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Principal Examiner's Report

Summer 2016

Pearson Edexcel GCE in Design & Technology: Food Technology (6FT03)

Unit 3: Food Products, Nutrition and Product Development

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The focus of the 6FT03 paper is to examine candidates' knowledge developed throughout the course of this qualification on a range of food commodities, aspects of nutrition, product development and food innovation. Candidates are required to have comprehensive knowledge of the main food commodities, their composition, basic processing and typical spoilage patterns.

A sound knowledge of nutrition and its influence on the diet, contemporary lifestyle issues and new product development is particularly important for food technologists. Similarly, consumer behaviour, demographics, modern lifestyles, cultural changes and sustainability issues have an influence on new product development. It is also important for candidates to be aware of the influence of new technologies and materials on the development of new food products.

The coverage of this paper effectively tested the candidates' knowledge and understanding of the topic areas and provided opportunity to apply this knowledge. The 'ramped' nature of the exam paper, variety of question styles and command words promoted accessibility to candidates of all ability levels. Progression, application of knowledge and understanding within the subject area was evident, with stretch and challenge opportunities for higher ability candidates. Marks were scored across all areas of the paper, with effective differentiation across the paper.

The purpose of this report is to share with centres general examples of the types of responses where candidates answered well and also to consider areas where candidates did less well, especially regarding common mistakes which caused candidates to lose marks.

Question 1 derives from specification point 3.5 'Product Development and food innovation'. Genetic Modification continues to be a much discussed topic in the news as well as in scientific and agricultural discussions, with strong feelings on each side of the debate. It promises to be so for many years to come. This question allowed candidates the opportunity to show knowledge of both sides of the argument.

Question 1(a). The best responses correctly identified a range of realistic advantages of genetic modification. Many candidates identified greater yields, the ability to grow out of season, improving the nutritional status of crops or focused on how the process could be used to solve world hunger. Good answers were very specific to the process. Where candidates did less well, they were less specific or would repeat the same point, e.g. stating greater yields as one advantage, but then stating greater yields of varieties for a second point. Some responses showed little understanding of the process with suggestions far beyond even what genetic modification could achieve. All candidates attempted this question and most achieved some marks with many achieving full marks. It was a good start to the paper with many showing a clear understanding of the benefits of genetic modification.

Question 1(b). There were some very good responses to this question with excellent explanations. It is evident that centres are facilitating good discussions of genetic modifications, many candidates rose to the challenge of explaining realistically the disadvantages of genetic modification without stepping into sensationalism. Most wrote about consumers being aware of the unknown element of genetic modification, which therefore might cause them to be reluctant to purchase products containing genetically modified ingredients. Several candidates focused on the cost aspect of the process and of course many highlighted the possibility of 'super-weeds' resulting from cross- pollination. Where candidates did less well, it was apparent that there was misunderstanding of the process. Some spoke about unwanted additives. There were some general comments which were too unspecific to GM to warrant any marks and there was much repetition of the 'unknown' element. Several candidates could only achieve 2 marks out of 4 as they gave rather simple statements instead of explained responses.

Question 2 derives from specification point 3.3.1 Meat and Fish.

2(a) derives from 3.3.1a) – the structural composition of meat. This question was answered well by many candidates who were able to demonstrate a good knowledge of the composition of meat. There were some excellent, detailed descriptions of the structure of meat. Many gave a detailed sketch to accompany their written responses. Where candidates did less well, they tended to refer to less relevant information, e.g. rigor mortis, movement from the Z line, breakdown of glycogen. Some wrote about cooking processes, however with no reference to fibre length or composition thus not able to achieve marks. However, in general, the question elicited a very good response, with most candidates able to access some marks and many able to achieve full marks.

2(b) derives from 3.3.1d) the Nutritional contribution of meat to the diet. This area has been tested many times before. However, in this response, candidates were expected to give an evaluation of the nutritional contribution of red meat in the diet. This topic has been widely reported in news stories and has been much discussed by health professionals. The best responses did exactly this and it was good to see the carefully considered responses focusing on the benefits of eating red meat and also on possible health issues; such as the saturated fat level and the consequences of this in the diet. Where candidates did less well, they tended to simply list nutrients present rather than providing a balanced evaluation. Both advantages and disadvantages must be considered for full marks, simple lists are unable to access full marks.

