



*Rewarding Learning*

**General Certificate of Education  
2024**

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**Nutrition and Food Science**

**Assessment Unit A2 1**

*assessing*

OPTION A: Food Security and Sustainability

OPTION B: Food Safety and Quality

**[ANF11]**

**TUESDAY 11 JUNE, AFTERNOON**

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**MARK  
SCHEME**

## **General Marking Instructions**

### ***Introduction***

The main purpose of the mark scheme is to ensure that examinations are marked accurately, consistently and fairly. The mark scheme provides examiners with an indication of the nature and range of candidates' responses likely to be worthy of credit. It also sets out the criteria which they should apply in allocating marks to candidates' responses.

### ***Assessment objectives***

Below are the assessment objectives for Nutrition and Food Science.

Candidates should be able to demonstrate:

- AO1** knowledge and understanding of the specified content
- AO2** the ability to apply knowledge, understanding and skills in a variety of situations and to analyse problems, issues and situations using appropriate skills
- AO3** the ability to gather, organise and select information, evaluate acquired knowledge and understanding, and present and justify an argument

### ***Quality of candidates' responses***

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity that may reasonably be expected of a 17 or 18-year-old, the age at which the majority of candidates sit their GCE examinations.

### ***Flexibility in marking***

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

### ***Positive marking***

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17 or 18-year-old GCE candidate.

### ***Awarding zero marks***

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

### ***Types of mark schemes***

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

### **Levels of response**

In deciding which level of response to award, examiners should look for the 'best fit' bearing in mind that weakness in one area may be compensated for by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement.

The following guidance is provided to assist examiners.

- **Threshold performance:** Response which just merits inclusion in the level and should be awarded a mark at or near the bottom of the range.
- **Intermediate performance:** Response which clearly merits inclusion in the level and should be awarded a mark at or near the middle of the range.
- **High performance:** Response which fully satisfies the level description and should be awarded a mark at or near the top of the range.

### **Quality of written communication**

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response as follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is adequate.

Level 3: Quality of written communication is competent.

Level 4: Quality of written communication is highly competent.

In interpreting these level descriptions, examiners should refer to the more detailed guidance provided below:

**Level 1 (Basic):** The candidate makes only a limited attempt to select and use an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that the intended meaning is not clear.

**Level 2 (Adequate):** The candidate makes a reasonable attempt to select and use an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

**Level 3 (Competent):** The candidate makes a good attempt to select and use an appropriate form and style of writing. Relevant material is organised with a good degree of clarity and coherence. There is widespread use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

**Level 4 (Highly competent):** The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is succinct, well organised and displays a high degree of clarity and coherence. There is extensive and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of the highest standard and ensure that meaning is absolutely clear.

Section A

- 1 (a) Describe how the Courtauld Commitment 2030 is helping the UK food and drink sector to reduce food waste. (AO1, AO2, AO3)

**Mark Band ([0]–[2])**

Overall impression: basic

- inadequate knowledge and understanding of the Courtauld Commitment 2030
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to describe how the Courtauld Commitment 2030 is helping the UK food and drink sector to reduce food waste
- quality of written communication is basic

**Mark Band ([3]–[5])**

Overall impression: adequate

- adequate knowledge and understanding of the Courtauld Commitment 2030
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to describe how the Courtauld Commitment 2030 is helping the UK food and drink sector to reduce food waste
- quality of written communication is adequate

**Mark Band ([6]–[8])**

Overall impression: competent

- competent knowledge and understanding of the Courtauld Commitment 2030
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to describe how the Courtauld Commitment 2030 is helping the UK food and drink sector to reduce food waste
- quality of written communication is competent

**Mark Band ([9]–[10])**

Overall impression: highly competent

- highly competent knowledge and understanding of the Courtauld Commitment 2030
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to describe how the Courtauld Commitment 2030 is helping the UK food and drink sector to reduce food waste
- quality of written communication is highly competent

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

- collaborative action; the Courtauld Commitment is a voluntary agreement that enables collaborative action across the UK food chain to help the sector take action on food waste. It brings organisations

- together to deliver changes which they could not realise individually
  - targets; the targets set are aligned with Sustainable Development Goals thus helping the sector and the UK achieve net zero by 2040
  - Courtauld Associates; businesses can join the Courtauld Commitment as an Associate to demonstrate that they are taking action to reduce food waste. They will have access to the Food Waste Roadmap and Toolkit. They are supported to reduce their operational food waste and receive guidance from WRAP to help them 'Target, Measure and Act' on food waste
  - activities; Courtauld Commitment activities delivered by WRAP such as Food Waste Action Week provide opportunities for businesses in the food and drink sector to share advice and raise awareness of the connection between wasted food and climate change
  - resources; resources provided by WRAP support partners in wasting less food. For example Guardians of Grub: Becoming a Champion. This is an e-learning course for businesses and professionals working in the sector to access training modules to reduce food waste
  - surplus food redistribution; the Courtauld Commitment Redistribution Working Group has been instrumental in increasing the amount of food redistributed across the UK
- All other valid points will be given credit. [10]

