OCR
RECOGNISING ACHIEVEMENT

GCE

# Home Economics (Food, Nutrition and Health)

Advanced GCE

Unit **G004:** Nutrition and Food Production

# Mark Scheme for January 2013

Oxford Cambridge and RSA Examinations

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

**Subject-specific Marking Instructions**

**Marking crossed out and duplicated answers**
OCR currently provides examiners with ‘rules’ for marking crossed out answers.

Duplicated answers refer to two (or more) alternative responses to the same question, or responses to more optional questions than required within the paper rubric.

The rules are as follows:

***Crossed out answers***
- where a candidate crosses out an answer and provides an alternative response the crossed out response is not marked and gains no marks
- where a candidate crosses out an answer to a whole question, but makes no second attempt and the inclusion of the answer would not cause a rubric infringement, the assessor should attempt to mark the crossed out response and award marks

***Duplicated answers:***
- normally all responses are marked and the highest mark given
- where alternate answers are provided to a multiple choice question, no mark should be awarded (for example: following a request to tick one box, the candidate ticks two or more boxes)
- where the candidate provides contradictory responses, no mark should be awarded (for example: the candidate writes a statement such as 'water freezes at 0oC this means it is a liquid at -10oC'). The candidate, here, does not seem to understand the context of the 'question' where the candidate has adopted a 'scattergun' approach by providing multiple answers to a single response question, no mark should be

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| 1 | (a) | (i) | **Two** from<br>Vitamins A, D, E and K. | 2 | |
| | | (ii) | **One** mark for the liver/fatty tissues/adipose tissue. | 1 | |
| | (b) | (i) | **Two** marks are available. **One** mark for stating each function.<br>• process of energy release.<br>• transmission of nerve signals<br>• functioning/structure of nervous system<br>• growth and development of the body<br>• requirements increase if body energy requirements increase. | 2 | |
| | | (ii) | **Two** marks are available. **One** mark for stating each food source<br>• pork<br>• vegetables<br>• milk<br>• cheese<br>• peas<br>• fresh and dried fruit<br>• eggs<br>• wholegrain breads<br>• fortified breakfast cereals.<br>• yeast<br>• white flour/white bread<br>• nuts<br>**Credit will be given for any valid named source.** | 2 | Not 'cereals'<br>Not 'meat'<br>Not 'pulses' |
| | | (iii) | **One** mark for stating **beri beri**. | 1 | |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| | (c) | (i) | **Four** mark for stating one source<br>• Mycoprotein/quorn<br>• Tempeh<br>• TVP<br>• Tofu<br>• Soya products eg dairy alternatives (1) | 1 | |
| | | (ii) | • Health benefits/health risks of red meat (1) low fat product/cholesterol/reduce red meat can reduce risk of CHD (1)<br>• Environmental impact (1) less pollution/methane/deforestation (1)<br>• Animal welfare issues (1) concern about the treatment of animals (1)<br>• Economic reasons (1) meat free products are cheaper (1)<br>• Improvements in technology (1) more products/choices (1)<br>• Higher profile (1) celebrity endorsements/advertising (1)<br>• Vegetarianism (1) animal welfare/healthier diet/protein source not from animal (1). | 4 | |

