

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.

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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
λ	Caret sign to show omission
NAQ	Not answered question
REP	Repeat
SEEN	Noted but no credit given
↓	Tick
×	Cross
LI	Level 1
L2	Level 2
L3	Level 3
L4	Level 4
VG	Vague

C	Question		Answer		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		Guidance
1	(b)	(i)	ONE MARK for the function. Helps keep the <u>level of fluids/water in the body balanced.</u> 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 <u>and choose foods</u> 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 <u>instead of salt</u>. 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	

C	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 adding minerals/vitamins/nutrients to food	1	
1	(d)	(ii)	SIX MARKS are available for describing three different benefits.	3X2	1 mark for identification of reason and 1 mark for correct example or development
			• Enhance nutrition. They offer a source of nutrient that might be lacking in a person's diet – eg low		Do not accept repetition of examples

Q	uestion	Answer	Mark	Guidance	
		 income families can buy inexpensive fortified products <u>such as</u> 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	

C	uestic	on	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 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 	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		

Question	Answer Ma		Guidar	Guidance			
			Content	Levels of response			
	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.			presented simply and some subject specific terminology will be used, although not always used appropriately. There will be errors of grammar, punctuation and spelling.			
	 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. 			 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 			
	 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.						

Question	Answer	Marks	Guidance		
			Content	Levels of response	
	 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. 	25	Content	Levels of response	
	 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. 				

Question	Answer	Marks	Guidar	ice
			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

Question	Answer	Marks	Guidance		
			Content	Levels of response	
	 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. 			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	
	 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 			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		
			Content	Levels of response	
	 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				

Question		Answer	Marks	Guidance	
				Content	Levels of response
		 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 less than 11 % total daily food energy intake from saturated fat Increase to more than 50% total daily food energy intake from sugar Not more than 5% daily 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 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. 			

Question	Answer	Marks	Guidar	ce
			Content	Levels of response
4	Explain the importance of risk	25		Level 4
	assessment to the food industry			19-25 marks
	including Hazard Analysis and Critical			The candidate demonstrates an
	Control Point (HACCP).			accurate knowledge of the
	The HACCP system is important			importance of risk assessment,
	because:			including Hazard Analysis and
	 It is legal requirement for all food 			Critical Control Point (HACCP).
	businesses. Since 1 January 2006 all			The explanation will be detailed.
	food businesses are required to have			The information will be presented in
	written food safety management			a fluent and well structured
	systems.			manner. Subject specific
	A HACCP system identifies hazards			terminology will be used accurately.
	associated with food and suggests			There will be few, if any errors of
	procedures to reduce risks and			grammar, punctuation and spelling.
	ensures food is safe to eat.			
	It helps to prevent problems rather			Level 3
	than reacting to them after they have			13-18 marks
	happened. It requires an active			The candidate demonstrates a
	approach to reduce risks and			good knowledge of the importance
	hazards.			of risk assessment, including
	The HACCP system can be applied			Hazard Analysis and Critical
	throughout the food chain from the			Control Point (HACCP). The
	primary producer to the final			explanation will show
	consumer and traceability of			understanding. The information will
	ingredients is possible.			be presented clearly and some
	It protects the food manufacturer. If			subject specific terminology will be
	the food manufacturer is taken to			used. There may be occasional
	court a defence can demonstrate that			errors of grammar; punctuation and
	the manufacturer had exercised			spelling.
	diligence through arrangements in			
	place to prevent an offence being			Level 2
	committed.			7-12 marks
	It helps ensure food is safe for			The candidate demonstrates some
	customers to eat and increases			knowledge of the importance of risk

Question	Answer	Marks	Guidance	
			Content	Levels of response
	customer confidence in food			assessment, including Hazard
	production. Less food is wasted			Analysis and Critical Control Point
	during production and resources are			(HACCP). The explanation will
	used more effectively.			show a limited understanding and
				may lack detail. The information will
	The HACCP system used in the food			be presented simply and some
	industry			subject specific terminology will be
				used, although not always used
	1. Identify the hazard			appropriately. There will be errors
	Construction of a flow diagram to show			of grammar, punctuation and
	the entire process of food production			spelling.
	from purchase of raw materials to			
	consumer purchase.			Level 1
	Identify all the potential hazards			0-6 marks
	 Physical hazards are objects that 			The candidate demonstrates
	can enter the food chain at any			superficial knowledge of the
	point during production e.g.			importance of risk assessment,
	insects, droppings of pests,			Including Hazard Analysis and
	fragments of glass, plastic,			Critical Control Point (HACCP).
	jewellery, nair, nails, Soil and			I ney will snow very limited
	OUSI.			understanding. The information will
	- Chemical hazards can be			be poony expressed with little of no
	cleaning or agricultural			Errors of grommar, pupetuation and
				enolling may be intrusive
	Riological bazarda ara			spenning may be millusive.
	- Diological flazarus are			0-no response worthy of credit
	capable of causing food			o-no response working of credit
	poisoning can affect the quality			
	and safety of food products. Poor			
	nersonal hygiene dirty			
	equipment and food waste can all			
	be the source of biological			
	hazards			

Question	Answer	Marks	Guidance	
			Content	Levels of response
	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 8°C. Hot food stored at below 63°C should be disposed of after 2 hours or chilled to 8°C 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	
			Content	Levels of response
	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			
	inionitoring ensure that the critical limits			
	For each critical point are not exceeded.			
	Specialist equipment used for monitoring			
	metal detectors			
	Vieual increations of ingradiants			
1 1 1	visual inspections of ingredients			

Question	Answer	Marks	Guidance		
			Content	Levels of response	
	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	Guidan	Guidance	
			Content	Levels of response	
	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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