- (b) Suggest possible reasons for food waste in UK households. (AO1, AO2, AO3)

**Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of food waste in UK households
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to suggest possible reasons for food waste in UK households
- quality of written communication is basic

**Mark Band ([4]–[7])**

Overall impression: adequate

- adequate knowledge and understanding of food waste in UK households
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to suggest possible reasons for food waste in UK households
- quality of written communication is adequate

**Mark Band ([8]–[11])**

Overall impression: competent

- competent knowledge and understanding of food waste in UK households
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to suggest possible reasons for food waste in UK households
- quality of written communication is competent

**Mark Band ([12]–[15])**

Overall impression: highly competent

- highly competent knowledge and understanding of food waste in UK households
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to suggest possible reasons for food waste in UK households
- quality of written communication is highly competent

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

- barriers to behaviour change; consumers underestimate how much food they throw away and how much they are contributing to the problem which impacts on their motivation to change
- temperature; food stored at a temperature that is too low or too high is subjected to degradation in quality faster than normal. According to WRAP the average UK fridge temperature is set at least 2 degrees too warm. Milk and other food items kept in the fridge perish quickly when not stored at the right temperature (0–5°C)
- storage; consumers may be unaware of correct storage practice, e.g. putting newly bought food at the back of the shelf to ensure older food is used first, labelling food with the date when the package has been opened or understanding which foods can be frozen
- poor planning; results in buying food already in the fridge or cupboard. This encourages the consumer to buy more than they need
- poor management of food; practices such as not checking use-by and sell-by dates and allowing food to spoil because it was not used on time lead to food waste
- preparing too much food; consumers tend to over-estimate portion sizes and cook too much food which is often wasted rather than used as part of another meal
- food labelling; ‘best before’ and ‘use by’ labels are still misinterpreted despite labelling guidance campaigns
- lack of support from supermarkets; supermarkets are still selling commonly wasted foods such as bread and potatoes in large packs – consumers need support to make changes at home as habits are hard to change

All other valid points will be given credit.

[15]

**AVAILABLE  
MARKS**

25

**Section A**

**25**

2 Discuss each of the following as a potential threat to achieving food security:

- world population growth
- intensive farming methods. (AO1, AO2, AO3)

**Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of world population growth and intensive farming methods
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss world population growth and intensive farming methods as potential threats to achieving food security
- quality of written communication is basic

**Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of world population growth and intensive farming methods
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss world population growth and intensive farming methods as potential threats to achieving food security
- quality of written communication is adequate

**Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of world population growth and intensive farming methods
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss world population growth and intensive farming methods as potential threats to achieving food security
- quality of written communication is competent

**Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of world population growth and intensive farming methods
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss world population growth and intensive farming methods as potential threats to achieving food security
- quality of written communication is highly competent

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

**World Population Growth**

- rapid growth; rapid growth of the world’s population is a threat to the future of food production because it puts the food system under intense pressure
- increasing wealth; the expanding global population is getting wealthier, richer people tend to eat more and demand food that is resource intensive to

- produce, particularly meat and dairy
- water; the demand for water increases as the population grows. According to the FAO, the main factor limiting global food production is water
- infrastructure; as the population grows so too does the need for housing and infrastructure leaving less land available for agriculture. Increasing demand for food can mean expansion of cropland which often involves destruction of vital forest resources and intensive farming methods which degrade the soil
- over reliance on one food industry; population growth is likely to cause over reliance on one food industry. For example, population pressures in coastal areas are affecting food security in countries, where there is a high dependence on fisheries for protein, such as the Philippines
- longer life spans; puts extreme pressure on existing food production systems. This could lead to a decrease in food quality if producers take shortcuts to meet this demand