| Question | | | Answer | Marks | Guidance |
|---|---|---|---|---|---|
| | (d) | | **Two** marks are available for each correctly explained point<br>• Costing of raw materials and the reliability of supplies will be examined (1). Importing ingredients will be expensive (1)<br>• Production costs/prototype (1) ingredients/wastage (1)<br>• Sensory testing (1) Modifications and refinements will be made to the product (1)<br>• HACCP (1) set up/verify/implement will have financial cost (1) Products that are high-risk will require stringent safety tests, which will add to the production costs (1)<br>• Quality control and quality assurance systems (1) expensive to administer (1)<br>• Factory/units/premises (1) A new factory may need construction and land purchasing or renting (1)<br>• Maintenance of equipment (1) New machinery may be rented/purchased or existing machinery (1)<br>• Labour costs (1). Staff may require training; specialist skills may be required for production (1)<br>• Ideas for packaging (1) legal requirements for food labelling followed<br>• Legal advice (1) to ensure compliance with legalisation relating to the manufacture and sale of food (1)<br>• Exhibitions and trade shows (1) Participation expensive for manufacturers (1)<br>• Advertising (1) in store by promotional methods (1). | 4 | |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | (e) | | **The HACCP system used in the food industry**<br>1 Identify the hazard<br>Identify all the potential hazards eg Physical, chemical and biological hazards.<br>2 Determine the critical control points.<br>A critical control point (CCP) is a step, or procedure in a food process at which control can be applied and a food safety hazard can be prevented, eliminated, or reduced to an acceptable level.<br>Every Critical Control Point (CCP) must have an effective Control Measure.<br>3 Critical limits<br>Establish critical limits for each critical control point.<br>A critical limit is the maximum or minimum tolerance to which a physical, biological, or chemical hazard must be controlled at a critical control point. This will prevent, eliminate, or reduce a hazard to an acceptable level. | 8 | | **Level 4 (7–8 marks)**<br>The candidates demonstrates accurate knowledge of all the stages in a Hazard Analysis and Critical Control Point (HACCP) system. The description will be detailed and will show thorough understanding. The information will be presented in a fluent and well structured manner. Subject specific terminology will be used accurately. There will be few, if any errors of grammar, punctuation and spelling.<br><br>**Level 3 (5–6 marks)**<br>The candidate demonstrates a good knowledge of the different stages in a Hazard Analysis and Critical Control Point (HACCP) system. The description will show understanding. The information will be presented clearly and some subject specific terminology will be used. There may be occasional errors of grammar; punctuation and spelling are able to explain satisfactorily. |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | 4 Monitor the critical limits.<br>Establish critical control point monitoring requirements eg Visual inspections of ingredients completed on arrival for processing.<br>5 Corrective action<br>Corrective action is required when monitoring suggests that the critical limits have not been met.<br>6 Record system<br>Establish record keeping procedures.<br>7 Verification<br>Establish procedures for ensuring the HACCP system is working as intended.<br><br>**Credit will be given for all valid points.** | | | **Level 2 (3–4 marks)**<br>The candidate demonstrates some knowledge of different stages in a Hazard Analysis and Critical Control Point (HACCP) system. The description will show a limited understanding and may lack detail. The information will be presented simply and some subject specific terminology will be used, although not always used appropriately. There will be errors of grammar, punctuation and spelling.<br><br>**Level 1 (1–2 marks)**<br>The candidate demonstrates superficial knowledge of different stages in a Hazard Analysis and Critical Control Point (HACCP) system. They will show very limited understanding. The information will be poorly expressed with little or no use of subject specific terminology. Errors of grammar, punctuation and spelling may be intrusive.<br><br>0 = no response worthy of credit |

