Version 1.0

General Certificate of Secondary Education
June 2013

Design and Technology: Food Technology 45451

(Specification 4545)

Unit 1: Written Paper

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from: aqa.org.uk

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX.

Section A

Question 1

1 **A manufacturer wishes to extend the range of biscuit products for consumers with special dietary needs.**

1 (a) **On the next two pages, use notes and/or annotated sketches to produce design ideas for biscuit products for two different special dietary needs.**

Some special dietary needs are shown below. You can choose from this list or use different special dietary needs if you wish.

- **Vegetarian**
- **Diabetic**
- **Coeliac / gluten free**
- **Nut allergy**
- **Lactose intolerance**

You must annotate your design ideas to show how they meet the following design criteria.

Successful products will:

- **be a sweet or savoury biscuit**
- **be suitable for the chosen special dietary need**
- **have sensory appeal**
- **be sold in individual portions**
- **be suitable for batch production.**

Do not draw any packaging.

The following mark scheme should be used for both question 1(a)(i) and question 1(a)(ii).

Candidates are required to use notes and/or annotated sketches for **one** design idea for **each** dietary need; specifying the 'special dietary needs' they are designing for and explaining how this influences consumer food choice.

*The 9 marks for each of question 1(a)(i) and 1(a)(ii) may be allocated throughout the notes and /or annotated sketch for **each** design idea using the guidance below.

Annotation/Sketches should show:

Choice of special dietary need:

- Candidates should identify the special dietary need used in each design choosing two **different** dietary needs (**no** marks awarded for this).
- Explanation of the special dietary need is required. You must credit evidence from written work or annotations around the sketch. The sections below give examples of creditable responses related to a range of special dietary needs:

Vegetarians (or may choose vegans as own choice)

- Vegans will not eat animal related products, e.g. butter in biscuit making, parmesan cheese (animal rennet based)
- Reference may be made to lacto/ovo vegetarians who will eat animal Products, e.g. milk, cheese.
- Consumers may be vegetarians because of cultural, religious or moral reasons, e.g. do not believe in killing animals, religious belief.
- Vegetarians need to obtain some nutrients, i.e. protein, vitamins B and D, Iron, calcium …credit can be given for examples e.g. use of pulses, beans, nuts, alternative proteins.
- Need for consumers to look carefully at the labelling of foods to allow informed choice of appropriate foods.

Diabetics

- May have very high or low blood sugar levels
- Need to control sugar content obtained from foods (note: this is not a 'sugar free diet')
- Need to control carbohydrate intake.
- Reference to foods e.g. fibre rich, which release energy slowly
- Biscuits may form part of their small but frequent meals
- Use of alternative/artificial sweeteners (do not accept honey as a sugar substitute)
- Need for foods that enable weight control
- Need to control insulin/glucose levels.
- Awareness of type 1 and type 2 diabetes.
- Need for consumers to look carefully at the labelling of foods to allow informed choice of appropriate foods.

Coeliac/gluten free

- Difficulty digesting the **protein** based gluten, often found in cereal foods e.g. wheat, rye, barley, pure oats
- Need gluten free products, e.g. bread, pasta, flour, starch, nuts, (Do not accept flour substitutes)
- Fibre comes from rice or potatoes
- Need for consumers to look carefully at the labelling of foods to allow informed choice of appropriate foods.
- Should not eat bread, pasta, cereals, biscuits, cakes, pastries, pies, gravies, sauce products unless labelled 'gluten free'.
- Basic foods e.g. meat and fish (not battered), fruit, vegetables, cheese, potatoes, rice are all gluten free and can be eaten freely.

Nut Allergies

- Avoid any food products with nuts in or traces of nuts
- Warnings needed on packaging
- Need production in nut free environments
- Allergy can produce severe reactions in body / anaphylactic shock / swellings in mouth
- Do not accept the adrenaline pen as this is not related to food choice
- Need for consumers to look carefully at the labelling of foods to allow informed choice of appropriate foods.

Lactose intolerance

- Lactose is the sugar found in milk.
- Cannot digest/tolerate lactose / sugar
- Avoid foods high in lactose e.g. butter, ice cream, cheese,
- Awareness of products that contain hidden amounts of lactose e.g. some salad dressings, biscuits, chocolate, boiled sweets, peanut butter, some breakfast cereals, packets of batter mix, instant potato and soup, some processed meats e.g. sliced ham.
- Avoid or reduce amount of cow's milk and other products containing milk e.g. chocolate
- Often lack calcium, may get this from white flour, dried fruit, cabbage, soya, tofu, nuts, bony fish.
- Some products are lactose free e.g. soya milk , milks made from rice, almonds, nuts, coconut, potato, carob bars
- Need to look for products labelled 'dairy free' or 'suitable for vegans'
- Need for consumers to look carefully at the labelling of foods to allow informed choice of appropriate foods.

