

# **2005 Health and Food Technology**

## **Advanced Higher**

### **Finalised Marking Instructions**

**These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments.**

## **Instructions to markers.**

### **General Instructions**

Each question is marked out of 25. Markers should use the full range of marks available as indicated in the mark descriptors for an A, B and C response at the top of each question.

Candidates should be rewarded according to the quality of thought revealed in their answers. They should not be rewarded solely, or even mainly, according to the quantity of knowledge conveyed. In progression from Higher a more advanced grasp of the skills of analysis, synthesis and interpretation is required. Credit will be awarded according to the degree of success with which the candidate:

- gives an answer which is relevant to the question and is explicitly related to the terms of the question
- is able to make the various distinctions required by the question
- responds to all the elements in the question in a coherent manner
- applies knowledge and explains, analyses, discusses rather than simply stating facts
- develops the skills of analysis and evaluation through critical appraisal.

## Section A

(a) Outline the major issues identified in the report.

**Mark allocation:** 5 marks

**A-4-5 marks**

The candidate is able to outline four to five of the main issues of the report.

**B-3 marks**

The candidate is able to outline three of the main issues of the report.

**C-2 marks**

The candidate is able to outline two of the main issues of the report.

**Answers should make reference to the following points:**

- marketing of foods influences food choices
- marketing of high fat/sugar/salt foods makes it hard for parents to insist children eat healthily
- majority of parents feel that there should be no advertising of junk foods during children's TV viewing times
- increased risk of obesity due to heavy marketing of these types of foods
- increase in range of unhealthy foods promoted – Big 4 to Big 5
- advertising of these types of foods provides a very unbalanced view of a healthy diet
- the Advertising Association argue that advertising doesn't influence quantity eaten merely particular brand chosen
- parents feel advertising especially TV strongly influenced children's desire for junk foods
- concern over children's ability to understand the aims of advertising
- contrast with advertised diet and the diet promoted by public health advisors
- manufacturers have to stay ahead of the game due to children's rapidly changing interests
- children as young as three are being used to target sales effectively
- increasing use of schools/sponsorship/voucher collection schemes may be encouraging increased consumption of junk foods
- increasing use of technology to promote foods eg Own Internet websites
- concerns over lack of regulations re food advertising
- report by Sustain reported that adverts aimed at children were for cakes, sweets, biscuits, chocolate and sugary food. Over 95% of foods advertised were high in fat, sugar and salt.

(b) Discuss the promotional techniques used by manufacturers when marketing food products for children.

**Mark allocation:** 10 marks

**A-8-10 marks**

Candidates are able to fully discuss the promotional techniques used by manufacturers when marketing children's food products. The discussion must show good analysis and the identification of the majority of the main points with full explanations.

**B-6-7 marks**

Candidates are able to discuss the promotional techniques used by manufacturers when marketing children's food products. Most of the main points will be identified with explanations.

**C-4-5 marks**

Candidates are able to identify some of the promotional techniques used by manufacturers when marketing children's food products with limited explanation.

**Answers should make reference to the following points:**

**Persuading parents**

- manufacturers want to create a product children want that parents will buy
- balance of child appeal/parental acceptability is critical
- research indicates that if the parent feels that their children are being exploited by manufacturers they will not purchase the product
- manufacturers must ensure that the contents meet parental approval otherwise repeat purchases will not be made
- nutritional value of products highlighted to parents to encourage purchase
- careful market research should be conducted on parents' expectations/product appeal
- product image must be acceptable to parent eg sweetie cigarettes no longer acceptable
- younger age range generally doesn't have their own money to spend on snack foods and confectionery items – purchase tends to be made by adult through persuasion
- as they get older children are given increasingly significant amounts of pocket money to spend as they like, often on snack foods and confectionery items.

**Product Image**

- use of characters/packaging to attract children and increase product appeal
- promotional packs – film characters, etc for visual appeal eg Looney Tunes baked beans; McDonalds kids meal characters
- consumer research to establish acceptability of product by target group.

**Promotion/Advertising**

- manufacturers sponsor events to advertise products
- use of on-pack offers for additional items/special offers/competitions can increase sales eg buy six cans and send for teddy bear for £3.99
- TV advertising is a high profile format for older age children
- timing of TV adverts is crucial to reach correct audience – children's TV time
- children are encouraged through adverts (mainly TV) to apply pressure to parents to purchase latest product/collect the set
- women's magazines – adverts to appeal to parents eg Sunny Delight
- websites – children are encouraged by magazines/TV adverts/cable channels to access products through games on the Internet
- promotion of free schools equipment through repeat purchases/voucher collection schemes can persuade parents to purchase particular items/schools to encourage children to persuade parents to purchase

- adverts which appeal to target group
- use of jingles
- use of celebrities
- free samples/free trial.