**SECTION B**

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| 2 | | | **Answers may include:**<br>• Sugars and starches are our major source of food energy. The two main types of carbohydrate are sugars and starch. Sugars and starch provide energy. 1 gram provides 16 kJ (3.75 kcal)<br>• The main function of carbohydrates is to provide energy. Too much energy in the diet can lead to a person becoming overweight<br>• Sugars can be classified according to their structure. They can be divided into groups: monosaccharides, disaccharides and polysaccharides according to the size of the molecule<br>• Sugars are the main dietary component associated with dental caries<br>• There are a number of starches which are all Polysaccharides (also known as complex carbohydrates) Polysaccharides are made up of many monosaccharide molecules, (usually glucose), joined together | 25 | | **Level 4 (19–25 marks)**<br>The candidate demonstrates an accurate knowledge of the role of carbohydrates in maintaining good health. The explanation will be detailed and will show thorough understanding. The information will be presented in a fluent and well structured manner. Subject specific terminology will be used accurately. There will be few, if any errors of grammar, punctuation and spelling.<br><br>**Level 3 (13–18 marks)**<br>The candidate demonstrates a good knowledge of the role of carbohydrates in maintaining good health. The explanation will show some understanding. The information will be presented clearly and some subject specific terminology will be used. There may be occasional errors of grammar; punctuation and spelling are able to explain satisfactorily. |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | | | • Starch is the main food reserve in plants. It is made up of many molecules of glucose<br>• Complex carbohydrates also include non-starch polysaccharides (NSP), *eg* cellulose, pectins and gums, found in fruits, vegetables, beans and whole-grain cereals<br>• Fibre is a type of carbohydrate found only in plants. Unlike other carbohydrates, it is not absorbed in the small intestine to provide energy, although some metabolism occurs in the large bowel. It is needed to keep the digestive system healthy<br>• Glycogen is similar to starch but is made from glucose by animals not plants. Small amounts are stored in the liver and muscles as an energy reserve<br>• **Starchy foods** include bread, rice, pasta, cereal, pulses and potatoes. Starches account for almost 60% of the total carbohydrate intake in the average British diet<br>• **Sugars** are found in foods and drinks containing such as milk, fruits and vegetables, jam, confectionery, table sugar and some soft drinks. Sugars account for almost 40% of the total carbohydrate intake in the average British diet | | | **Level 2 (7–12 marks)**<br>The candidate demonstrates some knowledge of the role of carbohydrates in maintaining good health. The explanation will show a limited understanding and may lack detail. The information will be presented simply and some subject specific terminology will be used, although not always used appropriately. There will be errors of grammar, punctuation and spelling.<br><br>**Level 1 (1–6 marks)**<br>The candidate demonstrates superficial knowledge of the role of carbohydrates in maintaining good health. They will show very limited understanding. The information will be poorly expressed with little or no use of subject specific terminology. Errors of grammar, punctuation and spelling may be intrusive.<br><br>0 = no response worthy of credit |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | | | • Carbohydrate acts as a protein sparer. If the diet is low in carbohydrate, then protein is used to provide as an energy source. This in turn means less is available for the growth and repair of body tissues<br>• If the diet is too low in carbohydrate then protein will be used to provide energy meaning that protein will not be available for growth and repair of body tissues<br>• Eating a lot of sugary foods between meals is associated with increased tooth decay<br>• **Intrinsic sugars** are sugars which form a vital part of certain unprocessed food, ie enclosed in the cell, the most important being whole fruits and vegetables<br>• **Non intrinsic sugars** are not located within the cellular structure of a food can be further divided into: Milk sugars, occurring naturally in milk and milk products.<br>Non-milk extrinsic sugars, which includes fruit juices, honey, and 'added sugars' which comprise of both recipe sugars and table sugars<br>• The term **hidden sugar** may be used to refer to the fact that a product contains added sugar or non milk extrinsic sugars<br>• The consumption of non milk extrinsic sugars (NMES) should be reduced because of the risk of tooth decay.<br>**Credit will be given for all valid points.** | | | |

