

FOOD STUDIES

Paper 9336/01
Theory

Key Messages

Candidates who gained most credit had good subject knowledge, showed a degree of pre-planning and were able to structure their long answers.

Some questions required the use of a labelled diagram.

Candidates are advised to read through all of the questions in both sections before selecting which questions to answer. Candidates should be familiar with the definition of command words used in examination questions and should know how different command words will alter the content and structure of the response. Candidates should take careful note of the command word in the question to ensure that they are answering in the anticipated manner. Candidates should check carefully the meaning of questions, looking at the command word and other vocabulary used in the question to help determine what is required.

General Comments

Candidates chose from the full range of questions and had good knowledge of the syllabus, although some found **Question 1** was more challenging. **Question 2** was a particularly popular choice across all Centres. **Question 7(d)** was an example of a question where many candidates overlooked the command word in the question, in this case 'discuss', and proceeded to list their knowledge of personal and kitchen hygiene rules.

Some candidates made good use of labelled diagrams in their responses and were able to gain credit for these. Where candidates used a diagram, good responses also included a written explanation.

Comments on Specific Questions

Section A

Question 1

- (a) It was important to state the functions of the given minerals. Few candidates provided more than one correct function for each mineral, resulting in partial credit for this question.
- (b) Strong responses took each of the minerals cobalt, copper, manganese and zinc in turn and gave two different functions for each. Weaker responses grouped the minerals together and gave a generalised response about these trace elements being required for 'growth and development'. To gain full credit for this question, candidates were required to demonstrate accurate knowledge.
- (c) A strong response to this question required candidates to give a significantly different food source for each of the trace minerals, for example, 'cobalt is found in liver, copper is found in fish, manganese is found in tea and zinc is found in milk'. Weaker responses repeated fish and green leafy vegetables as sources of each mineral.
- (d) Most candidates showed a good knowledge of the vitamin content of milk, with the majority correctly stating vitamin A and vitamin D early on in their response. Candidates needed to explain how vitamin A or vitamin D could be unavailable on consumption. Stronger candidates considered vitamin loss during the heat treatment of milk and were able to gain full credit if their response referred to vitamin C or vitamin B₁ being destroyed by pasteurisation, and vitamin B₂ being destroyed by exposure to light.

- (e) Many candidates showed excellent knowledge of the importance of NSP in the diet. A list of the functions of NSP was not sufficient for candidates to gain full credit. The better responses took note of the command word in the question, and were able to explain that the benefits of NSP are not just related to digestion.

Question 2

- (a) The response required the energy value as a whole number with the correct unit applied.
- (b) Candidates answered this question well and responses included accurate references to amino acids, peptide bonds, condensation reactions and the simplicity of the primary structure, before moving on to discuss the folding or coiling of the primary structure and the cross-linking across the R groups.
- (c) Strong responses discussed the tertiary structure of globular proteins, used the words compact, spherical and randomly coiled, and provided a diagram to reflect these features. Some diagrams were seen that were not at all random in their shape and these were not awarded credit. Candidates were able to provide many accurate examples of globular proteins and some candidates knew which of their given examples were soluble in water and which were not.
- (d) Many candidates were able to show a good understanding of the term 'complementation of protein' explaining that proteins of low biological value could be eaten together to ensure that all essential amino acids were present in a meal. Some candidates were also able to say which amino acid was missing in the food. 'Beans on toast' was often provided as an example of two LBV foods that can be eaten in combination to provide all of the essential amino acids. It would be more accurate for candidates to write 'baked beans on wholemeal toast'. Candidates need to be accurate in their responses about the meaning of the term 'protein quality'.
- (e) This question was particularly well answered by the majority of candidates, with many gaining full credit. Candidates needed to be more specific about changes that made the fish skin crispy, or the aroma of extractives intensified or the surface of the fish browning. Here candidates needed to show their understanding of these changes in relation to grilling or baking. These changes would not occur if the fish was boiled or steamed and candidates needed to show accurate knowledge here.
- (f) Many candidates were familiar with the disease kwashiorkor and knew that the person was deficient in protein and that their abdomen would be swollen due to oedema.

Question 3

This question was answered well.