Question 3) is derived from section 3.3 .2(c) the processes used to produce cheese.

3(a) The focus of this question was the pasteurisation of milk stages and the processes. Candidates were expected to outline the changes taking place at this stage in relation to cheese production. Many candidates gave correct temperatures, times

and outlined how pathogenic bacteria are destroyed at this temperature. Few however, linked this to cheese production; few mentioned destroying the bacteria in order to allow the safe incubation of the starter culture. Candidates who struggled to access marks described the organoleptic or nutritional effects of pasteurisation on milk with no reference to cheese production. This was not relevant to this question

Question 3(b) Candidates were expected to outline the changes occurring during the addition of the starter culture. The very best responses named the relevant bacteria and outlined how lactose is fermented to lactic acid allowing the pH to fall to the correct acidity for the addition of rennet.

Question 3(c) expected candidates to outline the changes occurring as a result of rennet being added. The best answers focused on the impact of rennet on casein, mentioning precipitation of casein.

Question 3(d) focused on the maturing stage of cheese. The best responses outlined the breakdown of large molecules. Candidates described lipids breaking down to release fatty acids or protein molecules breaking down to release amino acids allowing flavour development and texture development. Many candidates showed excellent understanding. Responses which were not as good, simply mentioned flavour development without giving any reason for this.

Question 4(a) focused on 3.4.3 – Nutritional recommendations and terminology. To achieve the maximum of one mark, candidates had to identify the DRV for energy. Those who achieved this mark correctly stated EAR or estimated average requirement. However, candidates widely misinterpreted this question with the majority of wrong responses giving GDA recommendations for Calories or Joules in a day.

Question 4(b) derives from 3.4.1, candidates were asked to define BMR– it was good to see that most candidates were able to do this correctly. Where responses were not so good, candidates confused this with BMI or tried to link BMR to the concept of energy balance.

Questions 4(c) (i), (ii) and (iii) all derive from 3.4.1 with the focus being the energy value of protein, fat and carbohydrate. Candidates were expected to evaluate this provision from each macro nutrient. Alongside the correct energy value for each macro nutrient, there were many very good evaluative comments provided. The evaluation should focus on the macronutrient's role in energy provision, not its general nutritional function. Thus, good responses focused on use of protein for energy, but that the priority for protein should be for growth and repair or the fact that obtaining a high proportion of energy from fat could also lead to health problems. Best responses gave COMA recommendations (now Government guidelines) for proportions of energy which should come from the different macronutrients. Where responses were not so good, superficial statements were made, such as

'carbohydrates are slow to release energy' without specifying sugars or starch, which of course are different rates of energy release. Responses which simply stated the functions of these nutrients were not able to achieve marks, unless related to energy provision.

Question 5 focused on special diets and diet related diseases, important features of the Contemporary Issues section of the A2 specification.

Question 5(a) (i) required candidates to outline coeliac disease as a condition. The best responses highlighted the fact that coeliac disease is an auto immune disease, rather than an allergy focused on gluten, often with reference to glutenin and gliadin. Candidates then went on to describe physical symptoms of the condition. These responses easily achieved maximum marks and it was good to see many candidates demonstrate high level knowledge. Not so good responses could usually achieve one mark for identifying the intolerance to gluten, but then tended to discuss the foods to be avoided rather than outlining the condition. Candidates who failed to achieve any marks were not able to provide any knowledge of coeliac disease or tended to focus on wheat allergies without mentioning gluten, this is too general to achieve at this level.

Question 5(a) (ii) required candidates to outline lactose intolerance. This proved more difficult to achieve marks on as candidates could not simply state that it is intolerance to lactose and achieve any marks. Good responses identified that lactose intolerance is when the body does not produce lactase to breakdown lactose to glucose and galactose. As with the previous question they went on to describe the physical symptoms of the condition. Again, those who simply stated foods to be avoided did not achieve marks as this was not the focus of the question.