### **Marketing**

- identify target market/customer profile
- name change/product re-vamp to increase appeal
- shelf-life of product must be carefully monitored – update/change of image should be maintained in relation to popular characters eg 101 Dalmatians became Harry Potter
- product location – siting within supermarkets is crucial – shelf height must be within child's reach/end of aisle promotions/beside checkouts will allow child to access product and persuade parent to purchase
- careful monitoring of product sales must be conducted to maintain pace in market eg Sunny Delight no longer accepted as a nutritious drink by parents has resulted in falling sales
- retail price crucial – parents want to feel it offers value for money
- novelty factor – must provide the child with a certain level of entertainment/enjoyment or the child will not pressure parent to re-purchase eg Kinder Surprise
- children in nursery/primary school can be encouraged to apply pressure to parents to purchase product through peer pressure/competition element
- offer free gifts.

### **Nutritional qualities**

- food additives – parents who have an understanding of the possible effects of food additives may think twice about purchasing products high in food additives
- promote the 'natural' ingredients in the product – encourages parents to feel that they are improving their children's diet/health
- vitamins – addition of extra vitamins can persuade some parents to purchase – media link with IQ
- use of chemical terms in ingredients list can be confusing/impressing to parents
- use of variety of different types/more than one type of sugar allows manufacturers to place these ingredients further down the list so parents think product is healthier.

(c) Critically discuss the other factors which may influence the food choices of children.

**Mark allocation:** 10 marks

**A-8-10 marks**

The candidate is able to develop a full and coherent discussion of the other factors which may influence the food choices of children. The discussion shows good analysis and the identification of the majority of the main points with full explanations.

**B-6-7 marks**

The candidate is able to develop a discussion of the other factors which may influence the food choices of children. Most of the main points will be identified with explanations.

**C-4-5 marks**

The candidate is able to identify some of the main points with limited explanation.

**The candidate should make reference to the following points:**

**Parents**

- their eating habits are passed on to their children and the children learn to like the foods parents provide and eat
- mother most involved with provision of food so can be very influential on children's preferences
- food in the home – children eat what is available, cannot eat what is not there ie fruit
- meals served at home – if filling less likely to snack between meals
- parents want their children to be healthy so provide products high in vitamins etc
- financial situation of family will determine quantity/quality/selection of foods on offer in the home
- frequency of eating out will determine children's acceptance of foreign foods/wider variety – depending on types of restaurant chosen
- amount of money given to children for spending on snacks will determine quantity eaten
- skills parents have in relation to food preparation, etc, choice is limited where parents skills are limited
- parent's lack of knowledge of food and nutrition may limit children's choices
- lack of time due to parents' working hours may restrict the time to prepare fresh foods.

**Culture**

- association of foods with events – Christmas, Easter, birthdays etc
- type of food offered at home eg friends' homes may increase range of foods they eat
- experiences of foods on foreign holidays may encourage eating pattern/choices when at home
- ethnic background may influence foods prepared at home
- religion/ethical.

**Peers**

- children are very conscious of being part of the 'gang' so copy cat behaviour common – can have positive or negative influences

**School**

- school meals available determine foods eaten especially in primary school
- vending machines in schools provide instant access to junk foods
- education of children in class on healthy eating choices can influence foods eaten
- some schools reward pupils with sweets encouraging consumption
- breakfast clubs can encourage healthy start to the day and reduce snacking
- health promoting schools may make the issue of healthy eating a feature and reduce junk food consumption

- use of milk machines in school can reduce fizzy drinks consumed
- distribution of free fruit to primary children
- 'Hungry for Success' initiatives within schools aim to increase nutritional value of food eaten during school day

**Personal Factors**

- personal likes/dislikes major influence
- perceived likes/dislikes influence acceptance of certain foods
- allergies to certain foods or additives may limit choice
- appearance of foods can determine whether children are attracted to them eg brightly coloured foods appeal
- texture/mouth feel may dissuade children from choosing eg crunchy/soggy vegetables
- amount of social interaction with others – eating habits can rub off
- where they live – access to fast foods/sweet shops may limit/encourage consumption
- availability/cost of different types of food will affect frequency/amount of consumption.