### **Intensive Farming Methods**

- soil health; intensive farming is a threat to the future of food production because it damages the health of the soil. This is significant because the health of the soil affects the quality and quantity of the crops grown
- monocropping; monocropping is the practice of growing the same crop on the same land year after year. It maximises production by allowing the farmer to focus on high-yielding crops that prosper in their conditions. However, over time, this practice depletes the soil of nutrients making the soil less productive. It reduces organic matter in the soil and can cause significant erosion. Eventually the soil will not be suitable for agricultural use
- soil fertility; monocropping reduces the fertility of soil making it necessary for the farmer to use synthetic fertilisers to boost plant productivity. Some of these synthetic fertilisers can reduce the pH of the soil which changes the availability of soil nutrients. Excessive fertiliser use can kill beneficial microorganisms in the soil that convert dead human and plant remains into nutrient-rich organic matter thus reducing the fertility of the soil
- compacted soil; intensive farming methods involve mechanical tillage and the use of heavy farm equipment. These cause the soil to become compacted. Compacted soil does not absorb water well and reduces soil aeration. Both of these effects lead to stunted growth in crops and smaller yields
- overstocking of livestock; this means that all the vegetation is eaten, even the new shoots. This leaves the soil exposed to harsh weather such as heavy rainfall which will wash the nutritious topsoil away. Overgrazing is a primary contributor to desertification because it converts arable or pasture land into unproductive land. The resultant soil is thus not suited for growing food since it loses its essential nutrients. The loss of land productivity directly results in the loss of food available for consumption
- deforestation and soil erosion; the clearing of forest areas to create room for agriculture has led to massive deforestation and soil erosion. Once plant cover is gone there are no roots to hold the soil in place during heavy tropical rains, which then wash away the topsoil and the nutrients necessary to regenerate future vegetation

All other valid points will be given credit.

[20]

20

- 3 Explain how local food systems contribute positively to the environment and the local economy. (AO1, AO2, AO3)

AVAILABLE  
MARKS

**Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of local food systems
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how local food systems contribute positively to the environment and the local economy
- quality of written communication is basic

**Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of local food systems
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how local food systems contribute positively to the environment and the local economy
- quality of written communication is adequate

**Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of local food systems
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how local food systems contribute positively to the environment and the local economy
- quality of written communication is competent

**Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of local food systems
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how local food systems contribute positively to the environment and the local economy
- quality of written communication is highly competent

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

**Environment**

- motivation; producers engaged in and customers of local food systems are often motivated to generate environmental benefits for example most vegetable box schemes are organic. Organic farming supports more biodiversity than conventional systems
- diversity of production systems; local food systems reward and encourage a diversity of production systems, meaning there is less pressure on the farmer to specialise for survival. Diverse farming systems can sustain a range of habitats for insects and small animals
- lower food miles and storage emissions; refrigerated transport, storage in regional distribution centres and refrigeration in stores means large-scale retailers add significantly to climate emissions. Food businesses that offer produce direct from the farm or with minimal storage reduce these emissions
- avoiding air-freighted food; air-freighted food produce comes with a large

carbon footprint

- reducing food waste; food waste is an enormous source of greenhouse gas emissions. Buying through shorter supply chains could help reduce waste in the food system. Less food is lost in short chains where there is a higher acceptance for less than perfect crops

**Local Economy**

- shorter supply chains; local food systems have shorter supply chains. A larger proportion of revenues are retained in the local community so there is greater local value added
- direct selling; farm shops and farmers' markets provide a valuable opportunity for farm businesses to diversify and to add value to their production. Direct selling through such outlets provide a direct link to customers and the opportunity for feedback
- increased spending in the local area; local retailers and producers are more likely to source goods and services locally resulting in increased spending in the local area
- employment; local food systems often support higher levels of employment relative to sales than national chains
- tourism; local food and drink can benefit the tourism sector economically by increasing the attractiveness of the area and attracting additional visitors

All other valid points will be given credit.

[20]

**AVAILABLE  
MARKS**

20

4 Discuss the causes and impact of food poverty in the UK. (AO1, AO2, AO3)

AVAILABLE  
MARKS

**Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of food poverty in the UK
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the causes and impact of food poverty in the UK
- quality of written communication is basic

**Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of food poverty in the UK
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss the causes and impact of food poverty in the UK
- quality of written communication is adequate

**Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of food poverty in the UK
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss the causes and impact of 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 food poverty in the UK
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the causes and impact of food poverty in the UK
- quality of written communication is highly competent

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

**Causes**

- income; food poverty is a symptom of low income or unreliable income. Households may not be able to afford the cost of enough good quality food or the associated transport or delivery costs. Others do not live in a home with facilities for cooking or storing meals
- social security system; not having enough income from the social security net is a significant factor for food poverty. The key features of the social security system negatively affecting people include: having to wait five weeks for the first Universal Credit (UC) payment, very low rate of UC standard allowance. Deductions from UC to repay UC advances and other debts, low Local Housing Allowance rates and caps, 'bedroom tax' and the structure and process of the Personal Independence Payment assessment
- low food budget; food budgets are relatively elastic compared to other essential living costs so often cuts are made to a food budget that cannot be made to rent or fuel payments