Question 5(b) allowed the opportunity for candidates to provide extended writing and there were many excellent responses with candidates applying their knowledge well. Most candidates were able to achieve at least 4 marks from this question with many of the best responses achieving full marks. The best responses gave a wide range of advice following healthy eating guidelines (and it was good to see much reference to the Eatwell Guide as opposed to Plate showing candidates are remaining up to date) and relating this specifically to preventing CHD. Responses which were not as good were very general in advice or would simply suggest following guidelines from the Eatwell Plate or Guide without actually outlining what these guidelines are. Those who only focused on fat consumption were not able to achieve more than half marks, as a range of guidelines should have been discussed. Not so good responses might discuss avoiding fast foods without explaining what aspects of these foods could be a problem for heart health from a nutritional perspective. Other ways candidates became distracted from the focus of the question was to discuss exercise or reducing smoking. This is not dietary advice and as such could not achieve marks. This was a good discussion question and candidates seemed to enjoy being able to apply their knowledge and to suggest very sound advice.

Question (6) derives from 3.3 3a – The characteristic behaviour of fruit, specifically changes during storage with the effect of temperature, controlled atmosphere, presence of ethylene and atmospheric pressure on these changes being the focus. Many candidates were able to display a high level knowledge on these factors with the best responses displaying accurate knowledge and using technical terms. Weaker responses were inaccurate or moved away from the focus of the question. For example, when discussing the effect of temperature on ripening during storage, several candidates who did not achieve well in this question described the effect of freezing fruit or the impact of temperature on bacterial growth.
Question (7) derives from the Contemporary Issues section of the specification 3.4.5 with the specific focus being on sustainability of food supplies. This is a major consideration for candidates when completing 6FT04 coursework and for 6FT03. Candidates are required to know specifically about biodegradable packaging and food miles, knowledge of both these topics are examined in this question.

(7)(a) required candidates to explain the term biodegradable packaging. Best responses correctly provide an explanation identifying that this type of packaging breaks down naturally with the help of micro-organisms and that it is compostable. Many could give a correct example of materials used. It was good to see clear understanding of this potentially important area of packaging for food materials. Less good responses might simply state that the material breaks down, however it could be argued that all packaging material eventually breaks down, even if it takes hundreds of years. To achieve marks, candidates would need to make the biodegradability aspect very clear. Some candidates confused biodegradability with recycling.

(7) (b) provided candidates with the opportunity to discuss the concept of Food Miles in relation to sustainability. Nearly all responses displayed knowledge of what Food Miles are and could describe the impact on the environment. Those who provided simplistic responses to the discuss aspect, often used superficial comments stating that the more food miles the less sustainable the product, without giving thought to any other area of sustainability could not achieve high marks. In the best responses, it was good to see many candidates approach this question in a well-reasoned manner, they provided good arguments for keeping Food Miles low, but discussed in terms of 'however'. Many good responses discussed the value of buying local foods for local businesses and agriculture. Many discussed the impact on developing economies, often with reference to Fair Trade and also discussed the importance of seasonality. There were many good examples cited to support statements. The best responses identified that Food Miles are just one aspect of food sustainability.

To sum up, successful candidates were able to demonstrate and apply high level knowledge and understanding in their responses to the questions. It was very pleasing to witness the depth of technical detail included in responses to questions which required explanation and discussion. It is very evident that centres are teaching the specification well and training candidates to appropriately recognise and use the command words which are used to differentiate questions. It is evident that

candidates are being prepared for the exam by ensuring that they have a full understanding of the requirements of different question types: name, state, give, identify, define describe, outline, compare, contrast, discuss, evaluate and explain. There were several good responses to all questions and it was very pleasing to witness that all candidates attempted most questions.

It would be useful for all centres to ensure the Subject Content Guide 6FT03 is referred to by both teachers and candidates. This can be accessed on the Edexcel website, on the GCE Food Technology page, under Teacher Support Materials

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx