Version 1.0

General Certificate of Secondary Education June 2010

Design and Technology (Food Technology) 45451

Unit 1

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 meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting 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 candidates' 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 to download from the AQA Website: www.aqa.org.uk

Copyright © 2010 AQA and its licensors. All rights reserved.

COPYRIGHT
AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

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

1 (a) On the opposite page, sketch two different design ideas for a savoury, main meal product.

For each sketch:

Design ideas should be for an animal protein based main meal, which includes a flavoured sauce, contributes to the 5 a day campaign and offers sensory appeal.

- Two different design ideas should be communicated through sketches, including 2D, 3D or cross section. E.g. meat product

Annotation should show:

- Suitability for a main meal product that uses protein rich ingredients from a named animal source, eg reference should be made to inclusion of named meat or fish, cheese, eggs, milk
- The inclusion of a flavoured sauce. Answers must include the name of the flavour e.g. flavoured white sauce to coat may use cheese, onion herbs, mustard, or may have a flavoured sauce that is used as a binding agent, eg rissoles, may use tomato sauce as a main component eg tomato based in lasagne, beef gravy.
- Contributing to the 5 a day campaign, eg highlight where these come from i.e. vegetables, may also mention portion size, nutritional value of vegetables chosen.
- Suitability for providing sensory appeal eg answers should include descriptors linked to aroma, colour, texture, shape, variety of flavours, finishing techniques..
- Credit may also be given for extra design information eg finishing techniques, cooking / preparation methods, portion control, number of servings.

Marks awarded as follows:

For each sketch:

Sketch and / or annotation attempted but only one design criteria met, May be an inappropriate choice of product 0-2 marks

Sketch / annotation shows basic ideas for a relevant product that meets most of the design criteria – but may not be communicated clearly 3-4 marks

Recognisable sketch / annotation showing good communication of main features and fitting all the design criteria for a relevant product 5-6 marks

(12 marks)

1 (b)(i) Using the chart below, produce a plan for making your chosen design idea in a test kitchen.

Candidates should produce a plan for making using the chart given.

Answer should show an awareness of different aspects of planning that make up a production system, eg at least one reference to some of the following may be included:

Stages of making:
- Clear, logical schedule
- Specialist terminology techniques
- Named cooking methods/processes
- Key times
- Key temperatures

Hygiene and safety checks:
- Personal hygiene
- Kitchen hygiene
- Food hygiene
- Safety points for workers

Quality control checks:
- Size / portion control
- Accurate weighing of ingredients
- Shape
- Appearance/accuracy/garnish
- Consistency
- No foreign bodies e.g. egg shells
- Feedback from control checks
- Finishing techniques used

Answers may appear in any column. **Do not** credit packaging, metal detection or bulk production as this is a test kitchen.

Marks awarded as follows:

Simplistic answer giving limited or no relevant planning 0-2 marks
Some parts detailed, may not be logical, some key areas for successful production omitted 3-4 marks
Logical planning with a range of different information 5-6 marks
Answer showing logical plans, clarity of instruction and detail 7-8 marks

(8 marks)

1 (b)(ii) Name one material suitable for packaging your chosen design idea.

i.e. plastics, aluminium (not tin), foil tray or paperboard (not cardboard)
Incorrect answer 0 marks
Correct answer 1 mark

(1 mark)

1 (b)(iii) Give two reasons why this material is suitable.

Examples of possible responses:

- May be thermo plastics
- Moulded into shapes
- Strong / flexible
- Cheap
- Easy to stack and store
- Withstands heat if heated in container
- May be suitable for reheating in microwave
- Withstands low temperatures of freezer
- Recyclable
- Can be sealed
- Impermeable to contamination
- Easy to print onto
- Water resistant
- Can be rigid or biodegradable
- Available in different thicknesses
- Other relevant answers.

Incorrect answer	0 marks
One correct answer	1 mark
Two correct answers	2 marks

(2 marks)

1 (c)(i) Complete the table below to show two different nutrients provided by your chosen design idea.

