



GCE Design and Technology: **Food Technology**

Unit 1 Materials, components and application (FOOD1)
Mark Scheme

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Mark schemes are prepared by the Lead Assessment Writer 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 associates 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 associate understands and applies it in the same correct way. As preparation for standardisation each associate 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, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

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.

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Section A

1. Name two food sources of folic acid.

[2 marks]

Sources could include:

Broccoli, Brussels sprouts, green leafy vegetables e.g. kale, cabbage, spinach, liver, asparagus, peas, chickpeas, brown rice, fortified breakfast cereals, wholegrain foods, wheat bran, oranges and orange juice, poultry, shellfish, yeast and beef extracts

Any other correct source will be credited.

1 correct source – 1 mark
2 correct sources – 2 marks

2. State two functions of fat in the diet.

[2 marks]

Functions could include **two** of the following:

- Fat is the richest source of dietary energy (1)
- Fat provides fat-soluble vitamins (A,D,E and K) and is necessary for their absorption (1)
No separate marks allocated for individual vitamins.
- Fat insulates the body and helps to retain heat (1)
- Fat protects internal organs such as the kidneys (1)
- Fats are sources of essential fatty acids (linoleic and linolenic acids) an important dietary requirement (1)
- Fats play a vital role in maintaining healthy skin and hair (1)
- Fats promote healthy cell functions (1)
- Fats add flavour to foods (1)

1 correct function – 1 mark
2 correct functions – 2 marks

3. Name two units which are used to measure energy in food products.

[2 marks]

Correct answers:

- Kilocalories / Kcal – 1 mark maximum
- Kilojoules / KJ – 1 mark maximum

For each unit, candidates only have to give the name **or** the abbreviation to get 1 mark.

4. Define and explain the term BMR.

[2 marks]

Definition (1 mark maximum)

Correct definition is Basal Metabolic Rate. (Base and basic are also acceptable.)

Explanation (1 mark maximum)

Possible correct explanations:

- The rate at which the body works whilst at complete rest i.e. maintaining processes such as heart beat, respiration, excretion – 1 mark

Any other correct explanations can be credited.

5. State the function of soluble and insoluble NSP (Non Starch Polysaccharide)?

[2 marks]

Soluble NSP may help to reduce the amount of blood cholesterol. It is partially digested, whereas the role of **insoluble NSP is to** help other foods move through the digestive system more easily, keeping bowels healthy and preventing digestive problems, as it passes through the digestive tract undigested. This process takes time and helps to keep blood sugar levels constant.

No examples to be credited

Mark breakdown

Candidate shows understanding but does not have a clear idea of the difference between soluble and insoluble – 1 mark

Response is accurate and candidate shows a thorough and comprehensive understanding of the difference between the functions of soluble and insoluble NSP – 2 marks

6. Give two examples of how food combinations could demonstrate complementation of protein in the diet.

An example is given below. Do not repeat this example.

Example: Beans on wholemeal toast

[2 marks]

1 mark for each correct example (no marks for example given in the question):

- rice and peas (1)
- vegetable chilli beans and rice (1)
- rice and dhal (1)
- peanut butter sandwich (wholemeal bread) (1)

Any other relevant combinations will be credited.

Must be 2 low biological value proteins

No marks credited for sources of high biological value such as soya, animal products, myco protein and fish.

7. A lack of calcium can lead to deficiency diseases.

Using examples, discuss how these diseases could be prevented.

[4 marks]

Examples of deficiency diseases could include:

Rickets, osteoporosis, dental caries, brittle hair and nails.

They can be prevented by:

- Consuming dairy products such as milk, cheese and other.
- Bread is an important source in the UK because most bread flour (though not wholemeal) is fortified with calcium by law and any other correct suggestions of fortification will be credited.
- Calcium is provided by some green leafy vegetables such as broccoli and cabbage (but not spinach), fortified soya products and fish eaten with the bones such as sardines, tinned salmon and whitebait.
- Vitamin D (the nutrient interaction needed to prevent the diseases).
- Sunshine is a good source of Vitamin D and can be credited.

Only 1 mark given if only 2 diseases named and no discussion

4 marks	Accurate and relevant examples of deficiency diseases caused by a lack of calcium are linked to a comprehensive and accurate discussion of how the diseases chosen could be prevented. Some answers may be extended and show greater detail.
2 – 3 marks	Examples may be given but may not always be accurate. Some discussion showing understanding of how the examples chosen could be prevented but will be limited in places. Some extended answers may be evident.
1 mark	A basic answer. Examples, if given, may be incorrect or very vague. Knowledge is very limited and restricted to a simplistic discussion. The candidate does not have a clear idea of how deficiency diseases could be prevented.
0 marks	No relevant responses.