**Other Factors**

- seasonality affects availability
- climate may influence food choice
- body image/role of models
- boredom/mood.

## Section B

- (a) One of the Scottish dietary targets states:  
“White fish consumption to be maintained at current levels. Oil rich fish consumption to double from 44 grams per week to 88 grams per week.”  
Eating for Health, A Diet Action Plan for Scotland, 1996.  
Discuss the contribution of fish to diet and health.

**Mark allocation:** 10 marks

### **A-8-10 marks**

The candidate is able to develop a full and coherent discussion of how the consumption of fish contributes to diet and health. The discussion shows good analysis and the identification of the main points with full explanations.

### **B-6-7 marks**

The candidate is able to develop a discussion of how the consumption of fish contributes to diet and health.

### **C-4-5 marks**

The candidate will be able to identify some of the main points with limited explanation.

### **Answers should make reference to the following points:**

- all fish is a good source of high biological value protein, invaluable for growth, repair and maintenance
- oily fish contains between 10%-20% unsaturated oil, may be important to help reduce consumption of saturated fats
- fish is a source of omega 3 (which is a long chain polyunsaturated fat). It has an important role in the diet to help lower the effects of blood fats and decrease the chances of the blood vessels being clogged up with cholesterol/reduces cholesterol
- omega 3 can also help the blood flow more easily around the body making it less ‘sticky’ and likely to clot and so helping to prevent CHD
- white fish contains less than 2% oil, helpful if trying to reduce total energy from fat
- all fish are a good source of the B vitamins – thiamine, riboflavin, niacin and vitamin B6, vital for the release of energy from CHO and for the proper functioning of the nervous system
- oily fish are important sources of Vitamins A – vital for growth and development/development of visual purple/anti oxidant vitamin
- oily fish are important sources of Vitamin D – needed for the absorption of calcium so assisting bone formation
- oily fish are good sources of calcium, especially when the bones are eaten, eg tinned fish, important for bone formation/rickets
- fish is an important source of phosphorous and magnesium and the trace elements iodine, fluorine and zinc, vital for the functioning of all cells
- fish oils can help prevent cancer cells progressing to the stage where the person develops a tumour
- fish oils can reduce inflammation and provide relief for sufferers of rheumatoid arthritis
- fish oils can help some skin conditions, eg psoriasis
- a good intake of oily fish during the last 3 months of pregnancy is believed to assist in the development of the child’s brain and retina
- fish tinned in brine may increase sodium levels in diet
- oily fish are good sources of calcium – helps with blood clotting
- oily fish are good sources of calcium – preventing osteoporosis.

(b) Critically discuss the benefits to health of the other Scottish dietary targets.

**Mark allocation:** 15 marks

**A-12-15 marks**

The candidate is able to critically comment on the benefits to health of the majority of the other Dietary Targets, giving full analysis.

**B-9-11 marks**

The candidate is able to critically comment on the benefits to health of most of the other Dietary Targets, giving some analysis.

**C-7-8 marks**

The candidate is able to critically comment on the benefits to health of some of the other Dietary Targets, giving limited analysis.

**Answers should make reference to the following points:**

**Reduce fat intake to no more than 35% of total energy intake**

This will lead to a reduced risk of:

- overweight and obesity – higher in calories – concentrated source of energy
- CHD – excess weight puts a strain on the heart which may lead to CHD
- HBP/strokes – excess weight may increase high blood pressure which could lead to strokes
- excess weight associated with complications during operations
- excess weight associated with increased risks to the mother during pregnancy and childbirth
- trans fatty acids in processed and dairy foods act like saturated fatty acids causing an increase in cholesterol levels and increased risk of heart disease.

**Reduce saturated fat intake to no more than 11% of total energy intake**

This will lead to a reduced risk of:

- CHD and heart attacks – diets high in saturated fat raise cholesterol in the blood – deposits of cholesterol on arteries restrict blood flow – can lead to CHD and heart attacks.

**Reduce salt intake to no more than 100mmol per day**

This will lead to a reduced risk of:

- HBP and CHD – salt is known to be a contributor towards high blood pressure and CHD
- high intakes of salt thought to be linked to stomach cancer
- high intakes of salt associated with Alzheimer's Disease.