Protein for energy, repair, growth **no mark** as given in example

For others credit each appropriate nutrient given for 1 mark
Credit correct functions for 1 mark each, e.g.
Carbohydrate for energy
Fat for energy, warmth, protection
*Mico nutrients must be named not generic references. E.g.
Vitamin A for healthy eyesight, mucus membranes, healthy skin issue, night vision
Vitamin B for release energy, formation of red blood cells
Vitamin C for general good health, iron absorption, healthy skin, gums, builds immune system and fights infection
Vitamin D for calcium absorption and growth and maintenance of strong bones
Vitamin E, K, sodium, phosphorous, flouride
Iron for healthy blood and transfer of oxygen around body
Calcium for healthy bones and teeth, healthy muscles and nerves

Do not accept water or fibre as nutrients

Marks awarded as follows:

Incorrect answer	0 marks
Named nutrient but incorrect function	1 mark
Named relevant nutrient and correct function in the body	2 marks

2 x 2 marks

(4 marks)

1 (c)(ii) Explain how your chosen design idea could be developed for consumers who are vegetarians.

May change ingredients, eg name substitutes, such as soya based ingredients in place of dairy
Vegetable based proteins (peas, beans, lentils)
Also related answer to alternative sources of protein, eg quorn, soya, tofu, halloumi cheese, tivalli – wheat and vegetable based protein
Sauce could use soya milk
Differences between lacto and vegan vegetarians can be credited, eg lacto(ovo)vegetarian - eggs and dairy products, vegan – no animal products

Marks awarded as follows

Incorrect answer	0 marks
Answer gives basic idea for changing	1-2 marks
Answer gives at least one change with a reason or two changes without a reason	3 marks

(3 marks)

2 (a)(i) Give two ways a computer could be used when researching market trends.

Any two from the following, or any other acceptable answer:
Must name methods not generic answers indicating 'getting information'

- e-mail,
- websites of manufacturers,
- internet searches,
- use of cd roms,
- processing questionnaires – writing,
- spreadsheets – recording results,
- quicker analysis of data than humans
- on-line questionnaires / surveys

Marks awarded as follows:

Incorrect answer	0 marks
One correct answer	1 mark
Two correct answers	2 marks

(2 marks)

2 (a)(ii) Give two advantages of using computers to carry out research.

- Less human error / more reliable / quicker
- Cheaper than employing extra staff to research / in long term
- Greater accuracy and up to date information
- Wider range of information available
- More consistent
- Easier to carry out analysis of statistics / results
- Can be carried out when human not present, 24/7
- Clearly presented results eg graphs, charts
- Can make changes easily to update current data
- Results can be analysed quickly, eg on Excel
- Easier to import other programs and software
- Other relevant answers

Marks awarded as follows:

Incorrect answer	0 marks
One correct answer	1 mark
Two correct answers	2 marks

(2 marks)

2 (a)(iii) Explain one disadvantage of using computers to carry out market research.

- May be expensive to set up initially / decreasing profits
- Need to decide on validity of entries on websites or other information used otherwise results are worthless
- Need to train staff in it use or inaccuracies will result
- If information is inaccurate it can affect success of future products based on research
- Lack of human interaction may lead to incorrect results
- Lack of compatibility between software programs
- Difficulties/costly if system breaks down, need back up

Marks awarded as follows:

Incorrect answer	0 marks
One correct answer showing some understanding	1 mark
Well explained, detailed answer	2 marks

(2 marks)

2 (b)(i) Which type of ready meal product was most popular in the year 2000?

- Canned and ambient meals

Incorrect answer 0 marks
Correct answer 1 mark

(1 mark)

2 (b)(ii) Which type of ready meal product may be most popular in 2010?

- Frozen meals

Incorrect answer 0 marks
Correct answer 1 mark

(1 mark)

2 (b)(iii) Which type of ready meal product may be least popular in 2010?

- Dried meals

Incorrect answer 0 marks
Correct answer 1 mark

(1 mark)

2 (b)(iv) Which type of ready meal product is predicted to make the largest increase in sales between 2005 and 2010?

- Chilled meals

Incorrect answer 0 marks
Correct answer 1 mark

(1 mark)

2 (c)(i) What is meant by each of the following terms?

Chilled food:

- Foods that must be stored in a refrigerator
- Store between 0-5°C for up to a maximum of 5 days
- Extends shelf life for a short period only
- Candidates may give an example of a chilled food
- Chilled foods are often perishable
- Bacterial growth is slowed down during chilling

*not 'cook chill'

Ambient food:

- Foods suited for storage at room temperature
- Room temperature is around 20°C
- These may be fresh foods
- Candidates may give an example of an ambient food

Other relevant examples accepted

Marks awarded:

Incorrect answer	0 marks
Simplistic / basic answer	1 mark
Answer includes at least 2-3 of the given (or other acceptable) examples in detail. May only have described one type of food correctly	2-3 marks
Answer describes both types of food successfully	4 marks

(4 marks)

2 (c)(ii) Explain why ready meal products are popular with consumers.

