Examiners' Report/
Principal Examiner Feedback

Summer 2015

Pearson Edexcel GCE
A2 Design and Technology
Food Technology Unit 3 (6FT03/01)
Food Products, Nutrition and Product Development

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The focus of the 6FT03 paper is to examine students on the knowledge they have developed on a range of food commodities, aspects of nutrition, product development and food innovation. Students are required to have a 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 sustainable issues have an influence on new product development. It is also important for students 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 students' knowledge and understanding of the topic areas. The 'ramped' nature of the exam paper and variety of questions styles and command words promoted accessibility to students of all ability levels. Progression, application of knowledge and understanding within the subject area was evident, with stretch and challenge opportunities for higher ability students. Marks were scored across all areas of the paper, with effective differentiation across the paper.

Question 1 derives from specification point 3.4 (Nutrition) 4 'Contribution of nutrients and constituents of food to the diet'. Students should be able to identify the functions, sources, effects of deficiencies (or effect of surplus if detrimental to health) of the listed nutrients. This question effectively tested their knowledge of the contribution to the diet of Vitamin C, Vitamins B1, B2 or B3, Iodine and Vitamin K.

Question 1(a). The best responses correctly identified vitamin C / ascorbic acid and a good source of this vitamin. Where students did less well, they lost marks by not being specific when naming sources, for instance, just stating 'fruit' as a source of vitamin C will not gain a mark. The question asked for a 'good' source to be named, and at A2 level this would be expected. It was interesting to see the range of foods students think provide vitamin C, with both milk and meat being common incorrect answers. However, the majority of students were able to name a good source of this vitamin.

Question 1(b). A good range of responses was given with good understanding of the role B vitamins play in the release of energy from carbohydrate. Where responses were less good students either did not know the answer or incorrectly named a source or identified 'Vitamin B' as an answer. At A2 level students should know there is no 'Vitamin B'.

Question 1(c). Many students correctly identified iodine as the correct answer and named a good source of the mineral.

Question 1(d). It was pleasing to see the number of students who could identify vitamin K, with a high number correctly giving the chemical name of this vitamin. Green leafy vegetables were frequently given as

a good source, with a number correctly stating that this vitamin is widely found in foods.

Question 2 derives from specification point 3.3.7(b) Cereals - the processes involved in bread making. Students were expected to be able describe changes occurring during the bread making process.

Question 2(a) focused on the mixing stage. Good responses demonstrated good knowledge of specific ingredients with technical terms frequently used. Many students achieved full marks on this question. However some students missed marks as they only focused on one point, for instance the forming of gluten from glutenin and gliadin, which meant they did not achieve full marks. Weaker responses simply described the process which occur e.g 'flour is sieved, yeast is added'. Some students failed to achieve marks as they wrote about changes which would occur at a later stage in the bread making process rather than the focus of the question.

Question 2(b) focused on the kneading stage. Interestingly, this stage was not answered as well as the mixing stage. Many spoke about air being incorporated to form air pockets, showing a lack of understanding of the processes taking place. Most described developing the gluten to form an elastic dough. It was good to see responses with obvious high level understanding of the processes.

Question 2(c) focused on the proving stage. Good responses provided technical detail which demonstrated excellent understanding of the bread making process. Many good responses identified fermentation, with CO2 and alcohol being produced. Weaker responses frequently achieved one mark for identifying that the dough rises, however may not have used technical terminology.

Question 2(d) This question focused on the baking stage of bread making. There was opportunity for many technical and scientific terms to be used. To achieve high marks, it was expected that these terms would be used. Good responses identified starch gelatinising, protein coagulating and browning caused by the Maillard reaction or through dextrinisation. Marks were not awarded simply for saying 'the crust browns'. Some students failed to gain marks as they simply stated what happens at this stage, for instance the loaf is put into the oven at 200C or that the bread should sound hollow, rather than focusing on the changes occurring at this stage.

Question 3 (a) and (b) is derived from section 3.3 – 5 of the specification 'Sugar'. Question 3(a) is taken directly from the specification. Most students could correctly identify that sucrose is obtained from sugar cane and sugar beet. Other correct sources were awarded marks. Frequent wrong sources were given as either fructose or glucose.

