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Examiners' Report
June 2010

GCE Design and Technology 6FT02 01

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Introduction

This year it was good to see that the majority of candidates kept their responses to the spaces provided. Some still wrote out of clip but the number of candidates using additional paper was less than last year. The reason why candidates may be finding space limited is that they are answering in complete sentences. Using the question as part of the response is reducing space available and is not necessary. The examiner can see the question, so they do not require the question as part of the answer. Some questions are very detailed and using the question as part of the response will result in the candidate running out of space, writing out of clip and requiring additional paper.

Although the number of candidates using additional paper has reduced by fifty percent, too many are still using the additional paper to put one / two line answers. Very rarely does this result in any additional marks. There is the view that if you use additional paper, the script cannot be scanned and it will be sent to be personally marked by an examiner. It should be pointed out that all scanned scripts are personally marked by an examiner. Whether a script is on the computer screen or physically in front of the examiner, makes absolutely no difference to the marking system. Question papers have been designed with plenty of space for candidates to record their responses. Candidates should be encouraged to work within the space available.

This year there were a large number of blanks, where no response was provided, even for the easier questions. This is a concern as the exam is worth forty percent of the overall AS total mark. With this in mind, it is very important that candidates spend forty percent of their time learning and revising theory.

A lack of understanding on the more technical / scientific questions was again in evidence and a recurring issue of vagueness and use of generalisations was evident. Candidates are strongly encouraged to avoid irrelevant comments and focus on direct responses to the question. This will help candidates to score more marks and to provide responses within the space available.

Again there were a number of responses that referred to last years' paper but not as many as in previous years. This report must reiterate the requirement for question papers to examine as much subject content as possible during the life of the specification. Candidates are encouraged to cover the whole specification in their learning and revision sessions.

Comments on Individual Questions

This report will provide exemplification of candidates' work, together with tips and/or comments, for a selection of questions. The exemplification will come mainly from questions which required more complex responses from candidates.

Question 1(a)

Generally a well answered question, with the majority of candidates scoring the full two marks. Steam, abrasion and lye systems were the most popular responses. Where candidates lost marks was in referring to methods of cleaning, size reduction, blanching and vague responses such as 'big giant potato peeler'; 'big peeling machines'.

Question 1(b)

Generally a well answered question, most candidates scored at least one mark, if not the full two marks. Responses such as: 'to allow for further processing'; 'to cook or freeze all pieces evenly'; 'so that all sizes are the same' and 'to meet what the product requires' were popular and correct. Where candidates lost marks was in referring to why products are sorted and graded. For example: 'to fit into packaging'. This response was only accepted, if the candidate qualified their response, by stating a relevant type of packaging, e.g. canning. Many candidates focused on the consumer and not on the food manufacturer / production. There was a lot of confusion over the difference between sorting and grading, and size reduction.

Question 1(c)

This question was not answered well. A large number of candidates scored no marks, as they simply did not know what the process was. It appears that candidates focused in on the 'sation' part of the word homogenisation and the fact that it was milk, lead them to mistakenly assume that it was a preservation process. Therefore many responses referred to pasteurisation and sterilisation heat processing techniques. Some very good candidates scored two marks plus, with only a few excellent candidates scoring the full four marks.

Question 2(a)

Generally a well answered question. Many candidates scored the full two marks. Responses such as: 'carotenoids'; 'chlorophylls' and 'anthocyanins' were the most popular. Slight misspelling was allowed and candidates that referred to the colour examples main groups, for example: isoprenoid, were credited. Where candidates lost marks was in referring to named colours such as: red, blue, green, etc. Quite a few candidates did not have a clue and came up with responses such as: glucose, starch, flavours and vitamin D.

Question 2(b)

Surprisingly, this question yielded very few successful responses. Only a few very candidates scored the full two marks. Some scored one mark but the majority scored no marks. The problem appears to be that many candidates focused in on the word 'problems' and wrongly assumed that this meant bad news. So responses such as: 'bad for your health'; 'allergic reactions' and 'people don't like them' were not credited. Also many candidates referred to 'lost of colour during processing' and 'having to use too much to get the right colour'. Both

are wrong, candidates have very little understanding of how the food industry operates with regard to natural colours (or use of synthetic / artificial colours or any additive for that matter). Operators do not stand over the machine pouring in gallons of colour until they get it right. The recipe formulation would have been worked out in advance and produced using a specification. Therefore the amount used and effects of processing would have been analysed and evaluated during the development stage. Also, some responses referred to change of colour when cooking food, e.g. cabbage. Far too many candidates referred to change of flavour and texture. Some even referred to change of colour as a bad thing. The examiner was looking for responses such as: 'seasonability'; 'variation of colour in batches' and 'expensive to extract / use'.

