OCR
Oxford Cambridge and RSA

GCE

Home Economics (Food, Nutrition and Health)

Unit **G004:** Nutrition and Food Production

Advanced GCE

Mark Scheme for June 2014

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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.

Annotations

Annotation	Meaning
BP	Blank Page – this annotation **must** be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	Unclear
BOD	Benefit of doubt
	Caret sign to show omission
NAQ	Not answered question
REP	Repeat
SEEN	Noted but no credit given
	Tick
	Cross
L1	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
VG	Vague

Question			Answer	Mark	Guidance
1	(a)	(i)	**ONE MARK** for one source. TWO Maximum. • oily fish, such as salmon and sardines • eggs • fortified fat spreads/margarine • fortified breakfast cereals • powdered milk/ Infant formula milk/full fat milk • liver • cheese • butter • mushrooms • sunflower seeds/oil • oysters • caviar	2x1	
1		(ii)	The correct answer is **Calcium**	1	
1		(iii)	**ONE MARK** for identification of disease + **ONE MARK** for description. Rickets is a childhood bone disorder/Osteomalacia is an adult bone disorder (1) Bones soften/weakens and become prone to fractures and deformity/bow legs (1).	2	Not porous bones
1		(iv)	**ONE MARK** for one group. • all pregnant and breastfeeding women (1) • babies and young children younger than five (1) • older people aged 65 years and over/elderly (1) • people who are not exposed to much sun, such as people who cover up their skin when outdoors or those who are housebound (1) • people who have darker skin such as people of African, African-Caribbean and Asian origin (1) • coeliacs (1)	1	Eg 'Asian women who cover their bodies/skin' 'Women who wear the veil'

Question			Answer	Mark	Guidance
1	(b)	(i)	**ONE MARK** for the function. Helps keep the level of fluids/water in the body balanced. Electrolyte balance Helps with muscle contraction Nerve transmission	1	
		(ii)	**ONE MARK** for one effect Having too much salt is linked to an increase in blood pressure/hypertension (1) Increases the risk of a stroke/heart failure/CHD (1). Kidney disease/kidney failure (1) Vascular dementia (1)	1	
		(iii)	**ONE MARK** for each suggestion, 2 maximum. • Check food labels and choose foods with less salt. • Choose tinned vegetables and pulses with no added salt. • Use sauces, such as soy sauce, sparingly because these are often high in salt. • Eat fewer salty foods, such as crisps, salted nuts, bacon, ham • Use herbs and spices for flavour instead of salt. • Choose low-salt products. • Do not automatically add extra salt when cooking or at the table. • Reduce fast foods/convenience foods/ready meals/takeaways	2x1	
1	(c)		**ONE MARK** for a brief response **TWO** required. **Features of saturated fats** • Saturated fatty acids have no double bonds between any of the carbon atoms in the carbon chain. • Saturated fats are usually solid at room temperature. • More likely to become rancid (oxidation).	2x2	

Question			Answer	Mark	Guidance
			• Saturated fats are usually found in red meat, butter, milk, cheese and eggs. However, coconut oil, palm oil and palm kernel oil rich in saturated fats. • Research suggests that saturated fat can raise blood cholesterol/raises LDL • Evidence suggests there is a greater risk of CHD • Low smoke point **Features of unsaturated fats** • Unsaturated fatty acids have some hydrogen atoms missing, creating a 'double-bond' between two of the carbon atoms in the chain. • The double bond puts a curve in the otherwise straight carbon chain. This allows movement and they are liquid. • Have a longer shelf life. • There are two types: Monounsaturated fatty acids - have one double bond. Polyunsaturated fatty acids - have two or more double bonds in the carbon chains. • Unsaturated fatty acids are found mainly in oily fish, nuts, seeds and the vegetable oils e.g. corn, olive and sunflower. • Polyunsaturated and monounsaturated fats may help lower blood cholesterol level/raises HDL when used in place of saturated fats • High smoke point • Evidence suggests that there is less risk of CHD		
1	(d)	(i)	The process of <u>adding minerals/vitamins/nutrients</u> to food	1	
1	(d)	(ii)	**SIX MARKS** are available for describing three different benefits. • **Enhance nutrition.** They offer a source of nutrient that might be lacking in a person's diet – eg low	3X2	1 mark for identification of reason and 1 mark for correct example or development Do not accept repetition of examples