Question 3 (b) derives directly from the specification where it is identified that students should know the processes involved in refining sugar. The question is not asking about the production of raw sugar from sugar cane or sugar beet. Unfortunately a number of students read the question as this and so described the wrong stage of the process and so were not able to access the marks. A previous question in an earlier paper had asked for the

process of extracting raw sugar from cane or beet and many students provided this information having evidently learnt it from a previous mark scheme. In general, this question was not well answered, there seemed to be a lot of guess work. However, where students could distinguish between the two stages, and where they had learnt the process, some very good answers were provided. Some students revealed high level knowledge of the process, achieving full marks.

Question 3(c) derives from section 3.3.3(b). Fruit and vegetables: preserve making. There were many excellent responses and it is good to see that centres are very evidently using practical work to teach theory work very successfully. Good responses explained clearly the requirements of gel formation, with many giving correct examples of fruits with good gelling properties. Many identified the osmotic effect of the high sugar concentration to preserve the product. Many correctly explained that gel formation only occurs when the concentration of sugar, pectin and acidity lie within certain limits. Poorer responses confused the role of pectin, or showed no understanding of the role of acid, with several stating that this was the source of pectin. A high number of students incorrectly stated that over-ripe fruit was preferable for preserve making with under-ripe fruit lacking pectin. Strawberries were frequently cited as an example of a fruit with high pectin content.

Question 4(a) focused on 3.5 1c – with the focus on 'business confidence', one of the 'factors which influence a generation of new product ideas'. Students were expected to describe the impact business confidence can have on food product development. However this question was not answered well generally as several students interpreted the question incorrectly. Business confidence is one of the most fundamental of market factors within which products are bought and sold. When students interpreted the question correctly, explaining the impact, for example describing how producers are more likely to take risks when the economy is strong, they achieved well. Many students however, wrote about a business being confident in its product rather than writing about the financial climate within which business activity takes place. A number of students wrote about stages in the product life cycle or responses focused on food scares, very often the Horse Meat scandal of 2013. This was not the focus of the question and consequently these students struggled to achieve marks.

Question 4(b) derives from 3.5 1a – demographics and the influence this factor has on new food product development. Many students linked their response specifically to this factor. It was very pleasing to see the many thoughtful responses provided with a wide breadth of interesting ideas discussed. The best responses identified the needs of this demographic and described how food manufacturers are responding to these needs. Good responses considered ready or pre-prepared meals, traditional meals, single portion meals, meals to meet specific dietary needs, fortified food products as well as describing the many companies who have moved into delivering specialist meals to the home. Most students achieved highly on this question and it was good to see so many applying their knowledge well to a topical need.

Where responses were not as good, students interpreted the question as to what the nutritional needs of elderly people are, writing at length about the nutritional needs but failing to translate this into the way food manufacturers have responded to these needs. Or, poorer responses focused on just one area of new product development, for instance ready meals in many different guises without considering the many other aspects which manufacturers have responded to. It was disappointing to see students being too general in their responses, where suggested products could have applied to any target group or where the different products were not linked to the needs of this target group.

Question 5 focused on typical food spoilage patterns, an important feature of the A2 specification.

Question 5(a) derives from specification point 3.3 1b – The characteristic spoilage in meat. The many good answers focused on the question set and described the changes which occur during the putrefaction stage and as meat spoils. Less technical, more superficial responses described slimy skin or colour changes. When responses were not good, students were observed to have repeated answers to past questions, obviously learned from previous mark schemes. These frequently related to fish spoilage or the conversion of muscle to meat. Both these responses are unrelated to this question. Where students just repeated a learned answer from a previous mark scheme, they show poor understanding and consequently scored poorly.

Question 5(b) derives from 3.3 2d, focusing on the characteristic changes in the souring of milk. A good understanding of the souring of milk was evident with changes being described as well as explained from a chemical perspective. The question elicited a very good response from students, with many being able to achieve full marks.

Question 5(c) derives from 3.3 3c – the characteristic spoilage of fruit caused by either chill injury or rotting. The question is asking for changes which take place. The focus of the question is the changes during spoilage. Poor answers focused on a vast array of topics from climacteric fruits to ethylene production to ripening. Past answers to questions were frequently given, lots of information about climacteric and non-climacteric fruits together with the ripening process. However this question's focus is the spoilage of fruit and as such the focus should have been on the changes taking place at this stage. This shows much learning, seemingly by rote, of past answers but little application of knowledge to answer the question set. Good answers focused on aspects such as chill injury or focused on the enzymic activity causing cellular breakdown. It was interesting to see reference to Erwinia and the resulting mould growth as well as good explanations of loss of turgor. As ever in good responses, technical terms were used.