Acceptable answers such as:

- Lifestyle changes / fewer family meals / less time to prepare and cook meals / no set mealtimes
- Some are individual portions/good if special diet/age related needs in single family member
- lack of practical skills
- introduction of novel and functional foods
- people want to try new ideas
- healthy option products available
- Wider availability
- Wide range of product types
- meet different consumer budgets and needs (may give credit for examples)
- Good when cooking facilities are limited e.g. bedsits/only microwave
- more people live alone
- quick to cook and serve

Marks awarded as follows:

Incorrect answer	0 marks
One or two simplistic basic answers given	1-2 marks
Answer includes up to 4 of the given answers or fewer with detailed answers	3-4 marks
Answer describes several reasons, some may be extended answers giving full explanations	5-6 marks

(6 marks)

3 (a)(i) Complete the chart below to explain two developments that will help each product meet healthy eating guidelines.

Eclairs:

- Removal of cream or lower fat cream
- Use creme fraiche in place of cream
- Custard based filling
- Use of yoghurt in place of cream / chocolate
- Fruit fillings
- Lower fat ingredients e.g. chocolate, use carob instead of chocolate
- Drizzle rather than spread chocolate
- Omega 3 enriched eggs
- Use ½ wholemeal ½ plain white flour
- Other relevant answers

Reasons for choice:

- Related to ingredients chosen
- Meets 5 a day rule
- eg adds vitamins, minerals, lower in fat, lower in sugar etc
- Healthier fillings will lead to healthier eating and help avoid future health problems, e.g. heart disease, diabetes, obesity (credit for naming problem/example)
- Lower in KCals

Sausage rolls:

- Lower fat sausages/leaner meat with higher percentage meat content
- Roll pastry thinner / use less pastry / reduce fat content in pastry
- Use vegetarian alternatives to sausages
- Do not use lard / butter (use vegetable fats)
- Lattice topping to reduce pastry amount.
- Combine meat with diced vegetables

Reasons for choice:

- Flaky / rough puff pastry is highest proportion of fat in recipe compared to other pastry types –
- change to shortcrust / filo etc which have lower fat %
- Too high fat content can lead to health problems eg heart disease, obesity
- Adding vegetables to filling contributes to Vitamin C intake and 5 a day and is lower in saturated fats, lower KCals in diet

Sandwich Cake:

- Replace flour with higher fibre content, part or whole eg wholemeal flour
- Add fresh fruit to filling instead of the cream
- Add grains to the top
- Additions of nuts / fruits eg sultanas, apricots, lemon rind

- Reasons for choice:
- Wholemeal flour adds fibre, aids digestion
- Addition of colour / texture
- Meets nutritional guidelines for healthy eating
- Higher NSP content prevents constipation, diverticulosis, bowel disorders and lowers cholesterol levels

Marks awarded as follows:
Incorrect answers 0 marks
Some correct development ideas, but several omissions 1-4 marks
Answers show some understanding of development but may lack clarity of reasons or meeting healthy eating guidelines 5-7 marks
Detailed understanding of development for all products 8-12 marks

(12 marks)

3 (a)(ii) How do food manufacturers inform consumers about healthy eating guidelines?

- Labels on packaging, which may also give dietary advice etc,
- Use the traffic light system and give nutritional charts
- Show portion size recommended on packaging.
- Advertisements in magazines / on television
- Use of websites
- Special claims on packaging
- Other relevant points accepted

Marks awarded as follows:
Incorrect answer 0 marks
Answer gives some methods, one method may be in detail 1-2 marks
Shows good knowledge of several methods used 3 marks

(3 marks)

3 (b) Explain five key features of the 'Eat well Plate'.

*It is recommended that the full response is read before allocating marks holistically.

Recommendations for eating for good health / portion size
Divided into five sections, named
1 Fruit, Veg
2 starch
3 milk and dairy
4 food and drink high in fat and sugar
5 meat, fish, egg, beans (protein)

- Further details: 1/3 starch, 1/3 fruit and veg, 1/3 other sections
- (foods high in fat and sugar smallest section, consumers advised to eat least of these)
- Plate is designed to show the importance of eating the correct amount and balance of sectors
- Credit can be given for extended answers / reasons of why these are important, eg prevention of medical problems such as heart disease, diabetes etc
- Credit can be given for other information on the 8 recommendations for healthy eating – eat more fish, eat less salt, being active and try for a healthy weight, drink plenty of water, do not skip breakfast, eat more NSP, base meals on starchy foods (1 mark max)

Marks awarded as follows:
Incorrect answer 0 marks
Simplistic answer, eg names of sections 1-2 marks
Answer includes at least 2-3 of the given answers, some may be in detail 3-4 marks
Answer gives detailed examples / may also give reasons / extended answers 5 marks

(5 marks)

4 (a) Complete the list of product specification points for this pizza product.