Question			Answer	Mark	Guidance
			income families can buy inexpensive fortified products such as white bread (accept any appropriate example) • **Restore nutrition.** Important nutrients are lost during processing so must be restored e.g. by law in the UK, iron, thiamine and niacin must be added back to white and brown flour. • **Provide alterative choice.** To produce a substitute product with similar nutritive value. In the UK it is compulsory by law that margarine has vitamins A and D added to levels comparable with butter. • **To reduce deficiency diseases.** Nutrients may be added to foods irrespective of whether or not the nutrients are originally present in the food to help prevent disease. • **To offer technical benefit.** Vitamins C and E are antioxidants and can reduce the rate of spoilage in some products/increases shelf life. • **To cater for special nutritional needs.** Meal replacements, sports drinks, slimming products, and foods aimed at particular groups, are often fortified making an important contribution to the diet of people who eat them.		Not healthier by itself they must qualify
1	(e)		**ONE MARK** is available identifying and **ONE MARK** for explaining a behaviour change. Maximum 4 marks. **Kneading creates stretchy/springy/elastic/smooth dough (1)** • Kneading creates stronger links between the proteins (1). • The gluten strands align/ develops gliadin and glutenin protein (1).	2X2	Behaviour change is a physical change. Explanation of the physical change required for 2 marks max

Question			Answer	Mark	Guidance
			Kneading incorporates oxygen/air into the dough (1) • Gives strength to the gluten (1). • Gluten forms a mesh like structure which will stretch around carbon dioxide produced by the yeast (1).		
					Total 25 marks

Question			Answer	Marks	Guidance	
					Content	Levels of response
2			**Describe the different types of vegetarians and explain their different nutritional needs.** **Types of vegetarian:** • **Pesco-vegetarian** does not consume red meat and poultry but fish and other animal products are still consumed. • **Lacto-ovo-vegetarian** does not consume meat, fish, poultry but milk, milk products and eggs are still consumed. • **Lacto vegetarian** does not consume meat, fish, poultry and eggs. Milk and milk products are still consumed. • **Fruitarian** does not consume any foods of animal origin as well as pulses and cereals. The diet mainly consists of raw and dried fruits, nuts, honey and olive oil. • **Vegan** does not consume any foods of animal origin. The diet mainly consists of grains, vegetables, vegetable oils, cereals, pulses such as beans and lentils, nuts, fruit and seeds. **Nutritional needs of vegetarians** • It is important to ensure that adequate intakes of protein for the amino acids that the body needs. • A vegetarian diet that includes milk or eggs should contain enough high biological protein. Protein from plant	25		**Level 4** **19-25 marks** The candidate demonstrates detailed and accurate knowledge of the different types of vegetarians and of their nutritional needs. Information will be detailed and 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. **Level 3** **13-18 marks** The candidate demonstrates a good knowledge of the different types of vegetarians and their nutritional needs. The explanation 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. **Level 2** **7-12 marks** The candidate demonstrates some knowledge of the main types of vegetarians and their nutritional needs. The explanation will show a limited understanding and may lack detail. The information will be

Question			Answer	Marks	Guidance	
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			sources with the exception of Soya have a low biological content which means that one or more of the essential amino acids needed by the body are missing. A deficiency of amino acids in a plant protein can be compensated for by the amino acids in another. • Vegans need to ensure adequate quantities of calcium, iron, Vitamin D, iodine, and Vitamin B12 are consumed. These nutrients are more difficult to find from plant sources. • Vitamin B12 is only found in foods from animal sources. • Vegans may need to consume Vitamin B12 either as a supplement or in fortified foods such as yeast extract, fortified Soya milk or fortified breakfast cereal. • There may be a problem with adequate intakes of vitamin D amongst vegetarians. Low vitamin D status may be due to a combination of low exposure to sunlight and the type of vegetarian diet followed particularly if it excludes milk and its products. • Care is needed if babies are to be weaned on to a vegan diet. The diet must be planned to ensure it contains sufficient fat and protein. Soya based infant formula can be given.			presented simply and some subject specific terminology will be used, although not always used appropriately. There will be errors of grammar, punctuation and spelling. **Level 1** **1-6 marks** The candidate demonstrates superficial knowledge of vegetarianism. 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. **0=no response worthy of credit**

Question			Answer	Marks	Guidance	
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			• Children under 2 years of age can take supplements of vitamin drops containing vitamins A, C and D. Foods fortified with vitamin B12 should be included in the diet and, if necessary, a vitamin B12 supplement taken. • Calcium is present in milk, cheese and dairy products so many vegetarians who consume milk and milk products are likely to have adequate intakes of calcium. • Vegans may not have an adequate intake of calcium because relatively few other foods contain large amounts. • Lacto-ovo-vegetarian diets usually contain adequate amounts of iodine, because it is found in milk and eggs but vegans are at risk of low intakes. • Haem iron is easily sourced from red meat. Non-haem iron is obtained from sources such as eggs, cereal foods, green vegetables, nuts and pulses. If vitamin C is consumed from fruit, fruit juices and vegetables this will enhance the absorption of non-haem iron; for example, having beans on toast and a glass of orange juice at the same meal. • Female vegetarians need to take care that they consume sufficient quantities of iron.	25		