- 8. Explain why the fortification of food is important to the health of the nation. Give examples to illustrate your answer.**

[4 marks]

Food fortification is a process of adding micronutrients to foods, which may have been removed during processing. A public health policy used by the Government, which aims to reduce numbers of people with dietary deficiencies in a population e.g. rickets, anaemia.

Some foods are fortified by law e.g. margarine and some voluntarily e.g. breakfast cereals.

Examples include:

- Margarine – vitamins A and D
- White and brown flour (not wholemeal) – Iron, Thiamine (Vitamin B1), Nicotinic acid or Nicotinamide and Calcium Carbonate
- Breakfast cereals – iron and B group vitamins
- Soya products - calcium

4 marks	Comprehensive and accurate discussion of why fortification is important to the health of the nation, with a range of examples given to show real understanding. Some answers may be extended and show greater detail.
2 – 3 marks	Some discussion showing understanding of the importance of fortification. Some examples may be given but may not always be accurate.
1 mark	A basic answer. Examples, if given, may be incorrect or very vague. Knowledge is very limited and restricted to a simplistic discussion. The candidate does not have a clear idea of how deficiency diseases could be prevented.
0 marks	No relevant responses.

Section B

9 (a) Discuss the nutritional requirements that should be considered when designing food products for vegetarians.

[10 marks]

Consideration must be given to the fact that there are a range of types of vegetarian to consider. Answers could include reference to:

- **Lacto-ovo vegetarians**
 - A wide range of products to choose from as these consumers eat both dairy products such as milk and yoghurt and vegetarian cheese and eggs which contain **high biological value protein**, although **saturated fat** content however must be considered when high fat cheeses are used e.g. mozzarella and Cheddar.
 - Vitamin and minerals readily available through the range of fruits and vegetables used, but the **high insoluble NSP** content of them can **compromise the uptake of iron and calcium**.
 - Iron comes in a **ferric form** and is less available to humans than the haem version found in red meat in particular
- **Lacto vegetarians**
 - As above, but do not consume eggs.
- **Vegans**
 - Do not eat dairy products, eggs or any other animal product, so it is important to combine sources of **low biological protein** (complementation) and include the use of soya based products (beans, tofu, tempeh) which are good sources of high biological value protein.
 - With the lack of cow's milk, **Calcium, and Vitamin D** must be obtained from other sources e.g. fortified soya, rice and oat drinks, calcium-set tofu, sesame seeds and tahini, pulses, brown and white bread. In the UK calcium is added to white and brown flour by law, so this could form a component of a product. Other sources include dried fruit such as raisins, prunes, figs and dried apricots.
 - **Iron** (ferric) can be provided with the use of pulses, wholemeal bread and flour, breakfast cereals fortified with iron, dark-green leafy vegetables such as watercress, broccoli and spring greens, nuts, dried fruits such as apricots, prunes and figs and **Vitamin B12** normally obtained from meat can be obtained from soya drinks fortified with vitamin B12, yeast extract such as Marmite

8 – 10 marks	Responses give a detailed discussion of a wide range of nutritional requirements and give a full explanation of why they need to be considered when designing food products for vegetarians. Discussion is relevant and accurate.
4 – 7 marks	Responses will identify some requirements to be considered but discussion may not always be relevant or accurate.
1 – 3 marks	Responses will be superficial with few or no discussed requirements. Responses may be unfocussed and may not necessarily discuss the main issue raised in the question.
0 marks	No relevant responses.

9 (b) Food technologists use sensory tests to assess the viability of newly designed products for a target group. Describe these different tests.

[10 marks]

There is a set of standard tests which can be used by industry. These are laid down by British Standard (BS5929).

- **Preference Tests**
 - These supply information about people's likes and dislikes of a product.
 - They are not intended to evaluate specific characteristics, such as crunchiness or smoothness.
 - They are subjective tests and include pair comparison, hedonic and scoring.

- **Discrimination Tests**
 - These aim to evaluate specific attributes, i.e. characteristics of products (crunchiness).
 - They are objective tests and include pair comparison, duo trio and triangle.
 - Will be carried out in specially designed kitchens in retail Food Product Development centres and organisations such as the Leatherhead Food Research Association.