Question 2(c)

This question was reasonably well answered. Most candidates scored two marks plus. Only a few candidates scored the full four marks. Popular responses were: 'flavour enhancer'; 'used in Chinese food' and 'results in Chinese Restaurant Syndrome'. Very good candidates referred to: 'suppressing strong flavours'; 'rounding off flavours' and other food uses. However, far too many candidates did not know what MSG was. Many thought that it was an emulsifier, probably confusing monosodium with monoglyceride. Some thought that it was a gelling agent, anti-oxident or cellulose.

Question 3(a)

Generally a well answered question. Most candidates scored the full two marks for oxidative and hydrolytic rancidity. Candidates lost marks was in referring to one type of rancidity only, or giving poorly considered answers such as: 'rancidity 1' and 'rancidity 2'. Very slight misspelling was allowed but if answer was not clear e.g. hydrogation; hydrolive; oxidasis, was not credited.

Question 3(b)

Generally a well answered question. Most candidates scored two marks and very good candidates scored the full three marks. Many candidates knew that a mixed triglyceride contained one molecule of glycerol and three fatty acids, for two marks. Where candidates lost a mark, it was by not referring to the three fatty acids as 'different'. Some weaker candidates referred to protein structure.

Question 3(c)

This question was surprisingly not answered as well as it should have been. Considering that is has made an appearance in previous papers and is also in the sample materials as well. A reasonable number of candidates scored the full three marks, with a good number getting at least one / two marks. However, far too many candidates scored no marks by referring to 'emulsification process'; 'gelling' and 'heat treatments'. Many candidates knew that the process 'hardened' oils or that hydrogen was involved, for one mark. Good candidates referred to the use of a catalyst (nickel). Very good candidates referred to the double bonds taking up the hydrogen. Many candidates are confused about this process referring to double bonds 'breaking', they do not break, they are removed by the take up of hydrogen.

Question 4(a)

Generally a well answered question, not surprising, as it has made an appearance on a number of occasions. A large majority of candidates scored the full two marks, with bacteria and yeasts the most popular responses. Where candidates lost marks was in referring to naming a food product, naming bacteria (not credited- candidates were not asked to name bacteria) and repeating responses.

Question 4(b)

A well answered question with a large majority of candidates scoring five marks plus. Many candidates scored the full six marks. The bacterial life cycle had obviously been taught. Some candidates failed to name the stages but gave a good descriptive answer and were credited. Where candidates lost marks, it was in confusing stages, particularly 'lag' and 'log'; failing to give three distinct stages; writing generally about bacteria causing food spoilage and discussing factors that influence growth. Many candidates appeared confused about the stationary stage. Some thought that it meant that bacteria had simply stopped moving or when reproduction equals the amount dying. Both are incorrect. Stationary refers to growth of bacteria as at a constant i.e. no more growth due to depletion of nutrients.

Question 4(c)

Generally a well answered question. A large majority of candidates scored two marks, with a large number scoring three marks plus. Where candidates lost marks was in referring to similar personal hygiene rules. For example, wearing an apron, hairnets and shoe/face covering, all come under protective clothing and can only be credited once. Also washing hands after using: raw food, going to the toilet, handling rubbish, all come under washing hands and again can only be credited once. The candidate needs to think of complete personal (person) hygiene. So the examiner was looking for responses such as: covering cuts with a coloured plaster, reporting illness and no spiting / smoking / coughing / touching spots when handling food should also be considered. Some candidates referred to kitchen and food hygiene and were not credited.

Question 5(a)

Generally this question was not successfully answered. Considering that many candidates would / should have had to refer to this as part of their coursework. Very few candidates scored the full four marks. Some managed to score two marks plus. This question basically required candidates to refer to how HACCP would be carried out. What are the requirements of HACCP, what does it require you to do? Answer: analyse the process, identify hazards, recognise CCPs, monitor and document the process. Far too many candidates incorrectly referred to quality control checks, hygiene procedures and failed to score any marks.

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Examiner Tip

Discuss questions usually look for a response and an explanation / justification to that response. But candidates need to look at the marks available, as some discuss questions may be worth three, five or seven marks and how they are answered is slightly different. For example, for this question, each part of the question is worth two marks. As long as a reasonable explanation / justification can be given to the response then the candidate will score the full marks available.