- ill-health and adverse life experiences; experiences such as household separation or eviction worsen people’s financial situation through creating extra expenses or through reducing their ability to access the benefit system
- lack of support; people lacking support from family or friends cannot be helped during a period of insufficient income
- food deserts; are serviced by smaller convenience stores which are more expensive and less likely to stock fresh, healthy food supplies. Food deserts force people who cannot afford private transport to go without healthy food choices

**Impact**

- higher risk of diet related illness and disease; food poverty reduces the ability to meet dietary guidelines and healthy eating advice. Cheap diets are often low in fruits, vegetables, wholegrains and low-fat dairy and high in free sugars, salt and fat. A nutritionally inadequate diet can increase the risk of a range of diseases and disorders such as dental caries, anaemia, Type 2 diabetes, cardiovascular disease (CVD), some types of cancer and osteoporosis
- obesity; lack of access to healthy and affordable foods along with cycles of food deprivation and overeating leave those in food poverty vulnerable to obesity
- chronic illness; food poverty status is strongly predictive of chronic illness such as arthritis, chronic obstructive pulmonary disease (COPD) and kidney disease
- skipping meals; parents on low incomes may skip meals so their children can eat. Children who are unable to access free school meals during the holidays may miss meals with good nutritional content
- health, development and well-being of children; food poverty is especially detrimental to the health, development and well-being of children in the short and long term. They are likely to be sick more often and recover from illness more slowly. Lack of adequate healthy food can impair a child’s ability to concentrate and perform well in school and is linked to higher levels of behavioral and emotional problems. Inadequate dietary intake during pregnancy and early childhood can increase the risk of birth defects, anaemia, low birth weight and developmental risk

All other valid points will be given credit.

[20]

20

AVAILABLE  
MARKS

5 Explain why foods with the following labels provide sustainable options for the consumer:

- Red Tractor
- Marine Stewardship Council (MSC). (AO1, AO2, AO3)

### **Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of Red Tractor and MSC
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain why foods with the Red Tractor and MSC labels provide sustainable options for the consumer
- quality of written communication is basic

### **Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of Red Tractor and MSC
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain why foods with the Red Tractor and MSC labels provide sustainable options for the consumer
- quality of written communication is adequate

### **Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of Red Tractor and MSC
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain why foods with the Red Tractor and MSC labels provide sustainable options for the consumer
- quality of written communication is competent

### **Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of Red Tractor and MSC
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain why foods with the Red Tractor and MSC labels provide sustainable options for the consumer
- quality of written communication is highly competent

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

#### **Red Tractor Logo**

- a sustainable option is to choose food that has been produced with respect for the environment, provides appropriate conditions for animals and takes into account consumer health and safety. Looking for the Red Tractor logo provides the consumer with information and assurance about the quality of their food
- the Red Tractor logo can only be used on food that has been produced, transported, stored and packed to robust standards. Red Tractor promotes sustainable, low-intensity systems such as organic and pasture-fed regimes where the number of animals raised in one area is limited, few or no chemicals are used on the land and animals are not routinely dosed with

antibiotics. These practices are less harmful to the climate than intensive farming methods

- Red Tractor standards require certified farms to have a number of systems in place to manage their impact on the environment including the appropriate management of manure, fertiliser or agrochemicals to prevent contamination and pollution
- Red Tractor farms must adopt practices to minimise the impact of the farm on biodiversity and conservation value on or around the farm. Growers must maintain soil health and only use appropriate, safe and suitable fertilisers. Excessive use of water is not permitted
- consumers are assured that farming methods are sustainable in relation to animal welfare for example the standards ensure that livestock and birds receive a full healthy diet and are housed in a safe and secure environment with appropriate temperatures, ventilation and bedding. Red Tractor does not permit the use of hormones or antibiotics to promote growth

**Marine Stewardship Council (MSC) label**

- MSC label is found on retail products and in restaurants identifying fish and seafood that has been wild-caught in a sustainable way and is fully traceable
- MSC label is only awarded to well-managed fisheries that meet their independently verified standards necessary to maintain the structure, productivity, future and diversity of the marine ecosystem
- the MSC label informs the consumer that rigorous fishing standards have been met to ensure fish stocks are sustainable, i.e. there are enough fish left in the sea to reproduce, thus maintaining a supply of seafood for future generations
- MSC promote sustainable methods to avoid overfishing and to safeguard the marine ecosystem. This protects the jobs of people who depend on fishing for their livelihood

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 benefits of Good Manufacturing Practice (GMP) for a food business.