Trials may also be carried out in retail outlets to test public interest including:

- **Free food samples** – given to visiting shoppers at the launch of a new product.
- **Taste testing** – carried out in sensory booths in food product development kitchens.
- **Focus groups** – targeted consumers invited into stores to trial product designed for their population sub group.

8 – 10 marks	Responses will look at a wide range of tests with a full and detailed description of each. Descriptions are accurate and comprehensive demonstrating that the candidate has a clear understanding of the sensory tests that could be used by food technologists when assessing viability.
4 – 7 marks	Responses will include a number of tests, but these may be superficial in places. Description may not always be accurate.
1 – 3 marks	Responses will be superficial with few or no tests described. Descriptions may be unfocussed or inaccurate and may not necessarily focus on the main issue.
0 marks	No relevant responses.

10 (a) Describe the factors that food manufacturers must consider when developing products to appeal to consumers on low calorie diets.

[10 marks]

Possible answers could include factors such as those listed below:

- low or have no saturated fat – using monounsaturated fats such as rapeseed oil instead of butter or other hydrogenated fats.
- low in simple sugars (monosaccharides). Perhaps by using artificial sweeteners instead
- high in complex carbohydrates (Non-Starch Polysaccharide) to provide a feeling of satiety and avoid the desire to snack on other foods, e.g. appropriate ingredients such as sweet potato and lentils.
- have regulated portion size to avoid over consumption of calories.
- be attractive and appealing to consumers.
- constitute part of a well-balanced daily food intake.
- be affordable.
- high protein.
- be quick and simple to cook and serve.
- allow for a small component of ‘treats’ among the range of products designed.

Marks will be credited for other appropriate responses.

8 – 10 marks	Responses give a detailed discussion of a wide range of factors and a full explanation of why they need to be considered when developing products to appeal to low calorie diets.
4 – 7 marks	Responses will identify some requirements to be considered but discussion may not always be relevant or accurate.
1 – 3 marks	Responses will be superficial with few or no discussed requirements. Responses may be unfocussed and may not necessarily discuss the main issue raised in the question.
0 marks	No relevant responses.

10 (b) Discuss the impact that changing consumer lifestyles in the United Kingdom can have on the development of new food products.

[10 marks]

Answers could include reference to the following:

- Some consumers are opting to eat at home rather than at restaurants so ‘meals for two’ are proving popular.
- Busy/hectic lifestyles and part time working also create a demand for fast food products to be consumed ‘on the go’.
- The UK is also known as the ‘grazing nation’ and ‘products to go’ such as sandwiches, biscuits, cakes and ‘pot’ products are popular.
- During the current recession there has been an increased demand for affordable fast foods.
- With heads of household sometimes juggling one or more part time jobs, low cost meals such as pasta bakes to feed families at the end of the day.
- The multicultural nature of the UK and individuals love of travel has driven the popularity of a wide range of foods from nay different cultures e.g. curries, risottos, pizzas etc.
- Freezers and microwaves are now commonplace in most homes and these developments have driven the large growth in pre-prepared cook/chill products e.g. curries, pizzas, pasties etc.
- Greater health awareness and subsequent demand for healthier products e.g. low fat food products etc.
- Greater awareness of ethical issues e.g. increased demand for organic, vegetarian products etc
- Given the greying population, increased demand for products such as those with smaller portions, healthier nutrition content etc

Any other suitable points made will be credited.

8 – 10 marks	Responses give a detailed discussion of a wide range of the factors and give a full explanation of why they may be considered in the development of new food products.
4 – 7 marks	Responses will identify some requirements to be considered but discussion may not always be relevant or accurate.
1 – 3 marks	Responses will be superficial with few or no discussed requirements. Responses may be unfocussed and may not necessarily discuss the main issue raised in the question.
0 marks	No relevant responses.

Section C

11 (a) Describe how one or more savoury pasta products could be developed to:

- increase the iron content [5 marks]
- improve the aesthetic qualities [5 marks]
- increase the insoluble NSP (Non Starch Polysaccharide) content [5 marks]
- improve the Vitamin C content. [5 marks]

You may use annotated sketches to illustrate your answer if you wish.

Suggestions will vary based on the dish / dishes chosen and could range from hot dishes to cold salad products, with no side dishes credited.

Some candidates may choose to describe one savoury food product, others may describe more than one in their answer.