**Adult sugar intake to remain the same, children's sugar intake to reduce by half**

- sugar provides a concentrated source of calories and as much may contribute to overweight/obesity. This puts a strain on the heart and may also lead to high blood pressure
- bacteria may break down sugar, this results in the production of acids which attack and may eventually destroy the teeth
- "empty calories" so may reduce intake of other valuable nutrients
- high intakes associated with diabetes, gallstones etc
- addictive in nature therefore difficult to cut down
- overweight children often become overweight adults therefore preventative health measure for the future.

**Increase fruit and vegetable intake to 400g per day**

- these foods are high in NSP which promotes a feeling of fullness and reduces risk of snacking on high fat/sugar snacks between meals
- the foods are low in fat so useful as a snack food which does not increase daily fat or calorie intake to any great extent

- NSP in fruit and vegetables combines with cholesterol and bile salts preventing cholesterol from being absorbed – reducing risk of CHD
- Fruit and vegetables an important source of NSP and therefore help prevent constipation and other bowel disorders
- Fruit and vegetables are an excellent source of antioxidant vitamins, these have a vital role in the prevention of CHD, cancers etc

Antioxidants found in fruit and vegetables and their link to health:

- Alpha-carotene – high intakes linked to decreased risk of lung cancer
- Beta-cryptoxanthin – high intakes linked to decreased risk of cancer of the cervix
- Lycopene – high intakes linked to decreased risk of prostate cancer in men
- Lutein and zeaxanthin – appear to protect the macula of the eye from deterioration and therefore loss of vision in older adults
- Vitamin C – shown to reduce cancers of the digestive tract
- Vitamin C – helps absorption of iron so preventing risk of anaemia
- Carotenoids – found in many fruits and vegetables; if consumed in high quantities linked to reduced risk of cancers.

**Increase intake of complex carbohydrate by 25%**

- provides a steady supply of energy helping blood sugar levels to remain stable thus preventing snacking on high fat foods
- often a good source of NSP therefore associated benefits of fullness and removal of waste efficiently/reduce bowel disorders
- NSP combines with cholesterol and bile salts preventing the cholesterol from being absorbed – reducing the risk of CHD.

**Consumption of breakfast cereals to double to 34g/day**

- consumption of breakfast reduces the desire to snack on high fat/sugar snacks, particularly mid morning
- often contains NSP – associated health benefits/reduce bowel disorders
- wholewheat/no added sugar cereals will give associated health benefits.

**Bread intake to increase by 45% using mainly brown and wholemeal breads**

- often a good source of NSP therefore associated benefits of fullness and removal of waste efficiency
- NSP combines with cholesterol and bile salts preventing the cholesterol from being absorbed – reducing the risk of CHD
- provides bulk to the diet and so reduces the desire to snack on fatty sugary snacks which may lead to a variety of health problems

**Increase number of women breastfeeding during the first 6 weeks to more than 50%**

- reduces risk of baby developing gastrointestinal and respiratory illness in infancy
- provides protection against childhood diabetes/asthma/obesity in later life
- protects the mother against breast cancer
- boosts baby's immune system
- allows mother to lose weight gained in pregnancy.

2. Discuss the main issues concerning the production and consumption of organic foods.

**Mark allocation:** 25 marks

**A-18-25 marks**

Candidates are able to develop a full discussion of the main issues concerning the production and consumption of organic foods. The discussion shows good analysis and the majority of the main points will be identified with detailed explanations.

**B-15-17 marks**

Candidates are able to develop a discussion of the main issues concerning the production and consumption of organic foods. Most of the main points will be identified with explanations.

**C-12-14 marks**

Candidates are able to discuss the issues concerning the production and consumption of organic foods identifying some of the main points with limited explanations.

**Answers should make reference to the following points;**

**General**

- organic is a term defined by law
- all organic food production and processing is governed by a strict set of rules
- organic farmers have to prove that no agro-chemicals are used or have been used during a two year conversion period
- to be called organic the manufactured product must have no less than 95% of its agricultural raw materials produced or grown organically
- certification is provided by independent inspectors approved by the UK Register of Organic Food Standards (UKROFS)
- organic farming is experiencing a period of rapid growth
- high percentage of UK organic food is imported
- producers, manufacturers and processors each pay an annual fee to be registered and are required to keep detailed records
- any major infringement of the rules results in suspension of the licence and the withdrawal of products from the market
- standards are stringent and regularly updated. They cover every aspect of production
- the standards are enforced by certification bodies – most of which operate higher standards than are legally required
- consumers are also protected by The Advertising Standards Authority and Trading Standards.