**Mark Band ([0]–[2])**

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 outline the benefits of GMP for a food business
- quality of written communication is basic

**Mark Band ([3]–[5])**

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 outline the benefits of GMP for a food business
- quality of written communication is adequate

**Mark Band ([6]–[8])**

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 outline the benefits of GMP for a food business
- quality of written communication is competent

**Mark Band ([9]–[10])**

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 outline the benefits of GMP for a food business
- quality of written communication is highly competent

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

- quality assurance; GMP ensures that food is consistently produced and controlled to high specifications, going beyond the requirements set by legislation, therefore the manufacturer will have very high standards of food safety
- efficient manufacturing process; GMP covers every aspect of the food manufacturing process to guard against potential food safety risks that can prove detrimental to the products being produced. Cross-contamination, mislabelling, and adulteration are just a few of the things GMP aims to prevent

- competent staff; GMP stipulates that food handlers must be adequately trained to carry out and document procedures. Instructions are written in clear and unambiguous language meaning there is less risk of breaches in food safety
- equipment; process equipment must have hygienic design as a priority to meet the specific needs of the end user and comply with GMP requirements. Documentation also has to be provided to give evidence of competence and identify materials used in construction resulting in high standards of food safety and quality
- reducing complaints and rejections; GMP stipulates that complaints must be examined to prevent reoccurrence
- traceability; records must be kept to enable a batch to be easily traced should a food safety issue arise, resulting in fewer breaches

All other valid points will be given credit.

[10]

- (b) Describe the measures in place to ensure veterinary medicines do not pose a risk to food safety.

### **Mark Band ([0]–[3])**

Overall impression: basic

- inadequate knowledge and understanding of the measures to ensure veterinary medicines do not pose a risk to food safety
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to describe the measures to ensure veterinary medicines do not pose a risk to food safety
- quality of written communication is basic

### **Mark Band ([4]–[7])**

Overall impression: adequate

- adequate knowledge and understanding of the measures to ensure veterinary medicines do not pose a risk to food safety
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to describe the measures to ensure veterinary medicines do not pose a risk to food safety
- quality of written communication is adequate

### **Mark Band ([8]–[11])**

Overall impression: competent

- competent knowledge and understanding of the measures to ensure veterinary medicines do not pose a risk to food safety
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to describe the measures to ensure veterinary medicines do not pose a risk to food safety
- quality of written communication is competent

### **Mark Band ([12]–[15])**

Overall impression: highly competent

- highly competent knowledge and understanding of the measures to ensure veterinary medicines do not pose a risk to food safety
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question

- demonstrates a highly competent ability to describe the measures to ensure veterinary medicines do not pose a risk to food safety
- quality of written communication is highly competent

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

- assessment and approval; every veterinary medicine must be approved before it can be sold or used on animals in the UK. Veterinary medicines are assessed by the Veterinary Medicines Directorate. Assessment occurs before the veterinary medicine intended for food producing animals is authorised for use
- setting limits; an agreed Maximum Residue Limit (MRL) is calculated for every veterinary medicine. MRL is the maximum concentration of a residue that is legally permitted in a food. No Observed Adverse Effect Level is the highest dose that does not cause adverse effects. This figure is then divided by a safety factor (100) to determine the Acceptable Daily Intake (ADI). The ADI is the amount of the residue that is considered safe for an individual to eat every day for their lifetime. This must be calculated before an MRL can be established
- monitoring and regulation of veterinary medicine residuals; once on the market veterinary medicines continue to be highly regulated with legislation in place to govern their use
- record keeping; it is a legal requirement to record all veterinary medicines used in food producing animals. On the farm this is achieved by an animal medicines record book and records must be stored for a minimum of 5 years for traceability
- surveillance programme; foods are checked regularly as part of the government's surveillance programme (National Residues Control Plan) to ensure that any residue present is at a safe level. If food is found to have residues over the legal limit they are not allowed to be sold. If the food has already been distributed they are removed from the food chain
- shared responsibility; ensuring food from animals does not contain residues above the statutory limit is shared by all those involved in the animal medicine sector. Vets and primary producers have a role to play in minimising the potential health risk to food safety and safeguarding food
- withdrawal period; a legally defined amount of time must pass before treated animals can be slaughtered for their meat or their products can be collected, e.g. milk or eggs. This period of time is called the withdrawal period. This adds a safety measure and ensures that animals recently treated with veterinary medicines do not enter the food chain

All other valid points will be given credit.

[15]

**AVAILABLE  
MARKS**

25

**Section A**

**25**

2 Discuss each of the following as potential sources of food-borne illness:

- red meat
- fruit and vegetables.

**Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of red meat and fruit and vegetables as potential sources of food-borne illness
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss the two foods listed as sources of food-borne illness
- quality of written communication is basic

**Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of red meat and fruit and vegetables as potential sources of food-borne illness
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss the two foods listed as sources of food-borne illness
- quality of written communication is adequate

**Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of red meat and fruit and vegetables as potential sources of food-borne illness
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss the two foods listed as sources of food-borne illness
- quality of written communication is competent

**Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of red meat and fruit and vegetables as potential sources of food-borne illness
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss the two foods listed as sources of food-borne illness
- quality of written communication is highly competent

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

**Red Meat**

- food safety risk; animals carry bacteria such as salmonella and E. coli on their hides and in their intestines. The transfer of bacteria can occur during the slaughtering process – faecal matter on the hide can come into contact

with the flesh. During evisceration bacteria from the gut can contaminate the raw meat. If meat is minced any harmful bacteria from the surface spreads throughout the food. This applies to all minced meat, even good quality meat. Listeria occurs in meat products such as pates and salami

- purchase; there is no way of knowing which animals are carrying harmful bacteria in their gut. Not using a reputable supplier or not selecting Northern Ireland Farm Quality Assured red meat may increase the risk of microbial contamination
- cooking; meat needs to be cooked so the inside is pink rather than red, juices are clear and temperatures above 75°C are reached or the risk of illness increases. An exception to this rule applies to whole cuts of meat which can be eaten whilst still red inside, the outside will have been sealed at a high temperature killing any bacteria on the surface

**Fruit and Vegetables**

- food safety risk; fruit and vegetables can be contaminated with E. coli, salmonella and listeria via water, soil, manure or droppings from birds and animals. Root crops and leafy vegetables sold loose are likely to have the soil on the outside, a common source of E. coli. Pre-packed salads are a frequent cause of food poisoning as they can harbour microbes if they have not been processed in a sanitary environment. Food-borne illness has been associated with raw and lightly cooked sprouts, and melons have been the source of salmonella poisoning. Fresh-squeezed juices can harbour bacteria unless the juice has been pasteurised
- purchase; if a disreputable supplier is used produce may be bruised, damaged or badly soiled which can increase the risk of food contamination. Many fruit and vegetables are sold loose without a date mark which makes it difficult to gauge freshness. Bagged salad leaves can easily contain mushy and damaged leaves that are difficult to see unless inspected closely and have the potential to be contaminated with E. coli
- preparation; consumers may be unaware of the precautions necessary for fruits and vegetables as they are not considered high risk. However, they may require adequate washing or processing to remove soil which may contain E. coli. The Food Standards Agency advise that sprouts should be cooked thoroughly until steaming hot throughout
- storage; soiled vegetables can cause cross-contamination if they are not kept away from other produce

All other valid points will be given credit.

[20]

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- 3 The World Health Organization message “Safe food today for a healthy tomorrow”, stresses that safe food is important globally for people and the economy.

*Source: who.int 2021*

Consider the importance of safe food as highlighted in the statement above.

### **Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of the importance of safe food
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to consider the importance of safe food for people and the economy
- quality of written communication is basic

### **Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of the importance of safe food
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to consider the importance of safe food for people and the economy
- quality of written communication is adequate

### **Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of the importance of safe food
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to consider the importance of safe food for people and the economy
- quality of written communication is competent

### **Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of the importance of safe food
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to consider the importance of safe food for people and the economy
- quality of written communication is highly competent

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

- human health and wellbeing; safe food is essential for human welfare. The World Health Organization (WHO) estimate that more than 600 million people fall ill every year from eating contaminated food. However, these numbers represent only ‘the tip of the iceberg’ as comprehensive surveillance data is not available everywhere. When food is not safe humans cannot function effectively
- food security; without food safety there is no food security. Only when food is safe will it meet dietary needs and help ensure that everyone can live a productive and healthy life. Where food supplies are insecure, people tend to

