OCR
RECOGNISING ACHIEVEMENT

GCE

Home Economics: Food, Nutrition and Health

Advanced GCE **G004/01**

Nutrition and Food Production

Mark Scheme for June 2010

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Question			Expected Answers	Marks	Rationale
1	(a)		**ONE** mark for each correct answer. **TWO** required eg: • Red peppers • Green peppers • Blackcurrants • Broccoli • Brussels sprouts • Cauliflower • Spinach • Kiwi fruit • Strawberries • Raspberries • Oranges • Tomatoes • Potatoes • Orange juice/fruit juice • Green leafy vegetable • Citrus fruits	**[2]**	Must be a good source of Vit C
	(b)		**ONE** mark for correct answer. The correct answer is **scurvy**	**[1]**	
	(c)		**ONE** mark for correct answer. • Wounds are slower to heal. • Dental and gum problems including soft/spongy gums, tooth loss. • Bleeding from mucous membranes/gums. • More prone to infections/weakened immune systems. • Slows the metabolism. • Reduces the appetite. • Dry skin/rough/scaly skin. • Painful joints can develop .	**[1]**	

Question	Expected Answers	Marks	Rationale
(d)	**ONE** mark for correct answer. **THREE** required eg: • Required to make collagen/connective tissue. • Essential for the healing of wounds. • It helps the absorption of iron. • Role in the immune system/fight infections. • It is required for the formation of blood cells. • It helps the functioning of the nervous system. • Vitamin C is an antioxidant/It reduces the damage caused by free radicals.	[3]	
(e)	**TWO MARKS** available for answers demonstrating a clear description of a difference. **TWO** required eg **Features of saturated fatty acids** • Saturated fatty acids have no double bonds between any of the carbon atoms in the carbon chain. All of the bonds are saturated with single carbon bonds (1). Unsaturated fatty acids have some hydrogen atoms missing from the chain of carbon atoms, creating a 'double-bond' between two of the carbon atoms in the chain (1). • Saturated fats are usually solid and stable at room temperature (1), unsaturated fatty acids are liquid at room temperature (1). • Saturated fats are usually found in red meat, butter, milk, cheese and eggs, coconut oil, palm oil and palm kernel oil rich in saturated fats (1). Unsaturated fatty acids are found mainly in some foods including oily fish, nuts, seeds and the vegetable oils e.g. corn, olive and sunflower (1). • Research suggests that saturated fat can raise blood cholesterol (1). Polyunsaturated and monounsaturated fats may help lower blood cholesterol (1). • Saturated fats are linear/straight (1). Polyunsaturated are	[4]	Do not accept references to healthy versus unhealthy, good versus bad.

Question			Expected Answers	Marks	Rationale
			curved/bent (1). • Saturated fats increase the risk of CHD (1). If you substitute unsaturated fats for saturated it will decrease the risk of CHD (1). **Credit will be given for any correct answer**		
	(f)		**ONE** mark for correct answer. **TWO** required eg: • Food product name • List of ingredients • Allergy risk ingredients • Storage conditions required • Shelf life/use by/best before/display until • Instructions for use • Name/address/contact details of manufacturer • Place of origin • Weight/volume/quantity	**[2]**	
	(g)		This question is marked according to the quality of response. **High 5-6** Candidates are able to explain fully why food labelling is important to the consumer. The explanation will be well developed and may be supported by the use of subject specific examples. Ideas will be expressed clearly and fluently. There will be few, if any, errors of grammar, punctuation or spelling. **Middle 3-4** Candidates are able to explain satisfactorily why food labelling is important to the consumer. The explanation may not be fully developed and may lack specific examples. There may be occasional errors of grammar, punctuation or spelling. **Low 0-2** Candidates are able to describe superficially why food labelling is	**[6]**	

Question			Expected Answers		Marks	Rationale
			important to the consumer. The information may be poorly expressed and errors of grammar, punctuation and spelling will be intrusive.			
			The Food Labelling Regulations 1996 The label **identifies** the product to the consumer. The label must state the **processing** method used. The **ingredients** list is important to the consumer The **storage conditions** must be indicated The **shelf life** of the product must be	Legislation states the information that must be found on a food label this helps to guide and inform the consumer about a food product. The food product name must be clear e.g. coffee. If the product has many types and flavours then this must be specified eg decaffeinated coffee. Consumer may wish to avoid or select certain methods e.g. smoked, roasted. The consumer may wish to avoid or consume certain ingredients. Food additives must be included and the ingredients must be listed in descending order of weight.		