| Question | | | Answer | Marks | Guidance | |
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| | | | | | Content | Levels of response |
| 3 | | | **Answers may include:**<br>The importance of food labels –<br>• Food labels are a useful source of information and their role is to inform and protect consumers<br>• The following information must appear on a food label by law:<br>– Name of the food**/**description of the food. If the food has been processed, the process must be included in the label<br>– The weight/volume<br>– Ingredients in order of weight, consumer may wish to avoid certain ingredients<br>– Genetically modified ingredients must be indicated on the label<br>– Information on storage will help the consumer<br>– Instructions on how to prepare and cook the food must be given on the label<br>– The name and address of the manufacturer, packer or seller must be stated<br>– The label must display clearly where the food has come from<br>– The lot or batch number is a code that can identify batches of food | 25 | | **Level 4 (19–25 marks)**<br>The candidate demonstrates an accurate knowledge of the importance of food labelling and the current approaches to nutritional labelling used by food retailers. The description will show and will show thorough understanding. The information will be presented in a fluent and well structured manner. Subject specific terminology will be used accurately. There will be few, if any errors of grammar, punctuation and spelling.<br><br>**Level 3 (13–18 marks)**<br>The candidate demonstrates a good knowledge of the importance of food labelling and the current approaches to nutritional labelling used by food retailers. The explanation will show some understanding. The information will be presented clearly and some subject specific terminology will be used. There may be occasional errors of grammar; punctuation and spelling are able to explain satisfactorily. |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | | | – Manufacturers do not have to provide nutrition information by law unless they make a nutrition claim. Any nutritional information provided must follow specific rules: the energy value of the food in kilojoules (kJ) and kilocalories (kcal) must be provided, the amount of protein, carbohydrate and fat in grams (g) must be provided and the amounts of sugars, saturates, fibre and sodium must be provided if a specific claim is made about the nutrient<br>– Optional further information can be given on the amounts of other nutrients such as polyunsaturated fatty acids, monounsaturated fatty acids or cholesterol, and some specified vitamins and minerals. This helps consumers make choices.<br><br>Other important labelling information can be credited if linked to supporting consumer choice eg Fair Trade, environmental impact etc<br><br>**Current approaches to nutritional labelling**<br>• Guideline Daily Amounts (GDAs) are designed to help consumers understand the nutrition information provided on food labels | | | **Level 2 (7–12 marks)**<br>The candidate demonstrates some knowledge of the importance of food labelling and/or the current approaches to nutritional labelling used by food retailers. The explanation will show a limited understanding and may lack detail. The information will be presented simply and some subject specific terminology will be used, although not always used appropriately. There will be errors of grammar, punctuation and spelling.<br><br>**Level 1 (1–6 marks)**<br>The candidate demonstrates superficial knowledge of the importance of food labelling and/or the current approaches to nutritional labelling used by food retailers. They will show very limited understanding. The information will be poorly expressed with little or no use of subject specific terminology. Errors of grammar, punctuation and spelling may be intrusive.<br><br>0 = no response worthy of credit |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | | | • GDAs are guidelines for healthy adults and children on the approximate amount of calories, fat, saturated fat, carbohydrate, total sugars, protein, fibre, salt and sodium required for a healthy diet | | | |
| | | | • GDA's are based on population average figures so individual requirements vary depending on age, growth rate, weight and level of activity. The GDAs do not consider these variations<br>• 'Adult' GDAs have been developed which use the same figures as the healthy woman GDAs. GDA's for children aged 5–10 years are given, but the GDA values for teenagers are similar to adults, so figures should be used. | | | |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | | | **Traffic light labelling**<br>• Many supermarkets and food manufacturers use traffic light colours on the labels of products to help consumers choose healthy foods<br>• Food products with traffic light labels on the front of the pack show whether the food has high, medium or low amounts of fat, saturated fat, sugars and salt<br>• In addition to traffic light colours, the number of grams of fat, saturated fat, sugars and salt contained in what the manufacturer or retailer suggests is a serving of the food is given. Consumers can compare foods using the traffic light system and can check products to see which have the most ambers and greens | | | |