**Production**

- it is a safe, sustainable farming system
- it produces crops and live stock without damage to the environment
- it avoids the use of artificial chemicals – fertilisers/pesticides
- the use of genetically modified organisms is prohibited
- animals are reared without routine use of drugs, antibiotics or wormers
- helps the farm to remain biologically balanced
- a wide variety of beneficial insects and wildlife can act as natural predators for crop pests
- concern for animal welfare has increased demand for organic produce
- artificial fertilisers/pesticides can add to water pollution
- there have been no cases of BSE in any herd which has been fully organic since before 1985
- organic livestock less likely to harbour E-coli bacteria therefore safer food is thought to be produced
- can take up to 5 years to fully convert
- financial strain for many farmers wishing to convert is hindering the rate of conversion

- concerns over residues/contaminants in the soil
- pesticides can drift from nearby conventional farms
- higher price for organic food is not always received by the farmer
- smaller scale farming, lower yields, increased manual labour and less efficient machinery can increase costs to farmer.

### **Consumption**

- organic foods are considered to taste better by some consumers
- considered to be better for health – fewer side effects/allergies
- seen as a safe, nutritious, unadulterated food
- several studies have shown higher levels of protein, vitamin C, calcium, iron and potassium in organic vegetables
- no guarantee that organic produce is always completely residue free
- concern over foreign organic foods standards/authenticity
- fresh vegetable products may not have such a long shelf life as conventionally produced products
- fresh vegetables may not have such a good appearance – may not appeal to consumers
- many supermarkets exploiting the increase in demand for organic produce with increased prices
- higher prices can be due to packaging costs – organic produce must be kept separate from conventional produce
- smaller scale farming, lower yields, increased manual labour and less efficient machinery can increase costs and therefore selling price is higher
- no consistent evidence that organic produce tastes better
- some scientists believe there are no nutritional benefits on organic produce
- natural pesticides produced by plants can be more harmful than synthetic ones
- concern over the occurrence of E-coli bacteria in the manure used as fertiliser and the safety of organic crops
- high levels of toxins in organic food could be hazardous to health – eg green potatoes
- foods may be contaminated by copper and sulphur-containing fungicides

3. Discuss how the properties of protein can be used in the manufacture of food products.

**Mark allocation:** 25 marks

**A-18-25 marks**

The candidate is able to develop a full and coherent discussion of the properties of protein and their use in the manufacture of food products. The discussion shows good analysis and the identification of the majority of the main points with full explanation.

**B-15-17 marks**

The candidate is able to develop a discussion of the properties of protein and their use in the manufacture of food products. Most of the main points will be identified with explanation.

**C-12-14 marks**

The candidate is able to identify some of the main points with limited explanation.

**Answers should make reference to the following points:**

**Maillard Reaction**

- non-enzymatic browning ie Maillard Reaction important in food industry – wide variety of baked goods with browned surfaces – known as Carbonyl-amine browning
- occurs when protein and CHO occur together in foods and it is a reaction between free amino groups or free amino groups and carbonyl group of a reducing sugar eg glucose
- the following may affect Maillard browning so are important in food manufacturing – pH, temperature, moisture content, sugars and amino acids available
- carbonyl browning occurs at high temperatures and at a pH value of 7 and above
- it produces desirable changes in flavour, colour and aroma during dry cooking methods eg roasting, baking and grilling
- important for baked goods such as bread, biscuits and cakes, nuts and coffee beans (roasting), flavour in biscuits and breakfast cereals and meat extracts and roasted or grilled meat or poultry

**Denaturation**

- denaturation may be brought about by controlling pH and occurs most readily at the isoelectric point when proteins are least stable
- isoelectric point varies from each protein – it occurs when the pH is neutral
- many proteins are denatured by heat ie they coagulate
- coagulation results in the loss of solubility or change from fluid (sol) to more solid state to formation of gel eg egg white (ovalbumin) begins to coagulate at 60°C; egg yolk begins coagulation at 65°C
- as temperature rises, coagulation continues until whole mass is solid
- different proteins coagulate at different rates
- if cooking temperature is kept below 100°C coagulation is slow and coagulated protein is not too firm ie is more digestible, important when cooking meat and products containing eggs
- if cooking temperature is above 100°C coagulation is rapid and denatured protein forms a hard solid mass
- particularly important when stewing/casseroles meat – if cooked at too high a temperature for too long, can be tough.