Question 5(a) (4 marks)

> 1 Identify Hazzard annalysis - Identify all the Hazzards and problems which Could occour during production and work out ways to stop or reduce the promblem/Hazzard to Creat a qulaity product.
> 2 ~~Establish Critical Control points~~ Establish Record Keeping- Record all promlems that occoured So that next time they Can be Stopped. Record all Solutions to ~~prom~~ problems/Hazzards so they Can be re-used.

The candidate scored the full four marks by mentioning: identifying hazards for one mark; working out ways to stop or reduce problems for one mark; establishing record keeping for one mark and next time stop / record solutions (preventative measures) for one mark. Here we have a good example of how the candidate gives a reason and justification for each point.

Question 5(a) (2 marks)

> 1 To establish critical control points in the food product. this is done by enforcing checks at critical stages of the process on the production line for example the torelance levels of a produce e.g a cake may have to be a certain height
> 2 To establish the maintanance of the product for example maintaining or keeping the quality of a product the same this maybe from a supply in a product such as meat if the product is to be sold as lean beef clean as well mince meats what it should be.

The candidate scored two marks for part 1 of the question by mentioning establishing critical control points for one mark and enforcing checks of critical stages of the process for the second mark. For part 2 of the question the candidate did not score any further marks as they did not refer on how to establish maintenance of the product. The rest of the answer is meaningless as it refers to quality control not HACCP.

Question 5(b)

Another very badly answered question. Something that may have been referred to in coursework but not referred to in the exam. Some candidates scored one mark by referring to Q.C. checks or training staff. Only a few very good candidates scored two marks plus. Many candidates focused

in on quality control and proceeded to list a number of checks. This can only be credited once. Effective quality control also includes: specifications, trained staff, documentation, feedback and corrective action. Something to which very few candidates referred to.

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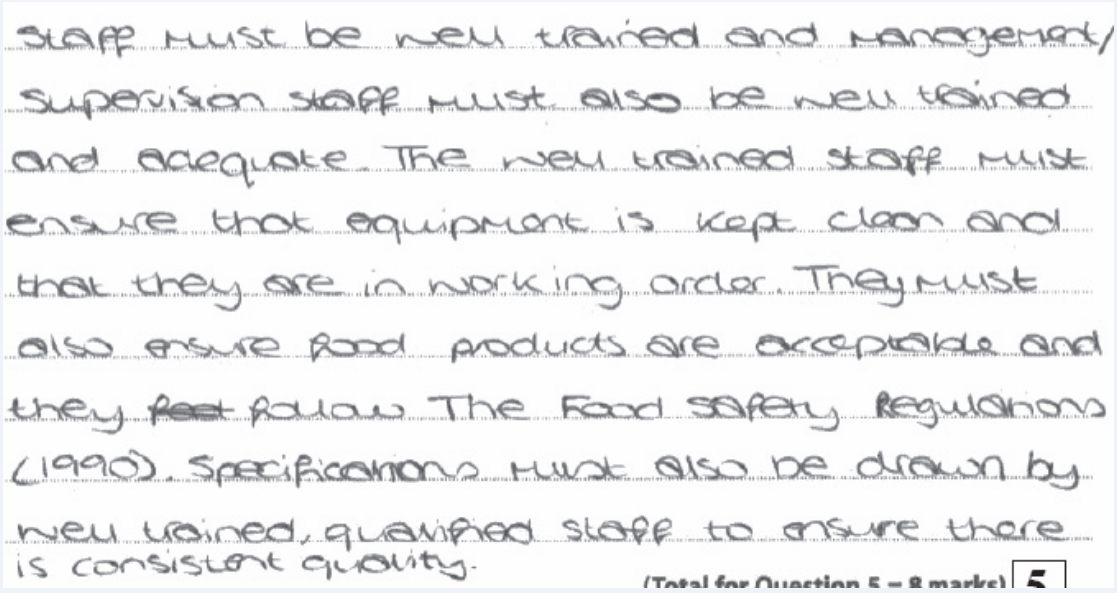
Examiner Tip

Explain questions are similar to discuss questions in that they require a response and an explanation / justification for two marks. However, as the answer space has not been divided into separate spaces for responses (see 5a) a list of relevant points will suffice. Candidates should look at the mark allocation. If a response if worth four marks and there are spaces for two answers, candidates should ensure that two responses and explanations / justifications are given for the full marks. If there is no division, only lines, then a number of discrete points is fine.