Question			Expected Answers		Marks	Rationale
			indicated by a date mark The **instructions** for use on the label The name and address of the **manufacturer** The place or **country of origin**. The **weight** or volume **Non statutory information** may be found on the packaging to **Nutritional information** is not required by law unless a claim is made about the product. **Environmental information** about the packaging and the disposal of the packaging	Consumer understands how to store the product safely. Consumer can consume the product before it deteriorates. Inform the consumer how to prepare and serve the product. Gives the consumer a contact point or a complaint route. Shows the consumer where the product originates Shows the consumer the quantity they are purchasing Help the consumer make decision about the purchase e.g. suitable for vegetarians, Fair trade, made with 'British beef' It allows consumers to make informed choices and compare		

Question			Expected Answers		Marks	Rationale
				products.. Help the consumer recycle the materials.		
	(h)	(i)	**TWO marks** identifying and explaining a behaviour change during kneading **Max ONE mark for** identifying **any** behaviour change(s) during the kneading		[2]	
			Behaviour change	**Explanation**		
			Proteins form into gluten **Kneading creates stretchy/smooth dough** **Kneading incorporates air and water into the dough** **Kneading makes strong dough**	Strong wheat flour contains a high proportion of the proteins glutenin and gliadin. When wheat flour is mixed with water, these two proteins link with the water molecules and with each other. Kneading creates stronger links between the proteins. The gluten strands align. The dough becomes stretchy. Oxygen and water helps to give strength to the gluten. It distributes the flour		

Question			Expected Answers		Marks	Rationale
				evenly throughout the dough and helps to form a continuous gluten network. Gluten forms a mesh like structure which will stretch around carbon dioxide produced by the yeast		
		(ii)	**TWO marks** identifying and explaining one behaviour change during baking X2 **Max two marks** identifying behaviour changes during the baking		**[4]**	
			Gases expand with heat **Bread rises**	Steam forms as the water is heated. This pushes the dough upwards and outwards. The bread increases in size		
			The bread becomes firm	During baking bread rises rapidly as the carbon dioxide produced from the fermenting yeast becomes trapped in the dough.		
			Gases evaporate	The stretchy gluten mesh expands with the carbon dioxide and steam until the starch in the dough gelatinizes or sets,		
			Enzymes are inactivated			

Question			Expected Answers		Marks	Rationale
			Crust turns brown	fixing the bubbles in place. The proteins coagulate and with the gelatinised starch form a solid frame work. Dry hard crust forms due to loss of moisture and gas escape The bread becomes light weight due to loss of moisture Aromas are released Enzymes denature and stop working production of carbon dioxide stops The yeast is killed at 54°C and fermentation stops. The action of steam release and heat on the surface of the bread forms dextrin which is a sugar. During baking dextrin caramelises to the crust of the bread eg Maillard reaction		

Question			Expected Answers	Marks	Rationale
2			**Discuss the concepts of a balanced diet in the UK.** **High 19-25** The candidate demonstrates an accurate knowledge of the concept of a balanced diet in the UK. The discussion will show detailed understanding and consider different benefits/limitations. The information will be presented in a fluent and well structured manner with a reasoned conclusion. Subject specific terminology will be used accurately. There will be few, if any, errors of grammar, punctuation and spelling. **Middle 13-18** The candidate demonstrates a good knowledge of the concept of a balanced diet in the UK. The discussion will show understanding. The information will be presented clearly and consider some benefits/limitations with more emphasis on one or the other and a limited conclusion. Some subject specific terminology will be used. There may be occasional errors of grammar, punctuation and spelling. **Middle 7-12** The candidate demonstrates some knowledge of the concept of a balanced diet 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 occasional errors of grammar, punctuation and spelling. **Low 0-6** The candidate demonstrates superficial knowledge of the concept of a balanced diet in the UK. They will show very limited understanding. The information will be poorly expressed with weak descriptions and little or no use of subject specific terminology. Errors of grammar, punctuation and spelling may be intrusive.	**[25]**	

Question			Expected Answers	Marks	Rationale
			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. A variety or mixture of foods should be consumed over a period of time to 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%		

Question			Expected Answers	Marks	Rationale
			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 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 monounsaturated 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 minerals are essential for health and assist many body processes. A balanced diet is made up approximately as: - 10 – 20 % total daily calories from protein - less than 10 % total daily calories from saturated fat - Up to 10 % total daily calories from polyunsaturated fat - 60 – 70 % of the total daily calories from monounsaturated fat and carbohydrates		

Question			Expected Answers	Marks	Rationale
3			**Discuss the importance of HACCP and how it is used in the food industry.** **High 19-25** The candidate demonstrates an accurate knowledge of the importance of Hazard Analysis and Critical Control Point (HACCP) and how it is used in the food industry. The discussion will show detailed 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. **Middle 13-18** The candidate demonstrates good knowledge of the importance of Hazard Analysis and Critical Control Point (HACCP) and how it is used in the food industry. 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. **Middle 7-12** The candidate demonstrates some knowledge of the importance of Hazard Analysis and Critical Control Point (HACCP) and how it is used in the food industry. 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 occasional errors of grammar, punctuation and spelling. **Low 0-6** The candidate demonstrates superficial knowledge of the importance of Hazard Analysis and Critical Control Point (HACCP) and/or how it is used in the food industry. 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.		

Question			Expected Answers	Marks	Rationale
			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 reduced 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 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		

Question			Expected Answers	Marks	Rationale
			products. Poor personal hygiene, dirty equipment and food waste can all be the source of biological hazards 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. **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		

Question			Expected Answers	Marks	Rationale
			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 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			Expected Answers	Marks	Rationale
			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 and microbial sampling and analysis.		

Question			Expected Answers	Marks	Rationale
4			**Explain the nutritional needs of vegetarians and the use of alternative protein sources in their diet.** **High 19-25** The candidate demonstrates an accurate knowledge of the nutritional needs of vegetarians and use of alternative protein sources in the diet. The explanation will show detailed 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. **Middle 13-18** The candidate demonstrates a good knowledge of the nutritional needs of vegetarians and use of alternative protein sources in the diet. 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. **Middle 7-12** The candidate demonstrates some knowledge of the nutritional needs of vegetarians and use of alternative protein sources in the diet. 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 may be occasional errors of grammar, punctuation and spelling. **Low 0-6** The candidate demonstrates superficial knowledge of the nutritional needs of vegetarians and/or use of alternative protein sources in the diet. 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. **Note -** in order to be awarded marks in the middle band the candidate **must** make appropriate references to both the nutritional needs of		

Question			Expected Answers	Marks	Rationale
			vegetarians **and** the use of alternative protein sources. If only one aspect of the question is addressed the response remains in the lower band. **Types of vegetarian maybe referred to in the response:** **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 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. Care needs to be taken by vegans 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. Vegetarians 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		

Question			Expected Answers	Marks	Rationale
			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. 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. However, some 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. 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. **Alternative protein sources**		

Question			Expected Answers	Marks	Rationale
			In a lacto vegetarian diet protein can be obtained from dairy products including milk, cheese, yoghurts and eggs. The foods which commonly supply the most protein in a vegan diet are pulses (peas, beans, lentils, soya products), grains (wheat, oats, rice, barley, pasta, bread), nuts (brazils, hazels, almonds, cashews) and seeds (sunflower, pumpkin, sesame). **Products from Soya** Soya foods e.g. tofu, tempeh, miso, soya sauces, oil, margarines contain HBV protein and calcium, iron, thiamine, riboflavin and niacin. Textured Vegetable Protein (TVP) is made from soya protein. Varieties of flavoured TVP are available. It is used in sausages, burgers and pasta dishes. Tofu is produced from soya beans. Tofu is semi-solid and is available in plain and smoke form. As it is quite soft, it absorbs flavours well. It may be used as a substitute for meat e.g. in stir fries. Tempeh is a mass of soya beans, which have been allowed to ferment. It is solid, has a white fluffy outer layer and can be sliced. It may be flavoured and cooked in a variety of ways. Soya protein available as burgers, sausages, canned foods. Soya oil and margarine are also available. Soya milk and soya dairy alternatives including soya desserts and yogurts made from soya milk. Miso is a fermented condiment made from soya beans, rice or barley grains, salt and water. Varies widely in flavour and colour and is used to flavour stews, soups and sauces. **Sources from Mycoproteins** Myco-protein or Quorn (trade name) is produced by fermentation of a fungus to produce fine fibres. The myco-protein undergoes forming, cutting and texturising according to the nature of the product to be made, *e.g.* pies, mince, burgers or sausages.		
			Total	**[75]**	

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