**Coagulation of proteins**

- coagulation of proteins is responsible for the thickening effect eggs give in products eg custards, quiche, lemon curd
- coagulation of egg custard produces a gel
- overheating would result in syneresis where protein becomes hard and separates from liquid in product producing ‘holey’ open textured product

- firmness of custard/final product depends on the proportions of ingredients eg eggs to milk for example and addition of other ingredients
- addition of sugar raises the temperature for coagulation and produces a softer texture
- salts are necessary for the gelling of egg custard mixtures – present in milk or by addition of salt (NaCl)

### **Partial Coagulation**

- partial coagulation occurs when eggs are whisked into a foam eg egg whites for meringues, whole eggs and/or yolks for sponge cakes
- heating results in further coagulation and the formation of rigid structure due to the denaturation of protein
- foaming occurs most readily at the isoelectric point
- when whisking egg whites, foaming may be promoted by the addition of acidic substances (vinegar, cream of tartar) which lowers the pH value nearer to the isoelectric point, this makes the foam more stable
- over beating – too much air incorporated – protein is denatured too much, protein film round bubbles or air becomes too thin and less elastic, foam collapses resulting in loss of volume
- addition of salt reduces stability of foam – decreased volume
- addition of sugar retards denaturation of egg white forms, better to add sugar after egg whites beaten
- addition of sugar to egg white foam will result in a more stable, stiffer foam.

### **Enzymatic Coagulation**

- this is typified by the clotting of milk in cheese making
- the protein casein is coagulated by the addition of rennin (or other enzyme) – forms a continuous mass initially, breaks into curds when agitated ie gel structure is broken down

### **Gels**

- proteins can be used to produce gels in cold desserts eg mousse, jellies and savoury pies/aspic jelly
- gelatin gels have qualities which make them preferable to other gelling agents – thermo-reversibility, elastic texture, melt in the mouth characteristic and good flavour
- gelatin's ability to form thermo-reversible gel makes it useful in the food industry as eg gelling agent, thickener, protective colloid, adhesive agent, stabiliser, emulsifier, foaming/whipping agent, etc
- gelatin is a useful nutritive component as it is protein and free from cholesterol
- viscosity of gelatin important in some food systems eg starch moulded confectionery where the working speeds demanded by modern processing techniques require a gelatin with a low viscosity
- gelatin produced from the protein collagen (commercial gelatine) is used as a stabilising agent for emulsions eg ice cream
- on cooling, gelatin sol (ie protein in water) will set to form a gel – this is semi rigid but is not coagulated by heat
- unlike egg custard gel this type of gel is reversible ie on heating it will liquefy
- if gelatin sol is cooled until viscous but not set it can be beaten into a foam to incorporate air – gelatin would have a degree of elasticity at this stage and would be able to stretch and surround air bubbles and is used in whipped cream and gelatin desserts.

4. Discuss the steps which should be taken throughout the food chain to ensure the safe provision of food.

**Mark allocation:** 25 marks

**A-18-25 marks**

Candidates are able to develop a full discussion of the steps which should be taken throughout the food chain to ensure the provision of safe food. The discussion shows food analysis and the majority of the main points will be identified with detailed explanations.

**B-15-17 marks**

Candidates are able to develop a discussion of the steps which should be taken throughout the food chain to ensure the provision of safe food. Most of the main points will be identified with explanations.

**C-12-14 marks**

Candidates are able to discuss the steps which should be taken throughout the food chain to ensure the provision of safe food identifying some of the main points with limited explanations.

**Answers should make reference to the following points:**

Legislation which may apply throughout the food chain

**The Food Safety Act 1990 –**

- deals with all stages of food production from growing to harvesting to the finished product
- during the food chain there are many potential hazards – food must be ‘traceable’
- documentation at each step is used to ensure food safety/traceability eg herd animal; date and place of slaughter, use-by-date etc.

**The Food Safety (Temperature Control) Regulations 1995 –**

- maximum temperature of 8°C for all foods that could support the development of harmful levels of pathogenic micro organisms on formation of toxins – applies at all stages from transport through to manufacture/catering/retailing
- cooked food to be sold hot must be kept at or above 63°C
- reheated food before serving must reach a temperature of not less than 82°C
- Environmental Health Officers enforce regulations.