- consume more unsafe foods which pose health risks
- child development; children under the age of 5 are at a higher risk of malnutrition and mortality due to unsafe food. 1 in 6 deaths is attributed to diarrhoea, a major killer in this age group. Those who survive may suffer from delayed physical and mental development, depriving them of the opportunity to reach their full potential
  - vulnerable groups; food-borne pathogens take advantage of weak immune systems. Infants and young children, pregnant women, the elderly as well as those who are immuno-compromised, are particularly at risk of morbidity and mortality associated with food-borne illness
  - developing countries; food safety concerns are global. However, food-borne diseases are concentrated in the developing world. Unsafe water is frequently used for the cleaning and processing of food. Poor food production processes and food handling (including inappropriate use of agricultural chemicals) and inadequate or poorly enforced regulatory standards all contribute to a high risk environment
  - antimicrobial resistance; the high volume of antibiotics in food producing animals contributes to the development of antimicrobial resistant bacteria, particularly in settings of intensive animal production. Antimicrobial resistant infections in humans can cause longer illnesses, increased frequency of hospitalisation and mortality
  - sustainability; good hygiene practices along the supply chain improve sustainability, minimises environmental damage and the amount of food that has to be discarded. Unsafe or contaminated food leads to food loss and waste
  - consumer demand; as the world's population grows, the intensification and industrialisation of food production to meet increasing demand for food creates challenges for food safety.
  - complex food chain; there are many opportunities for food contamination to take place due to the multifaceted supply system. Globalisation of food production is making the food chain even longer which further adds to the problem
  - economy; safe food production improves economic opportunities by enabling market access and productivity. Unsafe or contaminated food leads to trade rejections. It undermines food exports, tourism, livelihoods of food handlers and economic growth, both in developed and developing countries
  - poverty; for many living at or below the poverty line, food-borne illness perpetuates the cycle of poverty. Food-borne pathogens can cause debilitating infections including meningitis, acute poisoning or long-term diseases. As a consequence, the sufferer may be unable to work and provide for their family

All other valid points will be given credit.

[20]

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AVAILABLE  
MARKS

4 Discuss what is being done to minimise the risk to public health of the following chemical contaminants in food:

- acrylamide
- bisphenol-A (BPA).

#### **Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of minimising risk from chemical contaminants
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to discuss what is being done to minimise the risk to public health from acrylamide and BPA
- quality of written communication is basic

#### **Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of minimising risk from chemical contaminants
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to discuss what is being done to minimise the risk to public health from acrylamide and BPA
- quality of written communication is adequate

#### **Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of minimising risk from chemical contaminants
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to discuss what is being done to minimise the risk to public health from acrylamide and BPA
- quality of written communication is competent

#### **Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of minimising risk from chemical contaminants
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to discuss what is being done to minimise the risk to public health from acrylamide and BPA
- quality of written communication is highly competent

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

##### **Acrylamide**

- primary producers; levels of acrylamide can be reduced through the adaptation of farming techniques. Increasing sulphur and decreasing nitrogen levels in soil can lower the amount of acrylamide in some food crops. Selecting to grow varieties of potatoes low in sugars and the amino acid asparagine will reduce the concentration of acrylamide
- food industry guidance; legislation requires food business operators to

manage acrylamide within their food safety management systems. Work has been undertaken which includes developing guidance on ways to limit acrylamide formation. FoodDrinkEurope has produced a working document that outlines ways of reducing acrylamide in food production

- manufacturer innovation; production changes such as lower cooking temperatures, shorter processing times and recipe modifications can help lower acrylamide levels. Examples to reduce acrylamide include replacing ammonium bicarbonate with other raising agents in baked products and using potato dough for fried products instead of fresh potato
- Food Standards Agency (FSA) role; to understand more about acrylamide and reduce the risk FSA support food manufacturers' initiatives, conduct annual monitoring data for acrylamide in food and work with industry to help manufacturers comply with legislation
- regulations; currently no limits have been set for acrylamide in food. However, food businesses have a legal obligation to minimise levels of acrylamide in their products as low as is reasonably achievable and to monitor their performance using benchmark levels as a reference
- consumer advice; the FSA have issued a range of advice to reduce acrylamide via the "Go for the Gold" campaign. Consumers should aim for a golden yellow colour when cooking starchy food and follow the cooking instructions for foods like chips and roast potatoes.

### **Bisphenol-A (BPA)**

- regulations; packaging that comes into contact with food must follow strict rules. BPA may be used in food contact materials, so long as no more than 0.05 milligrams per kilogram migrates into the food. Specific rules forbid migration of BPA from coatings intended to be in contact with infant formula. Efforts have been made to reduce exposure to BPA for vulnerable population groups such as infants, children and pregnant women. There have been directives prohibiting the use of BPA for the manufacture of polycarbonate infant feeding bottles
- limits; following a risk assessment study on BPA the safety levels were reduced due to refinement of assessment methods rather than health concerns. Tolerable daily intake (TDI) is an estimate of how much people can consume daily over their lifetime without being harmed by it, BPA has a temporary TDI set for it. Consumers currently consume less than the TDI for BPA
- research; extensive safety research has been conducted providing a large database of toxicological and exposure data to establish the safe limits to which industry must adhere. The FSA conclude that BPA currently poses no risk to health and is safe for use in production of plastics, however, continues to consider any new evidence in relation to BPA
- minimising consumer exposure; consumers should – avoid putting plastic containers in the microwave or dishwasher as the heat may break them down over time and allow BPA to leach into foods; use alternatives such as glass or stainless steel containers for hot foods and liquids; use refillable coffee cups instead of disposable cups with plastic lining; replace plastic wrap with BPA with cellophane; buy food in loose packaging, or in glass jars; never reuse plastic drink bottles
- manufacturers; manufacturers have been removing BPA from their products and replacing it with bisphenol S (BPS) and bisphenol F (BPF) which are manufactured chemicals used to line aluminum cans

All other valid points will be given credit.