| Question | | | Answer | Marks | Guidance | |
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| | | | | | Content | Levels of response |
| | | | • A red light on the front of the pack means the food is high in one or more of the following: fat, saturated fat, sugars and salt. It is recommended consumers only have the food occasionally and to monitor how often they choose such foods, or to try eating them in smaller amounts<br>• An amber light on the front of the pack means the food is neither high nor low in one or more of fat, saturated fat, sugars and salt, so this is a choice that could be made most of the time<br>• Green means the food is low in one or more of fat, saturated fat, sugars and salt and is a healthier choice.<br><br>**Credit will be given for all valid points.** | | | |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| 4 | | | **Answers may include:**<br>• Dairy products includes milk, butter, cream, cheese and yoghurt<br>• Milk and milk products (cheese and yogurt) are important sources of protein, B vitamins such as riboflavin and B12, and minerals such as calcium, zinc and magnesium. Vitamin A and small amounts of vitamin D are found in whole milk products<br>• Milk and milk products in the diet provide 43% of calcium intake<br>• **Most milk undergoes some form of heat processing such as pasteurisation, sterilisation or ultra high temperature (UHT) treatment to ensure that any harmful microorganisms are destroyed**<br>• Milk can be used in many ways soups, sauces, batters, puddings, baked products and drinks<br>• **Butter** is a natural dairy product which is a water-in-oil emulsion made from cream<br>• Butter contains around 80 per cent fat, so is a high energy food. It also contains protein, vitamins A and D, and a small amount of calcium<br>• Butter has a number of uses Spreading, as a base for sauces, soups and pastries shortcrust, sweet shortcrust, puff and flaky<br>• **Cream** is made by separating the fat and solids from milk. It is a fat-in-water emulsion | 25 | | **Level 4 (19–25 marks)**<br>The candidate demonstrates an accurate knowledge of the choice and use of dairy products in food preparation and cooking. The discussion be detailed and show thorough understanding.<br>The information will be presented in a fluent and well structured manner.<br>Subject specific terminology will be used accurately. There will be few, if any errors of grammar, punctuation and spelling.<br><br>**Level 3 (13–18 marks)**<br>The candidate demonstrates a good knowledge of choice and use of dairy products in food preparation and cooking. The discussion will show understanding. The information will be presented clearly and some subject specific terminology will be used. There may be occasional errors of grammar; punctuation and spelling are able to explain satisfactorily. |

| Question | | | Answer | Marks | Guidance | |
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| | | | | | Content | Levels of response |
| | | | • Protein is found in small amounts in cream. The fat content of cream varies according to the type. Carbohydrate is present as lactose, and cream also contains calcium and vitamins A and D<br>• There are many different types of cream available and all vary in terms of their fat content<br>• When cream is whipped, it is transformed from a liquid into a foam. The air bubbles that are introduced into the cream. For cream to be whipped it must have a fat content of 38–42%<br>• If the fat content is too low, there will not be enough fat to enclose the air bubbles and form a foam. If the fat content is too high, the fat globules come into contact with each other too easily and instead butter granules are formed<br>• Cheese is made from milk protein coagulated by the addition of an enzyme such as rennet, which produces milk solids (casein curd) and liquid (whey), which is drained off<br>• Cheese contains protein of a high biological value, fat and carbohydrate in the form of sugars, particularly lactose. It is a good source of calcium, potassium, phosphorus, sodium and chloride, and also contains vitamins A and D<br>• There are many different varieties of cheese eg hard, soft etc | | | **Level 2 (7–12 marks)**<br>The candidate demonstrates some knowledge of choice and use of dairy products in food preparation and cooking. The discussion will show a limited understanding and may lack detail. The information will be presented simply and some subject specific terminology will be used, although not always used appropriately. There will be errors of grammar, punctuation and spelling.<br><br>**Level 1 (1–6 marks)**<br>The candidate demonstrates superficial knowledge of the advantages and disadvantages of choice and use of dairy products in food preparation and/or cooking. They will show very limited understanding. The information will be poorly expressed with little or no use of subject specific terminology. Errors of grammar, punctuation and spelling may be intrusive.<br><br>0 = no response worthy of credit |

| Question | | | Answer | Marks | Guidance | |
|---|---|---|---|---|---|---|
| | | | | | Content | Levels of response |
| | | | • Many uses for cheese include sauces, fillings, toppings, dips and spreads, baked products, soufflés, Desserts and Fondues<br>• **Yoghurt** is made by heat-treating homogenised milk that has been treated with two cultures – Streptococcus thermophilus and lactobacillus bulgaricus bacteria. The introduction of these bacteria converts the lactose present in the milk to lactic acid<br>• Yoghurt is a rich source of calcium<br>• There are many varieties of yoghurt available – stirred yoghurt and set yoghurt<br>• Low fat yoghurts and whole milk creamy yoghurts, both of which are available plain and flavoured<br>• Yoghurt drinks contain additional bacteria to aid the digestive system<br>• Drinks, desserts, salad dressings cream alternatives and toppings made with yoghurt. | | | |

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