening botulism and other organisms that can cause food poisoning. They also prevent spoiling reactions which alter a food's taste or appearance. Without the addition of a preservative, certain foods may turn rancid or change colour such as raw meat going brown

- food waste; preservatives extend shelf-life and ultimately reduce food waste. This also adds to consumer convenience and variety of food that can be consumed throughout the year, increasing supply keeps prices affordable. There are the additional environmental and ethical benefits to reducing food waste
- hyperactivity; studies have linked sodium benzoate to hyperactive behaviour in children. Combining certain artificial colours with the preservative are associated with hyperactivity in some children. In addition researchers have shown sodium benzoate lowers children's I.Q.
- cancer; when mixed with the additive vitamin C in soft drinks sodium benzoate creates benzene, a carcinogenic substance. There are concerns surrounding sodium nitrate used as a preservative in processed meat and smoked foods as there is evidence linking it to cancer
- neurodegenerative diseases; sodium benzoate can cause severe damage to DNA in the mitochondria, cells start to malfunction leading to ageing and a range of neurodegenerative diseases such as Parkinson's
- allergy and asthma; sulphites and benzoic acid can cause allergy-like symptoms in people with allergic rhinitis such as wheezing and a tight chest. Some asthmatics have suffered an attack after drinking acidic drinks containing sulphites. Severe reactions to sulphites (anaphylaxis) have been reported and people with urticaria (skin rash) can also experience worsening of symptoms

Flavour Enhancers

- improve appetite; monosodium glutamate (MSG) heightens the umami flavour of food without adding any flavour of its own. Individuals with a poor appetite, especially among older people, can use flavour enhancers to increase their food intake and body weight. Sodium containing flavour enhancers when used in moderation have negligible impact on blood pressure
- salt reduction; including MSG in food may help reduce excessive salt intake, which can contribute to cardiovascular disease because umami substances can lower the desire to salt foods. Replacing some salt with MSG can reduce sodium intake without sacrificing flavour in processed foods
- sensitivity; some individuals find that consuming MSG can trigger side effects including headaches, sweating, rapid heartbeat, nausea and fatigue. Researchers acknowledge that a small percentage of people may have short-term reactions to MSG
- obesity; MSG has been associated with an increased risk of metabolic disorders, primarily due to insulin resistance and high blood sugar levels. MSG may also disrupt the signalling effect of the hormone leptin which tells the body when enough food has been eaten. MSG has also been linked to overeating as it makes food taste highly palatable
- brain health; glutamate plays many important roles in brain function acting as a neurotransmitter. Some studies claim that MSG can cause excessive glutamate levels in the brain to overstimulate nerve cells

All other valid points will be given credit

[20]

20

- 5 Discuss how the Food Standards Agency (FSA) ensures food is safe for consumers with a food allergy or intolerance. (AO1, AO2, AO3)

Mark Band ([0]–[5])

Overall impression: basic

- inadequate knowledge and understanding of how the FSA ensures food is safe
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss how the FSA ensures food is safe for consumers with a food allergy or intolerance
- quality of written communication is basic

Mark Band ([6]–[10])

Overall impression: adequate

- adequate knowledge and understanding of how the FSA ensures food is safe
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss how the FSA ensures food is safe for consumers with a food allergy or intolerance
- quality of written communication is adequate

Mark Band ([11]–[15])

Overall impression: competent

- competent knowledge and understanding of how the FSA ensures food is safe
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss how the FSA ensures food is safe for consumers with a food allergy or intolerance
- quality of written communication is competent

Mark Band ([16]–[20])

Overall impression: highly competent

- highly competent knowledge and understanding of how the FSA ensures food is safe
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss how the FSA ensures food is safe for consumers with a food allergy or intolerance
- quality of written communication is highly competent

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

- legislation; the Food Standards Agency (FSA) implement legislation to improve statutory controls on the labelling of food allergens. They work with all sections of the food industry to develop new legislation as well as guidance and compliance with current legislation
- allergy research; FSA conduct research on food allergies to develop and improve allergen management standards. This research helps inform policy decisions and enhance consumer protection
- campaigns; FSA run campaigns to raise awareness and improve safety for individuals with food allergies. The Speak up for Allergies campaign encourages young people to inform food businesses about their allergies