[20]

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- 5 Explain how Environmental Health Practitioners ensure food safety for consumers eating outside the home.

**Mark Band ([0]–[5])**

Overall impression: basic

- inadequate knowledge and understanding of the work Environmental Health Practitioners conduct to ensure food safety
- demonstrates a limited ability to apply appropriate knowledge and understanding to the question
- demonstrates a limited ability to explain how Environmental Health Practitioners ensure food safety for consumers when eating outside the home
- quality of written communication is basic

**Mark Band ([6]–[10])**

Overall impression: adequate

- adequate knowledge and understanding of the work Environmental Health Practitioners conduct to ensure food safety
- demonstrates an adequate ability to apply appropriate knowledge and understanding to the question
- demonstrates an adequate ability to explain how Environmental Health Practitioners ensure food safety for consumers when eating outside the home
- quality of written communication is adequate

**Mark Band ([11]–[15])**

Overall impression: competent

- competent knowledge and understanding of the work Environmental Health Practitioners conduct to ensure food safety
- demonstrates a competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a competent ability to explain how Environmental Health Practitioners ensure food safety for consumers when eating outside the home
- quality of written communication is competent

**Mark Band ([16]–[20])**

Overall impression: highly competent

- highly competent knowledge and understanding of the work Environmental Health Practitioners conduct to ensure food safety
- demonstrates a highly competent ability to apply appropriate knowledge and understanding to the question
- demonstrates a highly competent ability to explain how Environmental Health Practitioners ensure food safety for consumers when eating outside the home
- quality of written communication is highly competent

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

- food registration; any premise used for a food business is required by law to be registered. This provides Environmental Health Practitioners (EHPs) with information about the food premises in their area so they can target enforcement resources effectively. Those premises which represent a high risk to health are frequently inspected to ensure food safety
- sampling; EHPs carry out routine sampling of food. Samples are tested to

- check that the ingredients match the label, they do not contain any non-permitted additives or pathogenic bacteria. If a product is found not to comply with standards it will be removed from sale
- inspections; the EHP inspect places where food is handled, such as food stalls, public houses and restaurants, to ensure that food safety and food hygiene regulations are being adhered to. They inspect the hygiene conditions in these outlets and audit their food safety practices. Inspections may be routine or as a result of a complaint
  - complaints; the EHP investigates complaints about unsatisfactory food, for example, a dirty eating establishment or allegations of food poisoning. They will also investigate complaints about labelling and ensure labels do not mislead consumers which could lead to food safety issues
  - education and advice; minor contraventions will result in the EHP advising on how best to rectify the situation. Rather than enforce the law, EHPs prefer food handlers to be made aware of their responsibilities with regard to food safety. EHPs run courses on food safety and organise specialised lectures for personnel working in the food industry to help raise food hygiene standards
  - enforcement; formal action is reserved for serious cases of poor food hygiene, the EHP will arrange for legal proceedings to be taken which may be an improvement notice, penalty notice or prosecution in court. If there is an imminent health risk, inspectors can serve an Emergency Prohibition Notice that prevents the use of the premises or equipment. They can also formally exclude someone from working in a food business if they have a food-borne illness or infectious disease
  - water; EHPs carry out monitoring of drinking water in food premises, they regulate a wide variety of food establishments where water is served or used as an ingredient in foodstuffs. They check that the water is potable to ensure that foodstuffs are not contaminated
  - Food Hygiene Rating Scheme; The Food Hygiene Rating Act is operated by EHPs. Food premises are inspected to check that the hygiene standards meet legal requirements: how hygienically food is handled; the condition and structure of the building and how the business manages and records what it does to make sure food is safe. A food hygiene rating is allocated, this helps consumers make an informed choice and raises standards
  - infectious diseases; EHPs will investigate notifications of infectious diseases (particularly food poisoning). The purpose of investigations and surveillance is to prevent the spread of food-borne illness within the community and establish possible causes. Particular attention is paid to those individuals who, through their work, could pose an increased risk of spreading infection
- All other valid points will be given credit. [20]

**Section B**

**Section A**

**Total**

**AVAILABLE  
MARKS**

20

**60**

**25**

**85**