- (a) (i) Candidates were able to explain that lactose is a disaccharide with the chemical formula $C_{12}H_{22}O_{11}$. Many also discussed the monosaccharides glucose and galactose and explained how they join in a condensation reaction.
- (ii) Candidates were able to explain how enzymic hydrolysis takes place during digestion and many knew that lactase hydrolyses lactose into units of galactose and glucose. Few candidates referred to the enzymes being catalysts of the reaction and few mentioned the presence of water being present to split the molecule. Good knowledge of lactose intolerance was evident.
- (b) (i) Candidates need to understand the role of the lipoproteins that carry cholesterol in the bloodstream. Responses placed too much emphasis on 'good' and 'bad' cholesterol and how LDL can have a negative effect on one's health. This question was more about the protein carriers themselves rather than cholesterol.
- (ii) There were some excellent responses to this question. Candidates showed detailed knowledge of the structure and function of intestinal villi and many supported their response with an accurate, labelled diagram.
- (iii) Most candidates gave an accurate account of the digestion of carbohydrates with good knowledge of the enzymes involved.
- (iv) Candidates showed some basic knowledge of the process, recognising that it takes place in the liver. A strong response would have stated that 'it is a reduction reaction that takes place in the liver when an amino group from an amino acid transfers to an alpha keto acid to form a new amino acid'. Candidates need to be clear about the difference between transamination and deamination.

Question 4

- (a) (i) Many candidates gained much of the available credit on this question. Strong responses explained that the body uses energy for mechanical functions, chemical functions, electrical functions and heating, giving an accurate example of each in the body.
- (ii) Responses stating that the body stores energy 'as fat' do not show the level of understanding required at A-Level. Candidates need to know that excess glucose is stored as glycogen in the liver. Few mentioned that the body has limited storage capacity for glycogen and that it is in these circumstances that glucose is then laid down as adipose tissue.
- (iii) Many candidates were able to explain that Maillard browning is the process of non-enzymatic browning that occurs between the amino group of a protein molecule and the aldehyde group of a reducing sugar. This was a very well answered question with examples of baked foods being given to support the explanations.
- (iv) Whilst most candidates explained how cutting open the cells of some fruits and vegetables causes enzymic browning, they did not explain that the fruit cells release phenolase that reacts with polyphenol substrate in the fruit.
- (b) Few candidates linked their comments to the specific requirements for adolescents. In strong responses, candidates were required to outline the age of and typical physical, growth, hormonal and social needs of adolescents that cause them to be a separate group of people to older adults and children. Candidates who did this were then able to link specific nutrients and food requirements to these factors that are specific to adolescents.

Section B

Question 5

- (a) (i) Candidates needed to be familiar with the pathogens tuberculosis or brucellosis which are often present in raw milk. Good references were made to the need to make the milk safe for human consumption and the need to extend the shelf life of the milk.
- (ii) Candidates showed a lot of good knowledge here, particularly in describing pasteurisation, sterilisation and ultra heat treatment. Few candidates described evaporated milk, condensed milk or dried milk powder. It is important for candidates to be accurate with temperature and times when describing these processes.
- (b) Many candidates were able to gain much of the available credit on this question by demonstrating a satisfactory knowledge of the production of a hard cheese. Candidates need to organise their information into a logical order and include the accuracy and detail required to gain full credit.
- (c) This question was designed to make the candidate think about which additives are likely to be used in yoghurt. As the yoghurt also contained fruit that should have been a clue to the candidate. There is no expectation that a candidate should automatically know which additives any given product is likely to contain but this is an opportunity for the candidate to show the examiner that they can think through the ingredient content, texture and flavour of the yoghurt to determine the likely additives. Better responses began with candidates correctly naming suitable additives; these included stabilisers, thickeners, flavourings, colourings, sweeteners, preservatives, emulsifiers and flavour enhancers. These candidates then went on to explain the purpose of each of the additives in the yoghurt, for example, 'strawberry yoghurt will not look pink without the addition of a colouring so therefore carmine could be added to intensify the pink colour'. Stating that 'colours and flavours could be added' was not sufficiently detailed.

Question 6

- (a) Candidates found it easy to gain most of the available credit on this question by listing flour, milk, egg and salt, and describing the mixing and frying of the pancakes. Candidates needed to remember that they were suggesting ingredient quantities for a pouring batter.
- (b) This question was designed to test candidates' knowledge of how yeast ferments when given favourable conditions. The most frequent examples of leavened bread or cake mixtures seen were bread loaves and doughnuts. Responses giving the word 'loaf' alone were not detailed enough. There were many candidates who were able to give detail about the enzymes that are active during fermentation and explain the value of the CO₂ by-product.
- (c) The responses to this question were excellent. All candidates were able to access most of the available credit as they demonstrated their knowledge of what points to look for when choosing and storing fresh fish.
- (d) Some very good responses were seen, with candidates referencing non-slip floors, good lighting, covered waste bins, easy-clean surfaces, lockable cupboards, and sensible planning of the positioning of surfaces and appliances. Candidates must read and ensure they understand the context of the question correctly. There were some candidates who wrote in great detail about food safety rather than a safe working environment.