Increase the iron content adding:

- offal e.g. liver, kidney
- meat e.g. beef, lamb
- beans e.g. soya, fine green
- nuts e.g. pine, hazel, Brazil
- dried fruit e.g. dried apricots, cranberries
- most dark-green leafy vegetables, such as watercress and curly kale

Improve the aesthetic qualities (making the product look more appealing) by adding:

- fresh herbs e.g. basil, rosemary, oregano
- chopped raw peppers e.g. red, yellow
- different types of pasta e.g. farfalle, penne etc.
- dried fruit e.g. cranberries
- garnishing e.g. with grated cheese, rocket, bread crumbs or any
- the size of ingredients e.g. chunky rather than grated

Increase the insoluble non-starch polysaccharide (NSP) content by using:

- green vegetables e.g. broccoli florets
- nuts
- lentils
- chick peas
- seeds e.g. sunflower, sesame, amaranth (except golden linseeds)

Improve the Vitamin C content by adding:

- Broccoli florets
- Red and green peppers
- Fresh herbs e.g. basil
- Tomatoes
- Peas
-

Any correct, appropriate food sources of the above can be credited

Maximum of 5 marks for each section

4 – 5 marks	4-5 relevant points made Alternatively, several points given with comprehensive and very accurate description showing full understanding.
2 – 3 marks	2-3 relevant points made Alternatively, 1 point given with good and accurate description showing full understanding. Not all points may be relevant or accurate.
1 mark	1 or more relevant points made but may be superficial and lack accuracy and complete understanding.
0 marks	No relevant responses.

11 (b) Give examples of information that must appear by law on food labelling and explain the importance of each piece of information.

[10 marks]

- **Product name** – key for consumer identification.
- **Ingredients list** – important for consumers who are keen to know what has been used in the creation of their purchase. Also important for those who may be allergic/intolerant to certain foods e.g. milk, nuts.
- **Shelf life** – to protect consumers from consuming food that has deteriorated to an unfit state. Useful with tinned and packaged goods when consumers do not remember the date of purchase.
- **Storage information** – important where medium and high risk foods are concerned e.g. the need to be refrigerated (0-5 degrees C).
- **Instructions for use** – temperature and time needed to render the foods safe to eat by the consumer.
- **Name and address of supplier** – to enable the consumer to make contact re complaints/information etc.
- **Country of origin** – for consumers interested in the source and mileage involved in the creation of the product.
- **Weight of the product** – to ensure that consumers are getting the amount of the product that they believe they have paid for.
- **Allergen advice** – to support consumers who have a food allergy or intolerance e.g. coeliac disease.

8 – 10 marks	For a top band mark it is expected that responses will include a wide range of examples with a detailed explanation of the importance of each. A clear knowledge and understanding of the labelling is evident.
4 – 7 marks	For a mid-range mark responses will include a number of examples with an explanation of their importance, but not all may be accurate or relevant.
1 – 3 marks	For a low range mark responses will be superficial with few or no justified examples made. Information may be inaccurate.
0 marks	No relevant responses.

11 (c) Explain how hygiene risks could be minimised when preparing and cooking a savoury pasta dish.

[10 marks]

Suitable application of the system related to the chosen product, will include a number of key stages such as:

- Correct preparation by the **food handler** in terms of and hand washing, and clothing (aprons and hairs nets).
- Correct choice of **clean equipment** such as worktops, chopping boards, knives etc
- Selection of fresh, in date **ingredients**.
- **Cleaning and preparation of foods** to lower microbiological risk e.g. washing vegetables to reduce risk of Clostridium Perfringens and Listeria.
- Correct **storage and cooking temperatures** to ensure a safe end product e.g. making sure that chicken is cooked until juices run clear when pierced.
- Making sure that **high risk foods are closely monitored** e.g. different chopping boards and knives for preparing foods such as chicken.
- Making sure that **correct cooking times** are observed to ensure.

Any suitable and correct points that relate to the risk assessment of a pasta product will be credited.

8 – 10 marks	For a top band mark it is expected that responses will include a clear indication of hygiene risks that could be minimised for a savoury pasta product would be carried out. There is clear knowledge and understanding of the issues identified.
4 – 7 marks	For a mid-range mark, responses will include reference to an outline of how a risk assessment might be applied to a savoury pasta product, but not all points may be accurate or relevant.
1 – 3 marks	For a low range mark, responses will be superficial with few or no justified points made and information may be inaccurate.
0 marks	No relevant responses.