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6FT03 Paper 01

Food Products, Nutrition and Product
Development

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UNIT 6FT03

Food Products, Nutrition and Product Development

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 question styles and command words promoted accessibility to students of all ability levels. Progression, application of knowledge and understanding within the subject area was evident, promoting stretch and challenge opportunities for higher ability students. Marks were scored evenly across all areas of the paper, with effective differentiation across the paper.

Question 1(a)

In Q1(a) students were required to identify the component proteins which form muscle. Most students correctly identified actin and myosin. The paper is ramped, with the challenge increasing as the paper progresses; this question elicited a very good response from students, with nearly all being able to achieve full marks.

Question 1(b)

This question focused on 'the breakdown of fish tissues after catching' and 'the development of odours'. Good responses identified that LITTLE glycogen is present in the fish after catching due to it being used up in the movement of fish as they are caught. This results in little lactic acid being produced and then a relatively high pH resulting leading to the rapid bacterial spoilage of fish. Good responses used technical terms frequently e.g. 'trimethylamine oxide changes to trimethylamine'. This seems to be a popular topic with students; many did well demonstrating a good understanding of the changes which occur in fish after catching. Where students did less well, they had an attempt at the question but showed little understanding of the changes which occur after death. Superficial knowledge was shown; students who did not do as well would write about anything to do with fish, not specific to the question. A focus on 'slimy' skin, change in colour rather than more technical changes was apparent in

middling answers. Many students wrote about changes occurring in meat rather than the specific changes in fish. This was a common issue where students had learnt previous answers to past questions but applied this knowledge incorrectly thus showing little understanding.

Question 2(a)

This question required that students could identify the enzymes needed to enable digestion of the macro-nutrients. This proved to be a very good differentiation question with top students being able to identify these enzymes correctly. It was a recall question with no explanations or discussions required; as such those who had learned the process of digestion were able to achieve well.

Question 2(b)

Students were required to identify the final components the macro-nutrients are broken down into in the digestive process in order to enable absorption to occur. Some students revealed high level knowledge of the process, achieving full marks. Such knowledge is fundamental to a good understanding of the digestive process. Many students scored poorly on this question simply due to a lack of knowledge rather than lack of understanding. Very few achieved highly; students seemed to list a number of hopeful, but incorrect answers. Fatty acids alone was the most common incorrect answer for fat, while starch or glycerol were the most common incorrect responses for carbohydrates.

Question 2(c)

This question focused on the role of bile as a key component in the digestive system. Good responses focused on the role of bile as an emulsifier of fat, enabling it to be broken down thus facilitating the role of lipase. It was pleasing to see many students achieve well with this question.

Question 3(a)

This question focused on the characteristic composition and behaviour of climacteric and non-climacteric fruits during storage and ripening. Many students showed a good understanding, being able to describe differences and relate the behaviour to the storage and/or shelf life of fruit.

Question 3(b)

This also focused on changes during storage and ripening. It steps up in difficulty as students are now expected to 'explain' the ripening process. It is not enough in an 'explain' question to simply state the changes; to achieve full marks students would need to explain why colour, texture, sweetness etc changes as a fruit ripens. For example, by stating that 'starch breaks down to simple sugars to become sweeter', or that 'colour changes due to chlorophyll pigments breaking down to release other pigments', then being able to name these pigments eg carotenoids or anthocyanins ensured students were awarded high marks. At A2 level, it is expected that

students will have developed this knowledge and understanding; it is not enough to simply state that the changes occur.

Question 4(a)

There have been many cultural changes impacting new product development; students who achieved well identified and described this, often giving appropriate reasons for such changes and went on to give specific examples of relevant new products.

Question 4(b)(i) and (ii)

Several students were able to identify correctly the stages of the life cycle; less were able to apply the correct marketing plan to the identified stage. Where this was done well, it was very pleasing to witness excellent knowledge and understanding demonstrated. The students who scored highly on this question tended to write about the introduction and decline stages, although good responses were also sometimes seen for the maturity and growth stages. The most common reason for not achieving marks was to identify the 'growth' stage but write about marketing plans implemented in the 'introduction' stage, thus confusing the two.