Question 7

- (a) This question was designed to test the candidate's knowledge of a spore producing bacteria that can reproduce anaerobically. Candidates need to ensure that they have a good knowledge of *Clostridium botulinum*.
- (b) Many candidates recognised that this question was designed to their knowledge of the conditions in which bacteria multiply. Good knowledge of the removal of moisture, dormant bacteria and rancidity was shown.
- (c) A good number of candidates knew that red kidney beans and green potatoes contain natural toxins, and these candidates made sensible suggestions as to how to prepare these foods to avoid being poisoned. Some candidates thought that the word 'toxin' was referring to food-poisoning bacteria. A very small number of candidates also mentioned cassava, poisonous mushrooms and other foods that contain cyanide and need treatment to remove/reduce the cyanide.
- (d) This was a very well answered question with many candidates showing a good range of knowledge about personal and kitchen hygiene. Candidates needed to pay heed to the command word in the question, and to focus not only on biological hazards but also to make reference to physical and chemical hazards.

Question 8

- (a) In this question the focus was on nutrition and cost. A strong response included an explanation of the nutrients that a family required and how to choose foods that are not extravagant and luxurious, yet still offer the nutrition needed. Many candidates were awarded credit for suggesting cheap protein foods, filling pulses and staple foods, and the need for a wide variety of fruits and vegetables.
- (b) Candidates answered this question about the choice of a refrigerator well. Many referred to the energy rating of the fridge, the space inside, the features, the brand, the colour, the cost, the guarantee and the space in the kitchen into which it is required to fit.
- (c) In this question candidates showed good knowledge of the types of dishes that are suitable for use in a microwave oven, and knew that foods should be covered when being heated in a microwave. Few other points were mentioned. Strong responses would have included advice on knowing the heating category of the microwave, reading the guidelines on food packaging, stirring and standing time and how to avoid over-cooking food.

FOOD STUDIES

Paper 9336/02
Practical

Key Messages

- The quality of the written answers was generally good and answers were set out clearly.
- The mark scheme published must be followed accurately. Reference must be made to the list of dishes planned by the candidate. Centres are reminded that all the work done in the Planning Session is marked externally.
- Some candidates chose dishes that were not appropriate or were not sufficiently skilful for an Advanced Level Practical Test. If a candidate does choose a simple dish, the maximum credit available for that dish must be reduced; credit for each dish should be awarded according to the skills demonstrated.
- Detailed comments must be written to justify the credit awarded. Reference should be made to the colour, flavour and texture and consistency of dishes, as appropriate.
- No credit should be awarded for any dish which is planned but not served and credit cannot be transferred to other dishes. Any dish prepared which is not on the original Time Plan cannot be awarded credit.
- It is important that examiners give as much information as possible on each candidate's method of working, in order to justify the credit awarded. When the Practical Test is marked by two separate examiners, they must reach a consensus mark for each candidate.

General Comments

Candidates' Time plans were generally very good and with clear instructions on methods, cooking times and temperatures. Most candidates listed an appropriate amount of work to be carried out in the 30 minutes of the Preparation Session before the start of the Practical Test.

Candidates should include the methods that they are using in their Time Plan, for example that a Victoria sandwich cake is made by the creaming method. It is not appropriate to discuss possible variations to dishes or to mention that a dish could be made in advance and frozen for future use.

Dishes need to be skilfully prepared for candidates to be awarded maximum credit; this cannot be the case when dishes are too simple. Dishes such as choux buns filled with crème pâtissière will gain more credit than choux buns filled with cream. Dishes like rice pilaff and gulab jamun are not considered to require sufficient preparation skills.

In **(b)**, a variety of dishes were made, such as flaky pastries with both sweet and savoury fillings; savoury breads; and chocolate mint cheesecake.

In **(c)(iii)**, candidates should ensure that they give practical reasons for their choice of dishes. In all instances examples are needed, such as which fruit/vegetables are in season, when referring to seasonal vegetables.

In **(c)(iv)**, candidates were asked to comment on the nutritional value of the dish chosen in **(b)**. Some answers related to all the dishes chosen. There were some excellent accounts but there were also a number of vague responses. Precise information is required at Advanced Level. Nutrients must be linked to ingredients and to functions.

Comments on specific questions

Question 1

In **(a)**, many candidates were able to prepare dishes using both haem and non-haem sources of iron. Candidates generally used liver, either in vol au vents or gougères. Some candidates used red meat to make lasagne, including making their own pasta, meat sauce and roux sauce.

Spinach was used to show the use of non-haem iron and this was incorporated into quiches and pancakes. Dark chocolate was also used as a source of non-haem iron in cakes or cheesecakes. Sometimes oranges were used with the dark chocolate which showed evidence of awareness of the role of vitamin C in the absorption of iron.

Part **(c)(i)** was generally answered extremely well. In **(c)(ii)**, Most candidates were able to give a variety of ways in which the loss of vitamin C during preparation and cooking could be kept to a minimum.

Question 2

In **(a)**, candidates made a variety of dishes, such as cheesecakes to show the use of butter and pastry to show the use of margarine. Many candidates limited the credit available to them by not specifying the type of fat or oil used.

In **(c)(i)**, many candidates were able to give several reasons why the body needs fat. The part of the question about essential fatty acids was less well answered. Part **(c)(ii)** was also relatively poorly answered although there were some detailed responses which included relevant examples.

Question 3

In **(a)**, a variety of dishes was made such as flaky pastries for aeration; a cake with a caramel topping for caramelisation; quiches for coagulation; mayonnaise for emulsification; breads for dextrinization; and roux sauces for gelatinisation. Some candidates made a cheesecake for gelatinisation; this shows the use of gelatine but not the effects of moist heat on starch.

Candidates generally answered **(c)(i)** and **(c)(ii)** well.

FOOD STUDIES

Paper 9336/03
Unsupervised Work

Key messages

- Centres are strongly encouraged to make **Section 7.2** of the syllabus, which provides details of the specific requirements of the Coursework Investigation, available to candidates.
- The subject of the Coursework Investigation should be appropriate to the syllabus.
- Reference should be made to the original aims and objectives in both the conclusion and evaluation.
- Candidates are advised that it is not necessary to print each page on card.

General comments

The majority of the Coursework Investigations were well presented, logically organised, interesting and informative. Many titles showed originality of thought and freshness of ideas.

The better performing candidates had selected well-defined titles which were set within clear and realistic boundaries. They had also followed the framework given in **Section 7.2**; used both quantitative and qualitative investigation procedures; and reached conclusions which reflected the initial aims and objectives.

Many candidates provided appropriate photographic evidence for tasting panels, visits and market surveys.

Choice and justification

The title must be relevant to the syllabus and have clearly defined parameters in order that the limitations of the study can be appreciated. A title such as, “Are 50–60 year olds in locality X consuming sufficient NSP in their diet?” clearly gives parameters, whereas one entitled, “Do elderly people eat healthily?” sets few limits to the study. Although the execution of the work is unsupervised, the suitability of titles should be checked and advice given to candidates if a proposed Coursework Investigation is outside the syllabus.

Candidates are expected to justify their choice of selected area of study with at least four reasons. Appropriate reasons could be that a subject is of personal interest; relevant to world health issues; or topical in local media. Weaker candidates did not provide any reasons for their choice of topic or confused reasons for choice with the aims and objectives of the Coursework Investigation.

Candidates are expected to outline clearly, but briefly, the investigative methods and resources they intend to use in their Coursework Investigation. There is a check-list to help with selection in the syllabus.

Planning

This section should demonstrate detailed and logical planning. There should be several objectives since these are the reference points against which the success of the Coursework Investigation can be evaluated. Sometimes objectives were not presented in a way that could be translated into achievable tasks. It is very difficult to measure the success of an objective such as “determine whether eating breakfast improves concentration”.

Many candidates gave structure to their work by the use of Gantt charts or by simply listing proposed activities giving dates for completing particular tasks or stages. Candidates often commented in the *Evaluation* section that data analysis was a long process for which the time estimated in their planning was too short. Some candidates produced a diary of activities. Although this shows how the Coursework Investigation progressed, it does not constitute a plan.

Some candidates stated the methods they intended to use but gave no further information or justification. The better performing candidates stated and justified each method of data collection, explaining how each

method would help to achieve their listed objectives. For example, for questionnaires or interviews, candidates included how respondents would be selected and how they intended to analyse and present the data they collected. The criteria in **Section 7.2** clearly state answering the questions “*how, when, where and with whom*” as a formula to follow.

Samples of questionnaires, interview questions etc. should be included in an appendix.

Theoretical research

All of the Coursework Investigations submitted included some theoretical research, but the quantity and quality was variable.

The better performing candidates consulted a variety of books, texts, articles and websites and summarised their findings in their own words. Candidates must not reproduce whole sections from publications verbatim and care should be taken to avoid plagiarism. Accounts need to be coherent and succinct; to contain only relevant material; and to avoid repetition.

Most candidates listed their sources in the bibliography. Acknowledgement must also be given to all materials (e.g. quotations, diagrams, charts, figures or tables) referred to in the *Theoretical Research* section. Credit was awarded for including relevant topical information, for example from newspaper articles or government reports.

The *Theoretical Research* section should include sufficient detail to form the basis for the subsequent investigative work.

Investigation skills

The most successful studies used at least five investigative methods; some candidates restricted the credit available to them by using far fewer than the recommended number of data collection techniques.

Some candidates visited local markets, shops and farms; others conducted questionnaires and compared and evaluated dishes. For each investigative method used, candidates should have explained *how, where, when and with whom* the investigations were done, and which of their objectives were being addressed. There should be evidence that questionnaires and interview questions were pretested before use in the Coursework Investigation.

Questionnaires should not contain too many questions, and they should be carefully phrased to get responses that can be collated, analysed and reported on effectively. The number of people taking part in a survey need not be vast, but the size of the sample should be stated. The primary information from interviewees should generally be different from or go beyond that available from secondary sources.

If a tasting panel is to be used, then it is more appropriate to select dishes between which definite comparisons can be drawn.

Candidates should be encouraged to use food diaries or food frequency tables more thoroughly. They are a valuable resource and can yield a great deal of useful data if used correctly. If the study is focused on one specific nutrient, e.g. calcium, then this can be the focus of the diary entries.

If planned work cannot be conducted, reference should be made to it in the *Evaluation* section.

Teachers must be aware of what their candidates plan to do during visits to other organisations. Candidates should not expect to be able to visit hospitals or clinics to talk to patients, and should not include the result of hospital tests in their study. Candidates do not have the authority or expertise to do clinical analyses themselves. Confidentiality must always be respected. Similarly, questions on family income should never be included in questionnaires.

Collation and presentation of data

The information from each of the methods of data collection used should be presented in an appropriate form which is clear and easy to understand.

In general, all the data collected were well collated. Most of the data were well presented, with the inclusion of titles and appropriate annotations. Candidates presented their findings using a range of methods including prose, tables, line graphs, bar charts, pie charts, histograms and comparison charts. Many candidates effectively included photographs which enhanced the quality and authenticity of their Coursework Investigations.

Some candidates presented information without reference to the Coursework Investigation. Data analysis should be presented separately from summaries and conclusions as this makes the study flow more logically.

Conclusions

This part of the study was often executed in a very superficial way. Candidates should provide an accurate summary and analysis of the evidence collected. Candidates need to provide evidence to support the conclusions drawn.

Conclusions can then lead to relevant recommendations linked to the original aims and objectives. These recommendations could be for implementation by individuals, families, organisations or governments. Whatever form the recommendations take, they should result from careful consideration of the evidence gathered from the Coursework Investigation.

Evaluation

This process is worth 10% of the final mark yet many candidates attached little importance to it and wrote very briefly and only from a more personal perspective of completing the study. It is expected that each section of the Coursework Investigation should be reviewed and comments made on the strengths and weaknesses of the work. This is not supposed to be an area solely for candidates to describe their own strengths and weaknesses; it is a forum to revisit and review each aspect of the whole Coursework Investigation and make suggestions for improving weak areas and extending the research.

Candidates should consider whether the original aim and each objective have been achieved. The planning work should be considered and constructive judgement given to the original proposed timings, comparing the expected time taken with the actual time expended.

The success or lack of success of each of the methods of data collection and collation used should be analysed and critically appraised.

Most candidates were able to state personal benefits they had gained from doing the study and these were well communicated. Some candidates mentioned that they had become more confident and had enjoyed meeting people from other backgrounds; others were pleased to have become more adept at using particular computer programmes. Sometimes candidates described problems they had encountered and described how they had dealt with them. This was commendable since it is often considered that weaknesses should be overlooked.

Presentation

Almost without exception candidates produced work which was attractively presented, logically and sequentially organised and consistently formatted. Candidates should, however, be reminded to adhere to the word limit. In some Centres candidates had included a word count on the front cover which was very helpful.

As a result of their Coursework Investigation, some candidates included original bookmarks, pamphlets and posters that they had designed themselves to use with their target group or in classrooms, canteens and meeting halls. This was an original and very interesting development to the study and showed commendable effort.