Answers may refer to
- shape,
- portion size,
- bases same size / identical thickness,
- number of servings,
- types of ingredients used in the filling eg cheese and tomato /
- strong plain flour for bread base,
- a variety of different toppings,
- how this would appeal to children of the right age, storage details,
- packaging details,
- cost,
- texture,
- colour/attractive/appealing,
- nutritional details,
- Italian ingredients,
- type of base used

Marks awarded as follows
Incorrect answers 0 marks
Up to 4 answers from list given (or other acceptable answers)
4 x 1 mark

(4 marks)

4 (b)(i) Explain two different control checks a test kitchen may make when adding pizza toppings.

- Temperature,
- cooking time,
- size,
- shape,
- weighing of ingredients,
- temperature of oven for cooking,
- size of prepared cheese eg fine grated,
- size of veg,
- colour / presentation of cooked product,
- answers may relate to standard component used

Marks awarded as follows, for **each** control check
Incorrect answer 0 marks
Answer gives a control check – limited explanation 1 mark
Shows good knowledge of control checks 2 marks
2 x 2 marks

(4 marks)

4 (b)(ii) Explain how each problem may be prevented.

Problem	Cause	Prevention
Pizza slices dry	• Insufficient liquid in bread base • Temperature too high / cooking time too long • Too much flour when rolling out • Control checks not completed • Used tomatoes on topping instead of puree with moisture • Insufficient topping	• Cook for correct time and at correct temperature • Use of food probe to check cooking • Use plenty of tomato base • Lightly flour when kneading base and rolling out dough
Dough base did not rise	• Inactive yeast • Water too hot and kills off yeast • Incorrect weighing of ingredients • Incorrect storage • Insufficient control checks or kneading • Temperature of water too cold • Insufficient time for dough to rise / prove	• Weigh using digital / electronic scales • Ensure water only hand hot • Make sure the temperature where stored for raising / proofing is correct • Do not use old yeast

(8 marks)

Marks awarded as follows:
Incorrect answer 0 marks
Answer gives correct cause 1 mark
Shows good knowledge of both cause and how to prevent the problem happening again 2 marks
4 x 2 marks

4 (c) Explain how the use of standard components can give a consistent pizza product.

- Fewer staff needed therefore less chance of human error so more accuracy
- Standard components are always same size,
- Same shape
- Usually from the same manufacturer so reliable consistent quality outcomes.
- Nutritional profile of product is consistent
- Sensory qualities should be consistent
- Avoids potential contamination
- Any other relevant answer
- Examples relating to pizza products may be credited, e.g. use of ready made bases, puree/sauces, grated/sliced cheese etc

Marks awarded as follows:

Incorrect answer	0 marks
Answer gives some methods, or some answers may be in more detail	1-2 marks
Shows good knowledge of several ways of obtaining consistency is shown	3-4 marks

(4 marks)

5 (a) How do food workers prepare themselves and make sure they are hygienic and fit for work?

- Wearing clean (disposal) aprons / overalls
- Short clean nails / prevent build up of dirt and bacteria / wash hands with antibacterial wash and hot water before handling food
- Apply 'Safer Food Better Business' rules
- Hats to cover hair / shoe covers / beard covers / disposable gloves
- Remove jewellery and nail varnish
- Wear flat, sensible shoes for use in kitchen – no outdoor shoes
- No illness – reported
- Wear blue plasters if any cuts / boils etc
- Do not chew or smoke near food
- Do not touch hair, nose, mouth, ears, before handling food

Marks awarded as follows:

Incorrect answer	0 marks
Answer gives some correct simplistic answer	1-2 marks
Shows good knowledge of personal hygiene	3-4 marks
Shows good range of several, well explained responses.	5 marks

(5 marks)

5 (b)(i) Explain why food probes are used in a test kitchen.