Question			Answer	Marks	Guidance	
					Content	**Levels of response**
			• A vegetarian diet provides on average 35% of their food energy as fat. In most vegan diets the amount of energy provided by fat is 10%. • Zinc is found in a variety of plant sources. Care needs to be taken with bread and cereal products, pulses, nuts and seeds, because many of these foods are also high in phytate, which is an inhibitor of zinc absorption.			
3			**Discuss the concepts of a balanced diet and malnutrition in the UK**. **Concept of a balanced diet** • No single food contains all the essential nutrients the body needs to function efficiently. • A balanced diet must contain carbohydrate, protein, fat, vitamins, minerals and fibre in the correct proportions. • A balanced diet should provide the correct amounts of each nutrient that an individual needs. A balanced diet can be achieved by eating the correct amount of food from the different food groups. • Energy balance maintained otherwise weight gained or weight lost. • A variety or mixture of foods should be consumed over a period of time to	25		**Level 4** **19-25 marks** The candidate demonstrates an accurate knowledge of the concepts of a balanced diet and malnutrition in the UK. The discussion will be detailed. 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. **Level 3** **13-18 marks** The candidate demonstrates a good knowledge of the concepts of a balanced diet and malnutrition in the UK. The discussion will show understanding. The information will be presented clearly and some

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			ensure an adequate intake of all the nutrients is achieved to prevent ill health and a healthy body weight is maintained. • There are five main food groups, and each group provides the nutrients that are essential for growth, energy and body maintenance. These are: - bread, cereals, and potatoes - fruit and vegetables - meat and fish - milk and dairy foods - fat and sugar • The correct proportions of food from each food group are shown on the Eatwell plate devised by the Food Standards Agency. • The aim of the plate is to give practical advice by showing the types of food to be consumed; - Bread, rice, potatoes, pasta and other starchy foods 33% - Fruit and vegetables 33% - Milk and dairy foods 15% - Meat, fish, eggs, beans and other non-dairy sources of protein 12% - Foods and drinks high in fat and/or sugar 8% • With the exception of fruit and vegetables and fish the Eatwell plate does not include references to frequency of serving and 'recommended' portion sizes. At least five portions of a variety of fruit			subject specific terminology will be used. There may be occasional errors of grammar; punctuation and spelling. **Level 2** **7-12 marks** The candidate demonstrates some knowledge of the concepts of a balanced diet and/ or malnutrition in the UK. 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. **Level 1** **1-6 marks** The candidate demonstrates superficial knowledge of the concepts of a balanced diet and/or malnutrition in the UK. 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. **0=no response worthy of credit**

Question			Answer	Marks	Guidance	
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			and vegetables should be consumed each day and two portions a week of fish, one of which should be oily. • The contribution of individual nutrients to maintaining health and well being may be explored: • Carbohydrates provide the body with its main source of energy. They take the form of either starchy foods or simple sugars. • Fibre found in fruits, vegetables, nuts, seeds and grains. Fibre provides bulk in a meal, helps slow down the rise in blood glucose after a meal and promotes healthy intestines. • Fat is important component of a balanced diet. Dietary fat provides us with essential fatty acids; dietary fat is also needed for the absorption of important fat-soluble vitamins. There are different types of fat some are beneficial and others can be harmful. The three main types of fat are: saturated, polyunsaturated and monosaturated fat. • Proteins are needed for structural components of cells and tissues and are used in the manufacture of many enzymes and hormones. Since most sources of protein do not contain all of the amino acids needed, it is important to eat a range of protein-containing foods. Vitamins and			

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			minerals are essential for health and assist many body processes. • A balanced diet is made up approximately as: - 15 % total daily food energy intake from protein - No more than 35% total daily food energy intake from fat - less than 11 % total daily food energy intake from saturated fat - Increase to more than 50% total daily food energy intake from carbohydrate of which no more than 11% from sugar - Not more than 5% daily energy intake from alcohol • Malnutrition means 'bad' nutrition. Malnutrition can include undernutrition or wasting and overnutrition or obesity. • Malnutrition is a deficiency, excess or imbalance of nutrients that causes adverse effects on health and wellbeing. Malnutrition can also be more scientifically defined as having a body mass index (BMI) of less than 18.5. • Groups at risk include the elderly, low income groups, drug users, babies and children and people suffering from long term illness.			