**The Quick Frozen Foodstuffs Regulations 1990 –**

- Food must be stored at -18°C or below. Can be delivered between -18°C and -15°C.

**The Food Safety (General Food Hygiene) Regulations 1995 –**

- aim to set out basic hygiene principles to control food safety risks covering premises/equipment/hygiene of food handlers/fitness for work/preventing contamination/training and supervising food handlers.

**Primary Producers – farmers/horticulturists/fishermen**

- strict control procedures should be used for primary producers eg storage of eggs to prevent salmonella; regular testing for TB; use of pesticides and veterinary medicines, etc
- milk fresh from a cow must be cooled from 37°C to 4°C and stored in clean tanks at this temperature
- animal health/regulations now being enforced by Trading Standards eg Animal movement records/markets.

**Initial processing/Primary Processing – Slaughter houses/dairies**

- slaughter houses must comply with the Poultry, Meat, Farmed Game Bird and Rabbit (Hygiene and Inspection) Regulations 1995
- dairies – milk is heat treated to make it safe for consumers/final processing of milk requires HACCP.

**Final/Secondary Processing or Manufacturing**

- processing/manufacturing – quality management systems are set up to reduce the risk of microbiological contamination eg HACCP/ISO (International Standards Association)
- The Food Safety (Temperature Control) Regulations 1995
- The Quick Frozen Foodstuffs Regulations 1990
- The Food Safety (General Food Hygiene) Regulations.

**Transportation**

- Transportation – operating procedures must be checked to ensure food products are preserved correctly and that monitoring procedures are carried out
- 3 international bodies responsible for implementing quality standards – European Union's Legislation on the preservation of hygiene and safety of food; International Standards Organisation (ISO); Codex Alimentarius established in 1962 by WHO and FAO
- correct temperatures must be adhered to during transportation
- products must be protected from any external pollutants
- product must be delivered in perfect condition with packaging fully intact
- vehicles must be hygienic to prevent contamination of the food from insects/clostridium perfringens.

**Retailer**

- retailer must ensure that products are received within use-by-dates, perfect condition, appropriate temperatures
- once received foods must be stored in correct conditions
- foodstuffs must be handled by trained staff
- cooked and raw foods must be stored separately to avoid cross-contamination.

**Consumer**

- consumers have a responsibility to be knowledgeable about current hygiene and safety practices – DEFRA produces advisory leaflets
- Foods Standards Agency developed to ensure food safety for consumers and inform/educate them regarding food safety/health
- foods should be purchased within correct dates and in good condition, packaged carefully to avoid damage on way home
- store food appropriately at home – correct temperature, keep raw/cooked food separate
- cook/reheat foods according to instructions. Only reheat once
- food safety officers are now being employed by some councils to ensure provision of safer food.

5. Discuss the use of additives in relation to the colour, flavour and nutritional value of food products.

**Mark allocation:** 25 marks

**A-18-25 marks**

The candidate is able to develop a full and coherent discussion of the use of additives to improve the colour, flavour and nutritional value of food products. The discussion shows good analysis and the identification of the majority of the main points with full explanation.

**B-15-17 marks**

The candidate is able to develop a discussion of the use of additives to improve the colour, flavour and nutritional value of food products. Most of the main points will be identified with limited explanation.

**C-12-14 marks**

The candidate is able to identify some of the main points with limited explanation.

**Answers should make reference to the following points:**

**Colour**

- the purpose of adding colours to food is to improve its general appearance
- colour can be added to replace natural colour lost during processing and subsequent storage
- colour may be added to a wide variety of foods eg soft drinks, confectionery, sauces, tinned peas, soups and fish fingers
- colours may be used to enhance the natural colour eg the natural colour may be weaker than the colour normally associated with a food
- they may be used to ensure uniformity of colour in foods from batch to batch, eg jam bought in December should look the same as jam bought in July
- colour can be bleached out of food by the use of preservatives or by lengthy storage, so it may need to be added to restore colour
- it may be added to foods which otherwise may be entirely lacking in colour eg drinks and boiled sweets
- consumer expectation of food quality is to an extent colour dependent so the use of additives is vital to the food industry
- many colours are derived from natural origin, eg carotenes, saffron
- no colours may be added to foods intended for babies and infants except riboflavin, lactoflavin and B-carotene all of which occur naturally in other foods
- colours may not be added to meat, fish, poultry, fruit, cream, milk, honey, vegetables, wine, tea, coffee and condensed and dried milk
- there are some safety issues in relation to synthetic food colours and links to hyperactivity, asthma, and other allergic reactions
- use of flour whitener/bleach to satisfy customer expectations.