Candidates should be given credit for alternative special dietary needs they may choose themselves such as age related needs e.g. young children, weight management needs e.g. weight loss, calorie counted, low fat or diets related to other named medical conditions e.g. heart disease. NOT 'healthy eating diet' as this is too generic and is not 'special' but expected as 'norm'.

Annotation/sketches should give details relating to the other design criteria. Allocate credit for each design criteria evidenced.
***Please note the top mark band can only be accessed if ALL the required design criteria are evidenced. Guidance for these is shown below.**

Design criteria 1: A sweet or savoury biscuit

- Sketch/annotation will communicate a relevant sweet or savoury biscuit product. These may be represented as tray bakes or individual biscuits.
  Biscuits, plain or decorated, any flavours permitted.
  NB. Definition of biscuits: (crisp, dry unleavened products that go soft when left). Do **not** allow cakes (raised, soft and spongy products that go dry when left).

Design criteria 2: Evidence of how design idea meets special dietary needs.

- Sketch/annotation evidenced how product meets the special dietary needs e.g. a coeliac biscuit may specify 'gluten free flour' or diabetic biscuit may identify relevant sugar/carbohydrate content.

Design criteria 3: How product offers sensory appeal:
Identification of any of the following:

- colour, shape, finish, flavour, texture, aroma

Design criteria 4: Individual portion size

- evidence of number of biscuits per serving
- individual size indicated clearly e.g. bite size
- dimensions or weight given (maximum size 10 cm)

Design criteria 5: Suitability for batch production

- tray bakes may show cutting plan,
- preparation / method of making identified, e.g. all-in-one
- many biscuits made in one go number made from each mixture e.g. 100 cookies
- number of servings
- references to scaling up ingredients
- cheaper than one off
- flexibility of run several biscuits can be made with same equipment/methods
- developed to meet needs of batch production e.g. consideration of extended shelf life, stabilising of mixture, addition of preservatives
- a list of ingredients with quantities suitable for a single batch can be used to credit batch production.

Credit also given for the quality of communication of the design idea. Responses may show this through any additional information given e.g.

- extensive knowledge of the special dietary need
- nutritional details of ingredients
- methods used,
- specialist equipment identified
- finishing techniques
- production details e.g. ingredient lists, cooking temps
- healthy eating points

Marks awarded as follows: **For <u>each</u> design idea:**	**Mark Range:**
No answer worthy of credit	*0 marks*
Sketch / annotation attempted but only <u>few</u> design criteria met, e.g. limited additional information, lack of knowledge of special dietary needs some incorrect or inappropriate responses.	*1 – 3 marks*
Sketch / annotation shows basic ideas for a relevant product that meets <u>all or most</u> of the design criteria – but may not be clearly communicated or lacks detailed dietary information.	*4 – 6 marks*
Recognisable sketch / annotation showing good communication of main features, understanding of impact on food choice and fitting <u>all</u> the design criteria for a relevant special dietary need product.	*7 – 9 marks*
	(2 x 9 marks)

1 (b) **Using the chart below, identify the quality control checks that will take place when making the biscuit product in the test kitchen.**

Candidates are expected to give two quality control checks relevant to each stage.

1 mark per check correctly identified. (There are no marks for identifying which design idea they are using). Repeated answers are not acceptable.

Possible responses may include:

Checking the quality of the ingredients

- Datemarks – are ingredients fresh, check best before, use by dates
- Quality – visual checks on appearance, is food in good condition, fit to eat
- Quantity – has the correct amount been delivered
- Condition of packaging – not tampered or damaged, suitable for ingredient
- Temperature – has a safe temperature for delivery / storage been maintained
- Hygiene of delivery vehicle / person
- Check reputable supplier source
- Selection of appropriate ingredients e.g. plain flour not SR

Making the biscuit mixture

- Weight of ingredients – accuracy of weighing / use of digital scales
- Proportions – recipe proportions used accurately
- Consistency – mixture is correct consistency, not too wet or dry
- Hygiene considerations, e.g. cleanliness of equipment, work area
- Hygiene considerations for worker, e.g. clean hands, hair tied back
- Workers trained in production technique used
- Use of consistent methods so batch can be replicated accurately. (batch / repetitive flow)
- Use of food processor or mixer to achieve a consistent result

Shaping the biscuits

- Portion control
- Consistent shape
- Consistent size / thickness / weight / dimensions
- Use of cutters / templates for consistency.
- Workers trained
- Regular sampling as part of quality control
- Hygiene considerations, e.g. cleanliness of equipment, work area
- Hygiene considerations for worker, e.g. clean hands, hair tied back

Cooking the biscuits

- Checking of oven temperatures
- Consistent colour / not burnt or undercooked – visual check.
- Monitoring cooking time (do not accept ‘cooked right’)
- Correct shelf in oven
- Greased tray or use of greaseproof tray
- Appropriate spacing on tray so biscuits do not merge.

(8 marks)

1 (c) **Explain how Computer-Aided Design (CAD) could be used during the development of the biscuit product and its packaging.**

Correct answers may be related to:

- Production of product profiles/supports match with specification
- Modelling of product using graphic packages to design the physical appearance .
- Using DTP for packaging and label design
- Using spreadsheets to calculate costing, portion size and ratio of ingredients.
- Using nutritional analysis packages to model energy and nutrients.
- Modelling of nutritional profiles for labelling
- Scaling up calculations /calculate costing/portion sizes
- Producing nets of packaging
- Modelling and communication of sensory profiles of product
- Calculating the mould free shelf life/microbiological profile/hazards
- Exploring the interaction of ingredients and their functional properties.
- Imagining systems for product quality and fault diagnostics.
- Production of HACCP charts for workers/designers/
- Can help predict effect of temperature changes in heated foods/food safety assessment
- Quickly recalculates and redesigns packaging/makes changes/improvements.
- To achieve greater accuracy/consistency and precision in design work
- Can produce the structure and cut it out on laser cutter
- Nets can be printed on one sheet, cut out precisely prior to gluing.
- Allows packaging designs to be scaled up/down to maximise space and minimise wastage, i.e. more economical support for sustainability.

Do <u>not</u> accept responses related to researching, use of internet.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
Simplistic answer giving limited or no relevant knowledge of CAD	*1 – 2 marks*
Detailed and knowledgeable answers relating to use of CAD. May include extended responses showing full understanding.	*3 – 4 marks*
	(4 marks)

TOTAL FOR QUESTION 1 – 30 MARKS

TOTAL FOR SECTION A – 30 MARKS

Section B
Question 2

2 (a) **Describe one way of improving each pizza.**

You must choose different design criteria for each pizza.

Best Improvement areas to be identified are:

Pizza A: colour, 5 a day portions and multicultural flavour

Pizza B: suitable for vegetarian, 5 a day, multicultural flavour

Pizza C: colour, multicultural flavour, 5 a day.

Candidates must choose different criteria for each product.

Allow 1 mark for correct identification of criteria needing improvement
and 1 mark for appropriate modification.

Lacks colour

- Add a garnish e.g. named fresh herbs
- Add another ingredient to add colour e.g. slices of roasted red pepper, caramelised onion, named meats
- Use different named cheeses in topping to vary colour
- Cook for longer to develop colour

Lacks multicultural flavour

- Add named herbs and spices, e.g. black pepper, curry powder ,chilli, garlic basil, coriander
- Add drops of a spicy sauce e.g. Tabasco, Worcestershire , sweet chilli sauce
- Adding multicultural flavours e.g. Parma ham, prosciutto, pineapple, nuts, spicy meats, marinades, spinach, ricotta, etc.

Not suitable for lacto vegetarians

- Remove any animal based ingredients e.g. pepperoni, butter in pizza base
- Use soya/olive oil in base
- Use vegetarian cheese
- Replace with variety of named vegetables, e.g. sliced onions
- Use of Quorn, tofu, soya as protein substitute in topping

Does not contribute towards 5 a day

- Add portion of named fruit, e.g. pineapple
- Add portion of named vegetable, e.g. mushrooms
- Add mixed peppers/tomatoes, or sun dried tomatoes in place of tomato sauce layer
- Top with rocket or fresh herbs

(6 marks)

2 (b) (i) The test kitchen is developing a new pizza product.
Describe development work that could be carried out to:

Development activities may identify and describe any of the following.
Marks are awarded across whole response.

Produce a quality finish on the pizza:
Development work may include

- Comparing different toppings/finishes shown on different products.
- Positioning of finish, cheeses
- Using and comparing different finishing techniques, e.g. using roasted vegetables or fresh sliced vegetables on the topping
- Comparing different browning agents / methods, e.g. timings in oven, egg wash v brush with milk, v egg white, and different oven temperatures.
- Different bases, e.g. thin crispy, deep pan, stuffed crust,
- Evaluation of use of standard components as a quality finish.
- Different garnishes, e.g. fresh herbs, cheeses
- Appeal of different shapes and sizes of product.
- Use of different equipment, e.g. spray egg wash, pastry brush.
- Sensory evaluation/testing/analysis of finish.
- Follow up decisions/evaluation/outcomes of testing activities.