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4			**Explain the importance of risk assessment to the food industry including Hazard Analysis and Critical Control Point (HACCP).** **The HACCP system is important because:** • It is legal requirement for all food businesses. Since 1 January 2006 all food businesses are required to have written food safety management systems. • A HACCP system identifies hazards associated with food and suggests procedures to reduce risks and ensures food is safe to eat. • It helps to prevent problems rather than reacting to them after they have happened. It requires an active approach to reduce risks and hazards. • The HACCP system can be applied throughout the food chain from the primary producer to the final consumer and traceability of ingredients is possible. • It protects the food manufacturer. If the food manufacturer is taken to court a defence can demonstrate that the manufacturer had exercised diligence through arrangements in place to prevent an offence being committed. • It helps ensure food is safe for customers to eat and increases	25		**Level 4** **19-25 marks** The candidate demonstrates an accurate knowledge of the importance of risk assessment, including Hazard Analysis and Critical Control Point (HACCP). The explanation will be detailed. 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. **Level 3** **13-18 marks** The candidate demonstrates a good knowledge of the importance of risk assessment, including Hazard Analysis and Critical Control Point (HACCP). The explanation 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. **Level 2** **7-12 marks** The candidate demonstrates some knowledge of the importance of risk

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			customer confidence in food production. Less food is wasted during production and resources are used more effectively. **The HACCP system used in the food industry** **1. Identify the hazard** Construction of a flow diagram to show the entire process of food production from purchase of raw materials to consumer purchase. Identify all the potential hazards - Physical hazards are objects that can enter the food chain at any point during production e.g. insects, droppings of pests, fragments of glass, plastic, jewellery, hair, nails, Soil and dust. - Chemical hazards can be residues of chemicals used in cleaning or agricultural chemicals. - Biological hazards are microorganisms. Some are capable of causing food poisoning can affect the quality and safety of food products. Poor personal hygiene, dirty equipment and food waste can all be the source of biological hazards			assessment, including Hazard Analysis and Critical Control Point (HACCP). 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. **Level 1** **0-6 marks** The candidate demonstrates superficial knowledge of the importance of risk assessment, including Hazard Analysis and Critical Control Point (HACCP). 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. **0=no response worthy of credit**

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			Hazard analysis also involves describing the options for controlling the hazards Control or eliminate hazards are called Control Measures e.g. supplying staff with the correct equipment **2. Determine the critical control points.** 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. Every Critical Control Point (CCP) must have an effective Control Measure. The CCP may be the control of temperature to prevent microorganisms from growing Control of weight to ensure consistency in cooking between products. Control of time can be applied to the storage of food. Perishable foods can be displayed for sale for a single period of not more than 4 hours above a temperature of 8ºC. Hot food stored at below 63ºC should be disposed of after 2 hours or chilled to 8ºC or less and disposed of at the end of the day. Food should not remain in the danger zone for more than 4 hours.			

Question			Answer	Marks	Guidance	
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			3. Critical limits Establish critical limits for each critical control point. 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. Set the critical limits for each critical control point. These targets will have a critical limit or a tolerance e.g. 0°C to 8°C for a chilled cabinet. The use of differently coloured boards and knives correctly is a critical limit as it prevents cross contamination **4. Monitor the critical limits** Establish critical control point monitoring requirements. Monitoring activities are necessary to ensure that the process is under control at each critical control point. A monitoring system must be set up for each critical control point. Monitoring can be achieved by observation and taking measurements Monitoring ensure that the critical limits for each critical point are not exceeded. Specialist equipment used for monitoring includes digital temperature probes, metal detectors, Visual inspections of ingredients			

Question			Answer	Marks	Guidance	
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			completed on arrival for processing. **5. Corrective action** Establish corrective actions. Corrective action is required when monitoring suggests that the critical limits have not been met Corrective action should deal with the immediate problem and prevent the problem happening again by considering the cause of the failure of the Control Measure and taking appropriate action If equipment fails and the critical limits are exceeded then the action could include contacting an engineer, replacing the machinery Corrective action could also be staff training and advising staff on correct action **6. Record system** Establish record keeping procedures. Records documenting the monitoring of critical control points, critical limits, verification and deviations must be kept. Full details of aspects of the food production process must be kept. Temperature logs for storage, cleaning schedules, staff training programmes. Delivery records and the names and addresses of suppliers.			

Question			Answer	Marks	Guidance	
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			7. Verification Establish procedures for ensuring the HACCP system is working as intended. The system must be verified to ensure that it is working by reviewing the plan and modifying procedures. Verification procedures may include such activities as review of HACCP plans, CCP records, critical limits			

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