**Flavour**

- sweeteners are added to foods to provide a sweet taste
- non calorific sweeteners are becoming more popular with increased demand for low calorie foods
- using sweeteners is also useful for diabetics as it allows them to have sweet tasting sugar free foods
- intense sweeteners are many times more sweet than sucrose and are used in very small amounts
- bulk sweeteners are about as sweet as sucrose and are used in similar quantities
- there are 5 permitted intense sweeteners – acesulfame potassium, aspartame, saccharin, thaumatin and neohesperidine

- the bulk sweeteners are – mannitol, sorbitol, xylitol and lactitol
- flavourings are added to food to give, enhance or intensify flavour
- there are thousands of flavourings available, both natural and artificial
- flavourings may be used in food without restriction at present, but may become restricted in future
- natural flavourings include, oils eg cloves, lemon, herbs and spices
- artificial or nature identical ones are usually copies of natural flavours
- flavourings are used in a variety of foods, eg margarine and butter would be unacceptable without them if eaten on their own
- new meat substitutes made from spun vegetable protein would be tasteless and uninteresting without them
- jelly for example would be tasteless without them
- foods such as strawberry yoghurt which has a low natural flavour level has flavourings added to enhance the natural flavour
- MSG is the most commonly used flavour enhancer
- stock cubes and many dehydrated soups contain MSG but many people react badly to it
- MSG has been known to cause palpitations, dizziness and chest pains, although not thought to be harmful, it is not added to foods for babies and infants
- the flavour of MSG is enhanced if it is used in conjunction with IMP (inosine monophosphate) or GMP (guanosine mono-phosphate)
- flavour enhancers make flavours in foods stronger
- they are added to foods in small amounts to improve taste
- they are added to foods where real flavours could be costly
- they are used to flavour foods which when processed could not replicate natural flavour.

#### **Nutritional Value**

- these are added to foods to maintain or improve nutritional value – this is called fortification
- sometimes nutrients replace those lost during processing, this could be a legal requirement or voluntary
- legal requirements – vitamins A and D added to margarine and calcium to flour
- voluntary – fortification of breakfast cereals, addition of vitamin C to soft drinks
- adding nutrients to basic low cost foods allows those on a low income to receive such nutrients
- addition of vitamin B12 to non-animal products.

**ADVANCED HIGHER HOME ECONOMICS  
RESOURCE MANAGEMENT**

**Context : Health and Food Technology**

Question	Context	Elaboration	Skills		Totals
			Knowledge	Evaluation	
<b>Section A</b> <b>(a)</b> <b>(b)</b> <b>(c)</b>	Psychology of food	<ul style="list-style-type: none"> <li>role/impact of media on food choice</li> </ul>	5 10	10	25
<b>Section B</b> <b>1(a)</b>  <b>(b)</b>	Food politics  Food Commodities  Food politics	<ul style="list-style-type: none"> <li>issues related to health in Scotland and the UK</li> <li>food and nutrition and health policies – Scotland and abroad</li> <li>fish – relationship to health</li> <li>issues related to health in Scotland and the UK</li> <li>food and nutrition and health policies – Scotland and abroad</li> </ul>	10	15	25
<b>2</b>	Biochemistry, preservation and processing	<ul style="list-style-type: none"> <li>organic foods</li> </ul>	25		25
<b>3</b>	Food Science. The nature of food constituents in relation to their properties in food manufacture  Food Commodities	<ul style="list-style-type: none"> <li>the properties and uses of proteins – denaturation of proteins, gels and gelatin, maillard reaction</li> <li>composition and properties of foods in their raw and cooked state – eggs, milk</li> </ul>	25		25

Question	Context	Elaboration	Skills		Totals
			Knowledge	Evaluation	
4	The food chain	<ul style="list-style-type: none"> <li>• awareness of the policies relating to – food, agriculture and fisheries</li> <li>• food hygiene issues</li> </ul>	25		25
5	Biochemistry, preservation and processing	<ul style="list-style-type: none"> <li>• food additives – sweeteners</li> <li>• specific commercial additives – colours, flavour enhancers and nutritional additives</li> </ul>	25		25

[END OF MARKING INSTRUCTIONS]