Question 5(a)

This question focused on the role of iron in the diet; students were expected to be able to give the functions of iron in the diet and state good food sources. Higher achieving students could frequently give 2 functions with formation of haemoglobin and prevention of anaemia being the most common correct answers. It would have been good to see more students mention myoglobin or iron's role in enzyme systems. Although the majority of students were able to identify sources of both haem iron and non-haem iron, many failed to achieve a mark by simply writing 'meat' as a good food source of haem iron. 'Meat' alone is not specific enough at A2 level; to achieve a mark, students should have written 'red meat' or given a named red meat.

Question 5(b)

Students were required to discuss the role of dietary fibre in the diet. Dietary fibre is a very important component of the diet. As Food Technology students, students should be able to demonstrate high level knowledge of this component and be able to discuss its role. However, there seemed to be much confusion about this component with several students being unable to discuss its role beyond preventing constipation. Good responses could identify a variety of correct functions, as well as discuss the implications of too much fibre in the diet. It would have been good to see more development of answers e.g. how dietary fibre can be useful in the control of obesity or how dietary fibre may help prevent diabetes type II rather than simply stating that it does these things.

Questions 6(a) and 6(b)

Many students could identify the uses of energy, but it would have been good to have seen more technical terms used, eg Basal metabolism rather than 'for bodily functions'. Good responses were frequently given for Q6(b) with many students being able to clearly explain the concept of negative energy balance. Some students unfortunately confused negative energy balance with positive energy balance, thus not gaining any marks.

Question 6(c)

Obesity is a diet related disease and Food Technology students should have a clear awareness of the implications of this illness not just for the individual but also for society as a whole. The question was generally very well answered with most students identifying obesity related diseases as well as commenting on the burden on the NHS or the cost to the economy. Many students suggested ways health professionals could promote healthy lifestyles.

Question 6(d)

Linked to the previous question but it also specifically requires students to apply their knowledge of new materials on new food products, specifically those focused on reduced-calorie diets. All the materials studied in the specification; modified starches, encapsulated materials and meat analogues or novel proteins, have been used to provide the consumer with reduced calorie products. An understanding of the function of these materials and how they can be applied is expected at this level. There was a very good range of answers with all these new materials covered. Most students referred to the low fat/high protein nature of meat analogues. Some wrote about modified starches, especially their role as fat replacers in low-fat meals to give a creamy mouthfeel. There were a few good answers focusing on the role of encapsulated materials, although it would have been good to see these particular responses developed more, especially as encapsulation is one of the growing sectors in new food materials. Some good responses focused on artificial sweeteners, which although not on the 6FT03 specification, is still a valid response as examples of new food materials widely used in reduced-calorie food products. Q6(d) was either answered very well or students tended to miss the point of the question and instead of writing about a new food material and how these can be used in food products aimed at those on a reduced-calorie diet, wrote about low-fat products or slimming diets in general.

Question 7(a)

For this question, students were required to state the three main parts of a cereal grain and most could give three correct answers.

Question 7(b)

Students were required to relate their knowledge of wheat, the different types, whether hard or soft, and then apply this knowledge to the processes

involved in bread making, biscuit making and pasta 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 showed an excellent understanding of the different wheats and their properties, revealing how these properties are put to use in the processes of making these important products. It seems that perhaps this question was frequently misread. Students who did not achieve well with this question answered by writing about different types of flour used in these processes rather than focusing on the different types of wheat. For instance, there was much description of white flour as opposed to wholemeal, or plain or even self-raising. 00 flour was frequently mentioned for pasta making, correct but not relevant to the question. Some students spent time writing about different cereal grains such as rye, not even focusing on wheat. It is important to be able to understand the materials used in order to understand the processes involved in the making of bread, biscuits and pasta. Good responses showed an excellent understanding of the different types of wheat and their properties, applying this knowledge to the processes involved.

It was very pleasing to see the depth of detail included in questions which required explanation and discussion. Successful students were able to demonstrate 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. Less successful students frequently had difficulty in achieving marks in the questions which required explanations. It is not sufficient to simply provide descriptions; underlying explanations also need to be provided at this level. Less successful students appeared to sometimes misread questions, for instance question 7b.

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.

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' for 6FT03 is referred to by both teachers and students. This can be accessed on the Pearson 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>