- For food safety – checking of temperatures
- Accurate way of measuring that food is safe to eat, tests core temperature of food
- Checks food has reached high enough temperature to kill off food spoilage bacteria / prevent occurrence of food poisoning
- Credit should be given to specific temperatures when using food probe

Marks awarded as follows:

Incorrect answer	0 marks
Answer shows simplistic knowledge	1 mark
Shows good knowledge of why food probe used	2 marks

(2 marks)

5 (b) (ii) Give three instructions that need to be followed when using a food probe.

- Sterilise / thorough cleaning before use.
- Sterilise /thoroughly clean after use,
- place into centre of food,
- do not touch the baking tin / equipment,
- leave in until temperature rises,
- ensure food core temperature reaches 72°,
- check starting temperature,
- leave in place for 2 minutes

5 (b)(iii) Explain how refrigerators and chillers are kept at the correct temperature for safe food storage.

- Training of staff,
- use of thermometers,
- mention of correct temperatures refrigerator 0-8C chillers 0-3C
- alarms if temperatures are interrupted (eg power cuts),
- may mention need for correct temperatures to prevent bacterial growth
- use of sensors,
- regular monitoring and logging of data,
- doors kept shut when not in use,
- correctly store foods inside,
- regular maintenance of equipment
- not over packed, checking of load lines,
- control checks used

Marks awarded as follows:

Incorrect answer	0 marks
Answer gives some methods, one may be in detail	1-2 marks
Shows good knowledge of several methods used	3-4 marks

(4 marks)

5 (c) Use the information from the graph to fill in the missing information in the reports.

Incorrect answer	0 marks
Report 1	0-5C allow any in this range (1 mark)
Report 2	5C (1 mark) to 63C (1 mark)
Report 3	70- 79 C allow any in this range (1 mark)

(4 marks)

6 (a) Explain some of the issues related to the packaging of food products.

Answers may relate to any of the points given below or other relevant points not listed. Candidates may discuss good positive and negative concerns.

- Excess use leads to poor environmental control / deforestation / world's natural resources (eg oils) running out
- Use of recyclable packaging /biodegradable/concern over length of time to decompose
- Ethical/ environmental /moral concerns/issues.
- no use of packaging if preferable but need to package certain foods and for cooking
- Land fill
- Storage problems for foods and left over packaging
- Queries over information provided on packages e.g. nutritional labelling
- Chemicals used in some food packaging
- Impact/harm of wildlife
- New technologies – vacuum packaging, nanotechnology/coatings,MAP, asceptic – benefits and advantages
- Extra cost

Marks awarded as follows:
Incorrect answer 0 marks
Simplistic answer, with little structure in response, several errors in spelling, grammar and punctuation 1-2 marks
Two simplistic or more detailed answers given. Fairly well structured answer with correct use of some Design Technology terminology and only a small number of spelling and grammatical errors 3-4 marks
A detailed answer that accurately includes a range of points. Response is well structured with a good use of appropriate Design Technology terminology. Good use of grammar, punctuation and spelling. 5-6 marks

(6 marks)

6 (b) Explain some of the issues related to food miles.

- Concerns that food has travelled long distances before sale
- Lack of nutrients
- Not as fresh as perceived
- Increase of CO2 emissions – leads to global warming
- More consumers want use of local produce
- Do not want to pay extra costs for transporting
- Good for foods out of season or foods from different cultures, or for foods otherwise not available – eg tropical fruits
- Support for workers in Third World countries, eg FairTrade
- Foods often cheaper when produced in other countries
- Credit for specific examples, eg roast dinner, bananas, exotic fruits

Marks awarded as follows:

Incorrect answer 0 marks
Answer gives several limited responses or one in more detail 1-2 marks
Shows good knowledge, gives a balanced discussion of positive and negative points or several main concerns 3-4 marks

(4 marks)

6 (c) Explain some of the issues related to the use of new technologies to extend shelf life, eg GM foods or nanotechnology.

Answer may relate to GM, nanotechnologies or other relevant new technology.

- Credit can be given for naming another technology, eg modified atmospheric packaging for increased shelf life because food is hermetically sealed
- Concerns that chemicals may harm the consumer
- Concerns that future side effects not yet known
- Good that they may extend shelf life or improve food stuffs in some way
- Often thought that artificial developments are not natural
- Cost of developing new technologies
- By law, GM foods should be specified on label
- Aseptic packaging is an alternative to canning and allows food to stay fresh for up to 6 months

Marks awarded as follows:

Incorrect answer 0 marks
Simplistic answer 1 mark
Answer gives more than one response, or one in detail 2 marks

(2 marks)