Question 6 derives from 3.4 5 Contemporary issues and specifically on special diets – vegetarian.

Question 6(ai) and 6(aii) required students to define ovo vegetarian diets and lacto-ovo vegetarian diets. This was a good differentiation

question; many students could give correct definitions. However, for many, there was an evident confusion as to what these types of vegetarians are. The most frequent wrong response suggested that ovo-vegetarians couldn't eat eggs and that lacto-ovo vegetarians can't eat eggs or dairy foods, with a high number of students who failed to achieve a mark suggesting that a lacto-ovo vegetarian was someone suffering from lactose intolerance and not able to consume lactose.

Question 6 (b) required students to apply nutritional knowledge. The provision of both protein and Vitamin D are considered by some to be problematic in a vegan diet and so students were invited to discuss this perception. Where answers were good, nutritional knowledge was sound along with a good understanding of which foods provide these nutrients for a vegan. It was pleasing to see many illustrate the complementary value of proteins by citing good examples, such as rice with pulses. Weaker responses stated that because meat and fish wasn't eaten, diets would be low in protein (not true with good planning) yet did not discuss how adequate protein provision could be provided. Many students stated that Quorn would be a good source of protein, yet this is not a food suitable for vegans. Mycoprotein is a focus of the 6FT03 specification and so it was disappointing to see so many incorrectly cite this as a vegan food. A number of students did not answer the question set, instead just wrote everything they seemingly knew about protein or Vitamin D without applying this knowledge to vegan diets. This did not help them to gain marks as it meant they strayed away from the focus of the question. This would be a good example of a question which must be planned by students before writing to ensure good coverage of relevant information to the question in their response.

Question 7 derives from the Product development and food innovation section of the specification, 3.51d and e. Encapsulation is an area of Food Technology which is fast developing. Very credible responses were provided for this question celebrating the use of encapsulation in many different fashions and products. There were some excellent descriptions of a wide range of products discussing how encapsulated ingredients are used. It was good to see the accompanying explanations as to how these developments can be useful to manufacturers and to consumers. The responses provided gave evidence of students keeping up to date with current technologies. It was very pleasing to observe students using the opportunity of extended writing to convey this information. A wide range of examples was given demonstrating wide reading by students. Students who achieved high marks focused on what encapsulation technology is and then described different examples of where it is used. Most focused on the encapsulation of flavours, or the encapsulation of nutrients and the opportunities this provides.

Where students did not have an understanding of encapsulation technology, they tended to write about any area of new technologies. GM featured incorrectly in some responses, as did modified starch. Several focused on coatings, e.g. the coating of Jelly Babies or Smarties – this is not encapsulation technology. Some even talked about waxing lemons or crust on bread as examples of encapsulation. Some responses started off well but

then deteriorated by straying into other unrelated areas. Students must focus on the topic of the question and not wander off topic. Some students gave case studies of medicine for which they could not be awarded marks as the question asks for food products. Unfortunately, there was a significant number who did not know what encapsulation is and consequently could not achieve any marks on this question. Encapsulation technology is allowing the development of many food products and it was good to see the interest students have in this topic and the positive way they wrote about these developments. This question provided stretch and challenge opportunities for higher ability students, it was pleasing to see the subsequent higher level responses.

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

Centres need to be aware of the necessity to prepare students for this exam by ensuring that they have a full understanding of the requirements of different question types: name, state, give, describe, outline, compare, contrast, discuss, evaluate and explain.

Less successful students sometimes misinterpreted questions, for instance question 4a. In these cases, it appeared that the students were rushing into the question and not giving their responses adequate thought. What was very apparent this year was where students had learnt past responses to questions from previous years' mark schemes and regurgitated this information. These responses did not achieve marks as they did not answer the question set, showed poor understanding as well as a lack of reflection upon the question.

Centres must ensure full coverage of the specification as any area could be tested. It would be useful for all centres to ensure the Subject Content Guide 6FT03 is referred to by both teachers and students. 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:
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