Reduce the cost of the pizza:

- experimenting with scaling of recipe, proportions, ratios of ingredients
- experimenting with use of different equipment to reduce time/staffing costs, etc.
- Different ratio of ingredients, e.g. base, tomato layers, cheeses, toppings
- different ingredient ranges e.g. economy v luxury
- alternative cheaper ingredients
- using seasonal ingredients
- smaller/ reduced packaging
- comparing sources of ingredients e.g. using fresh local ingredients to supermarket mass produced, related to costs.
- use of standard components / to reduce costs of equipment / reduce staffing
- reviewing costing regularly /seasonally for impact of market prices
- review of supplier/s, methods of cost reduction, comparison of ways of buying in bulk,
- methods for reducing staffing/production methods/efficiency of equipment/use of standard components.
- Follow up decisions from testing on cost reductions/

Find the safest storage conditions for the pizza.

- comparing different storage methods/increasing shelf life
  e.g. testing suitability for chilling v fridge v freezing v room temps
- outcomes recorded
- quality of sensory outcomes /evaluation of results
- use of additives to extend shelf life
- comparing effectiveness of different packaging materials

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
The candidate has a basic but possibly confused grasp of development work. Few correct explanations are given to illustrate points made. This candidate does not have a clear idea of what s/he is writing about.	*1 – 2 marks*
The candidate has some knowledge of development work but there will be less clarity of understanding. Some correct design activities will be given to illustrate points made but responses may include more design solutions. This candidate knows what s/he is writing about but is confused in some areas. Correct responses may be limited to one or two areas only.	*3 – 4 marks*
The candidate has a thorough understanding of development work and has provided relevant explanations to support the knowledge shown. This candidate knows what s/he is writing about and provides clear evidence of understanding. NB. Full marks can only be given with the inclusion of several design activities identified within the response which may include some design solutions.	*5 – 6 marks*
	(6 marks)

2 (b) (ii) **By law, the name of the product must be printed on food packaging. Give five other items of information that must be given by law.**

1 mark for each correct response.

Any 5 of the following are acceptable:

- Name and address of manufacturer
- Storage instructions
- Cooking instructions/Preparation instructions
- Weight or volume
- List of ingredients/additives used
- Date mark / best before /use by/shelf life (not sell by)
- Any special claims /warnings/allergy information
- Country of origin
- Description of product (not image)
  *do not accept 'name of product' as this is given in question.

Do **NOT** credit nutritional information

(5 marks)

2 (c) **Explain why evaluation is important in the development of a food product.**

- Evaluates strengths and weaknesses / /good or bad points
- Identifies areas for improvement/Inform improvements in product
- Aids continuous quality control
- Assist in meeting design specifications
- Assist in meeting the needs of consumers
- Help development team to change products characteristics for the better.
- If not evaluated product may fail to find approval with consumers
- Lack of sales therefore lack of finance, jobs, profit
- Money lost if poor, unappealing product
- Allows creation of perfect product profile.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit.	*0 marks*
The candidate has a basic but possibly confused grasp of the importance of evaluation. This candidate does not have a clear idea of what s/he is writing about.	*1 mark*
The candidate has some knowledge of the importance of evaluation but there will be less clarity of understanding.	*2 marks*
The candidate has a thorough understanding of the importance of evaluation. This candidate knows what s/he is writing about and provides clear evidence of understanding.	*3 marks*
	(3 marks)

TOTAL FOR QUESTION 2 – 20 MARKS

Question 3

3 (a) (i) **Explain why manufacturers use the following ingredients for this baked product:**

Answers may refer to ingredients in any component part e.g. pastry, jam, cake mix, or icing finish.

Flour (may refer to cake or pastry component)

- Structure of product
- Bulk of mixture in pastry or cake layer (do not accept main or base ingredient)
- Soft plain flour for pastry give low gluten content (protein) – gives soft crumb (not elasticity)
- When heated the protein sets the framework of cake.
- Dextrinisation of flour helps browning
- If SR helps to produce rise in cake
- Plain keeps pastry flat in pastry case
- If wholemeal can add fibre and colour

Eggs (in cake mixture or for a rich pastry)

- Trap air when beaten into foam / adds volume to cake and makes it rise/ aeration/ light open texture.
- Add nutritional value e.g. add protein albumen / lecithin in egg yolk
- Coagulate set on heating
- Hold fat in suspension/emulsion – stability of mixture
- Adds colour- must be qualified
- Enriches mixture
- Binds dry ingredients
- Can be used to seal pastry case

Sugar (in cake, jam or icing finish)

- Helps hold air in mixture when creamed with fat
- Increase volume
- Sweet flavour
- Adds attractive finish- colour from caramelisation
- Extends shelf life (jam)

Baking powder (in cake mixture)

- Raising agent –adds air- aerates
- Adds volume
- Chemical raising agents which break down on heating / provide CO2 to make cakes rise
- Gives lighter texture

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit.	*0 marks*
The candidate has a basic understanding of the functions of ingredients. Uses simplistic terminology.	*1 – 2 marks*
The candidate has some knowledge of the functions of ingredients but there will be less clarity of understanding. Correct responses to most ingredients with use of some specialist terminology.	*3 – 5 marks*
The candidate has a thorough understanding of the functions of ingredients and has provided relevant explanations to support the knowledge shown for all ingredients. This candidate provides clear evidence of understanding and uses a wide range of specialist terminology correctly.	*6 – 8 marks*
	(8 marks)

3 (a) (ii) **Explain what is meant by the *shortening effect* of ingredients used in cakes and pastries.**

- Shortening effect produced by the action of the fat e.g. named fats.
- When rubbing the fat into the flour
- The fat coats flour particles
- Fat prevents absorption of water/gives waterproof coating
- Prevent gluten from developing
- Stop mixture being elastic/stretchy
- Shortens mixture by making is soft and crumbly
- Gives a 'short' melt in the mouth texture
- May give examples e.g. shortbread, short crust pastry, biscuits / cookies Fruit cake, rock buns etc.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit.	*0 marks*
The candidate has a basic understanding of the shortening effect.	*1 mark*
The candidate has some knowledge of the shortening effect but there will be less clarity of understanding.	*2 – 3 marks*
The candidate has a thorough understanding of the shortening effect and has provided relevant explanations to support the knowledge shown. This candidate provides clear evidence of understanding.	*4 marks*
	(4 marks)

3 (b) (i) **Explain what is meant by *standard components*. Give examples used in cake and pastry products.**

Standard components:

- Pre-prepared items / readymade ingredients
- Used in the production / part of another product
- Prepared items bought in from another manufacturer

Examples: (allow maximum of 2 marks)

- Pastry; ready rolled, ready prepared, pastry mixes, frozen/chilled pastry, readymade pastry case
- Cake: cake mixes
- Icing: ready rolled icing / decorations / frostings / buttercream / marzipan
- Filling: jar / sachets of jam / readymade pie fillings / sauces
- Topping, e.g. meringue mix

(4 marks)

3 (b) (ii) Explain why manufacturers use *standard components*.

- Reduces production time/ quick
- Consistency of outcomes, e.g. size, shape reliable quality guarantee if reputable supplier
- Helps manufacturer meet precise specifications
- Save costs incurred by buying extra resources e.g. equipment, staff
- Saves on staff training, fewer skills needed/ ease of use.
- Allows them to use methods etc. would not otherwise be able to provide, extends their range of products.
- Less effort and skill needed by staff
- Less chance of contamination – high risk aspects delivered off site, more hygienic
- Can buy in bulk / as needed /reducing storage space needed.
- Cuts down production time therefore more can be made in less time – output greater
- Wider range of products can be made.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
The candidate has a basic understanding of standard components. May give a simplistic list of reasons.	*1 mark*
The candidate has some knowledge of standard components but there will be less clarity of understanding. Some attempt at an explanation in extended answers.	*2 – 3 marks*
The candidate has a thorough understanding of standard components and has provided relevant examples/extended answers to support the knowledge shown. This candidate provides clear evidence of understanding.	*4 marks*
	(4 marks)

TOTAL FOR QUESTION 3 – 20 MARKS

Question 4

4 (a) **The following problems were found when making desserts in the test kitchen.**

Complete the table to show how food workers could avoid these problems happening again in the future.

Possible responses may include two simplistic responses or one extended answer in each case.

Problem 1: The cream for piping on the top of a trifle does not thicken.
The food worker must:

- check that double or whipping cream is being used/As single cream does not thicken
- make sure cream is not past its use by date
- check cream has not been under whipped/whisk or whip for longer
- check correct / effective equipment is being used e.g. electric whisk v fork
- check correct storage conditions for trifle – chilled
- ensure cream is at chilled and not at room temperature when whisking.

Problem 2: A high level of bacteria is found in a milky rice pudding.
The food worker must:

- make sure product is not past its best before / use by date
- check milk / rice pudding both high risk foods have been stored in correct conditions / temperatures / refrigerator – chilled / 0-5^{o}C
- Check cooking times and temperatures are accurate
- check cleanliness of workers
- check cleanliness of equipment used
- ensure product is not eaten in its current state due to contamination
- cook for longer till piping hot

Problem 3: The apples for a fruit pie turn brown.
The food worker must:

- make sure acid/ lemon juice / citric acid has been put onto apples after cutting
- lemon juice / citric acid prevents enzyme browning/oxidation
- not use apples have open to the air.
- Cover with iced water /salt solution / to slow down browning action..
- Ensure apples have not been prepared too early before use. Leave preparation until last.

(3 x 2 marks)

4 (b) **Describe how to produce a good shape and structure when making each of the following food products.**

Do not repeat any of your answers.

Marking guidance; allocate up to two marks per section. This may be two simplistic responses or one extended response.

A strawberry jelly

- Correct proportions of ingredients / gelling agent
- Carrying out quality control checks
- Staff training
- Use of moulds to contain shape
- Correct storage so melting does not occur
- Correct temperatures for preparation and setting boiling 100^{o}C chilling 0-5^{o}C
- Allowing appropriate time to set
- Jelly cubes/gelatine fully dissolved/melted to give consistent outcome.

Chocolate muffins

- Correct proportions of ingredients
- Carrying out quality control checks
- Staff training
- Use of paper cases
- Use of baking tins for supporting shape during cooking
- Temperature checks
- Time checks
- Consistent amounts in each case/ not overfilling cases..
- Not opening oven door during cooking

Icing on a cake

- Correct proportions of ingredients / accurate measuring/portion control/use of scoops
- Carrying out quality control checks
- Staff training
- Making icing to correct consistency proportions liquid: icing sugar
- Use of piping bags / nozzles / icing pens /cutters to obtain required shape / form / surface appearance
- Use of pre made ready rolled icing
- Effective finish e.g. blending of colouring (fondant icing paste), attaching decorations effectively

(6 marks)

4 (c) **Some desserts contain gelling agents. Describe how gelling agents work.**

- Examples: by using arrowroot for a glaze over fruit, corn flour to thicken a sauce, gelatine for soufflés
- When mixed with liquid starch particles form a suspension
- On heating 60^0C starch granules swell as they absorb liquid
- Burst open releasing starch and thickening liquid
- Gelatinisation -boiling point 100^oC
- When mixture cools mixture thickens further and sets into a gel.
- Gelatinisation begins at 60^oC
- Modified starches – pre gelatinised starches
- Leaf gelatine or gelatine granules, dissolve in hot water, etc.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 mark*
The candidate has a basic grasp of gelling agents. This candidate does not have a clear idea of what s/he is writing about	*1 mark*
The candidate has some knowledge of gelling agents but there will be less clarity of understanding.	*2 marks*
The candidate has a thorough understanding of gelling agents and has provided relevant explanations to support the knowledge shown. This candidate knows what s/he is writing about and provides clear evidence of understanding.	*3 marks*
	(3 marks)

TOTAL FOR QUESTION 4 – 15 MARKS

Question 5

5 (a) **The following terms are often printed on food packaging.**

Explain what is meant by each term.

Environmentally friendly

- Product is kind to the world we live in
- Does not waste natural resources e.g. oil, metal, trees
- Both the product and / or packaging have been produced with the environment in mind with little or no packaging.
- May indicate product/packaging is biodegradable
- May be recyclable or reusable
- Use of landfill sites
- Packaging may be made from recycled materials
- Production uses minimum food miles, for transportation
- References to reduces carbon footprint /greenhouse gases
- Supports using local produce / skills
- Production methods do not harm wildlife, e.g. free range eggs
- Production does not harm habitats
- Product uses /supports minimum energy usage
- Farm assured logos / schemes, e.g. little red tractor ensure environmental protection and certain standards are met

Sustainable sources

- Consider the 6Rs reduce, reuse, recycle, refuse, rethink, and repair.
- Production ensures that resources can be renewed /do not use resources in short supply
- Supply of popular fish, e.g. cod, blue fin tuna are over fished and need to be protected. Other sustainable products need to be used, e.g. Pollock
- Examples: fish stocks, tree planting, wood from trees used for packaging materials
- Product / packaging may be produced using recycled materials
- Support maintained to ensure resources do not run out, e.g. use electricity from renewable sources e.g. solar / wind power
- Examples: reduction in packaging to reduce use of wood pulp tree plantations.
- Used local /regional to reduce food miles/pollution
- Seasonal ingredients
- Support local farmers markets
- Use allotments to grow your own.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
The candidate has a basic grasp of terminology. This candidate does not have a clear idea of what s/he is writing about.	*1 – 2 marks*
The candidate has some knowledge of relevant terminology but there will be less clarity of understanding and may only refer in detail to one of the terms.	*3 – 4 marks*
The candidate has a thorough understanding of relevant terminology and has provided relevant explanations to support the knowledge shown. This candidate knows what s/he is writing about and provides clear evidence of understanding.	*5 – 6 marks*
	(6 marks)

5 (b) (i) Explain what is meant by *Fairtrade* and discuss why sales of Fairtrade products have increased.

Marking guidance
For full marks to be awarded candidates must 'explain' what is meant by Fairtrade **and** discuss sales trend.

*Reminder: QWC is also assessed in this question.

Explanation:

- Enables workers -producers – farmers / to improve their position and have more control over their lives.
- Supports paid a fair terms of trade /guaranteed price for their products
- Both here and in the developing world
- Requires companies to pay sustainable prices/never lower than market price.
- Ensures better working conditions
- Supports local sustainability / most products are from physically traceable sources
- Ensures a reasonable standard of living for workers in poorer developing countries.
- Addresses injustices of convention trade/which discriminates against poorest/weakest producers.
- Many Fairtrade cooperatives reinvest profits in health, community and education projects in local areas.
- Fairtrade labelling international (FLO) sets all standards for fair trade.
- Use the Fairtrade mark on products/to guarantee they have been certified against Fairtrade standards.

Sales trends:

- Consumers are more aware of human rights / want to support a good cause
- Therefore buy more products where human rights are recognised
- Increasing range of Fairtrade products now available on sale.
- More supermarkets now sell Fairtrade products increasing awareness.
- Media coverage increases awareness
- Celebrity campaigns increase awareness
- Internet information/website informs consumers
- Products are recognised by the FAIRTRADE Mark.
- May give examples from the table/ or give examples of other Fairtrade products, e.g. bananas, fruit juices, dried and fresh fruit and vegetables, chocolate, cocoa, cereal bars, biscuits, nuts, rice, spices, wine. Also covers non-food products e.g. Beauty products, cut flowers, sports balls and ornamental plants.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit.	*0 marks*
The candidate has a basic but possibly confused grasp of Fairtrade. This candidate does not have a clear idea of what s/he is writing about. Little structure in response, several errors in spelling, grammar and punctuation.	*1 – 3 marks*
The candidate has some knowledge of Fairtrade but there will be less clarity of understanding. Fairly well structured answer with correct use of some Design technology terminology and only a small number of grammatical errors.	*4 – 6 marks*
The candidate has a thorough understanding of Fairtrade and has provided relevant explanations to support the knowledge shown in both sections. This candidate knows what s/he is writing about and provides clear evidence of understanding. Response is well structured with a good use of appropriate design Technology terminology. Good use of grammar, punctuation and spelling.	*7 – 8 marks*
	8 marks

5 (b) (ii) Explain the disadvantages of using Fairtrade ingredients when designing new food products.

- May be more expensive
- Puts up selling price of product
- Increased selling price may reduce profit/sales for manufacturer/retailer.
- Limited availability – some products are seasonal
- Range of foods is limited, but growing
- Not all shops stock Fairtrade products
- Public concern over food miles may damage this important development work/if people choose not to buy products for this reason.
- Often multicultural flavours not always liked by all consumers
- Other relevant responses.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
The candidate has a basic but possibly confused grasp of issues. This candidate does not have a clear idea of what s/he is writing about.	*1 mark*
The candidate has some knowledge of issues but there will be less clarity of understanding.	*2 marks*
The candidate has a thorough understanding of issues and has provided relevant explanations to support the knowledge shown. This candidate knows what s/he is writing about and provides clear evidence of understanding.	*3 marks*
	(3 marks)

TOTAL FOR QUESTION 5 – 17 MARKS

Question 6

6 (a) **The following items of equipment are used when making food products. For each item give one advantage and one disadvantage.**

For each item, 1 mark for each advantage and 1 mark for each disadvantage.

Microwave oven
Advantages:

- Quick
- Low cost
- Good for individual / small portions
- Can use timer
- Good for range of activities / styles e.g. defrosting, combination, reheating, grilling

Disadvantages:

- Large products cannot fit in
- Some foods are not suitable for cooking in microwave
- Some materials are unsuitable for use in microwave e.g. metal baking tins
- Hot and cold spots occur if not stirred
- Does not brown foods

A large scale oven
Advantages:

- Good for larger numbers of products
- Batch or continuous flow, mass production methods
- Consistency of controls e.g. time, temperature
- Can use computer aided making fewer staff/ avoids human error.

Disadvantages:

- Expensive to set up
- Not suitable for small scale production
- Takes up a lot of space
- Needs specialist cleaning between batches, time consuming/costly.
- Multiple products cooked at same time need same temperature/restrictive.
- Visual checks are difficult due to size. e.g. cannot see back products.

A bread maker

Advantages:

- Portable
- Can be used for different yeast mixtures
- Many have both bread and dough styles
- Can add own choice of flavouring, toppings, crust
- Good for individual sized portions
- Cheap to buy
- Little training needed / do not need to know how to make bread before use as instructions given
- Some will also cook cakes and preserves
- Can provide bread when no one there
- Automatic controls for time / temperature
- Removes human error.
- Consistent product. Every time.

Disadvantages:

- Limited size, shape
- Can only cook one product at a time/limited use.
- Difficult to clean
- Can take up workspace
- Can take a long time / several hours to complete cooking

(6 marks)

6 (b) (i) **What are the recommended temperatures for the following?**

Reheating cooked foods
Storing chilled foods

Reheating foods: 75^{o}C (accept 72 – 75^{o}C) – maximum 1 mark
*Scottish requirement is 82^{o}C.acceptable.

Storing chilled foods: blast chilling 4^{o}C is within range (accept 0 – 4 C or 'below 5^{o}C') – maximum 1 mark

Credit any responses within the agreed ranges.

(2 marks)

6 (b) (ii) **Name an item of equipment used to check the temperature of foods when reheating.**

Equipment used to check temperature of reheated foods:

- Food or temperature probe
  Do not accept 'thermometer'

(1 mark)

6 (b) (iii) **Describe the correct procedures to follow when using the equipment you have named in part (b)(ii).**

- Sterilise / clean with antibacterial wipe (clean not acceptable unless qualified, do not accept disinfect)
- Make sure sterile before and after use
- Check reading before start (ideally room temp)
- Place into centre of food / core temperature
- Do not touch container/baking tin with probe
- Keep in place for 2 minutes
- Check temp is 72^{o}C or over
- Remove from food /take the reading when it is stable/after 2 minutes
- If not at correct temperature continue cooking food and re-apply later.

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
The candidate has a basic but possibly confused grasp of reheating temperature checks. This candidate does not have a clear idea of what s/he is writing about.	*1 mark*
The candidate has some knowledge of reheating temperature checks but there will be less clarity and detail in understanding of procedures.	*2 marks*
The candidate has an understanding of reheating and temperature checks and has provided relevant explanations to support the knowledge shown. This candidate knows what s/he is writing about and provides clear evidence of understanding.	*3 marks*
	(3 marks)

6 (c) Explain what will happen to food stored in the freezer section at -18 °C.

Freezer shows -18°C which is correct temperature means:

- Water in food / stored here will remain frozen/solid
- fast freezing produces small ice crystals so reduces damage to food structure
- slow freezing produces large crystals leading to cell damage for some fruit and veg
- sensory properties e.g. taste, flavour, colour, shape will be maintained for most foods (not some fruit / veg)
- nutritional value will be maintained
- food will not decay while correct temperature and storage time are maintained
- Shelf life extended
- Bacteria stop growing – dormant – water changes to ice crystals making it unavailable for bacterial growth.
- bacteria are not killed!- will become active again on thawing
- enzyme action is slowed down but not destroyed.

Explain what will happen to food stored in the refrigerator section at 10°C.

Refrigerator temperature shows 10°C which is too high/incorrect. Food stored here will:

- Perishable food will have its shelf life reduced/ food will not last as long.
- Bacteria will grow/breed
- Temperatures are in danger zone / 5 – 63°C (extended answer)
- Chilled food will not be safe to eat
- Danger of food poisoning and
- Health concerns if food is eaten.
- Quality of food will suffer e.g. texture
- Correct temperatures should be: 1 – 6°C perishables
- Correct temperatures for high risk perishables should be 1 – 4°C

Marks awarded as follows:	**Mark Range:**
No answer worthy of credit	*0 marks*
The candidate has a basic but possibly confused grasp of chilling and freezing. This candidate does not have a clear idea of what s/he is writing about.	*1 – 2 marks*
The candidate has some knowledge of chilling and freezing but there will be less clarity of understanding. Knowledge may be limited to one aspect only.	*3 – 4 marks*
The candidate has a thorough understanding of chilling and freezing and has provided relevant explanations to support the knowledge shown although one section may be stronger. This candidate knows what s/he is writing about and provides clear evidence of understanding.	*5 – 6 marks*
	(6 marks)

TOTAL FOR QUESTION 6 – 18 MARKS

TOTAL FOR SECTION B – 90 MARKS

TOTAL FOR QUESTION PAPER – 120 MARKS