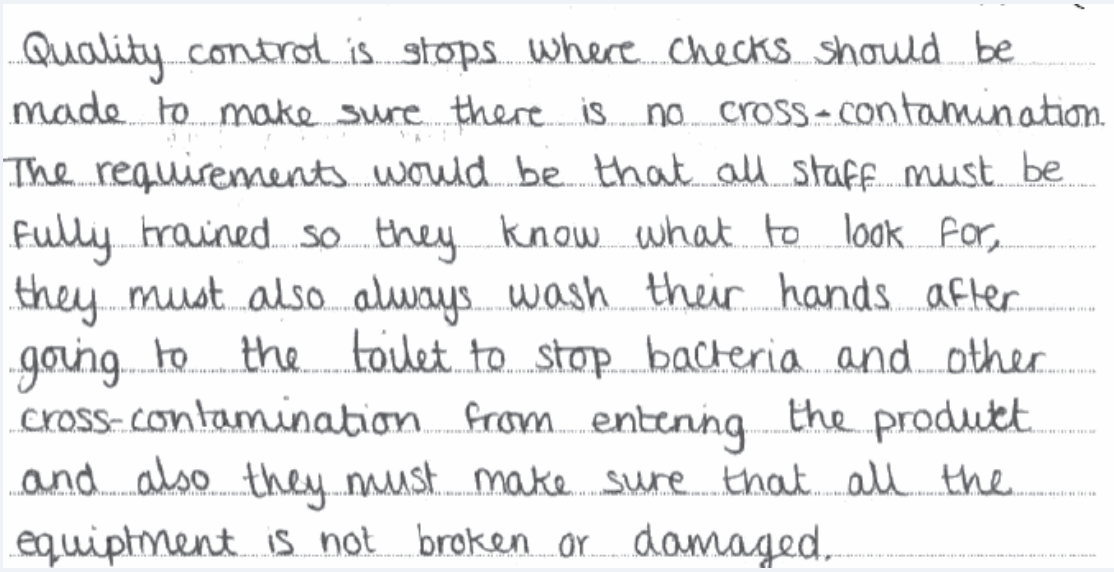
Question 5(b) (4 marks)


Staff must be well trained and management/ supervision staff must also be well trained and adequate. The well trained staff must ensure that equipment is kept clean and that they are in working order. They must also ensure food products are acceptable and they ~~feel~~ follow The Food safety Regulations (1990). Specifications must also be drawn by well trained, qualified staff to ensure there is consistent quality.

(Total for Question 5 = 8 marks) 5

The candidate scored the full four marks by mentioning: trained staff for one mark; management are adequate for one mark; staff ensuring products are acceptable and follow food safety regulations (relevant inspection and monitoring) for one mark and drawing up specifications for one mark.

Question 5(b) (2 marks)


Quality control is stops where checks should be made to make sure there is no cross-contamination. The requirements would be that all staff must be fully trained so they know what to look for, they must also always wash their hands after going to the toilet to stop bacteria and other cross-contamination from entering the product and also they must make sure that all the equipment is not broken or damaged.

The candidate scored one mark for checks / relevant inspection and one mark for staff fully trained. No other marks, as rest of response relates to general personal hygiene (wash hands) and kitchen hygiene (equipment).

Question 6(a)

Generally a well answered question with most candidates scoring the full three marks. As there were a large number of general answers to this question on the mark scheme, many candidates appeared to score the three marks using a hit-or-miss approach. Where candidates lost marks was in referring to plastic in general and not LDPE specifically.

Question 6(b)

A badly answered question, far too many candidates referred to last years question on chilled storage. Candidates obviously focused in on the words 'chilled storage' and ignored the word 'principles'. The principles of chilled storage is asking why is food chilled, not how should it be stored. Therefore, any responses referring to storage were not credited. Some candidates did score at least one mark by referring to 'slowing down the growth of bacteria'. Here a lack of knowledge or / and understanding of micro-biology was evident. Chilling (unlike freezing) does NOT stop the growth of bacteria. Bacteria continue to grow, only very slowly. Psychrophilic organisms thrive at chilling temperatures. Food spoilage organisms such as moulds and yeasts continue to grow at these temperatures and food will spoil. Also chilling does not kill (nor does freezing for that matter) bacteria. Very few candidates scored the full three marks.

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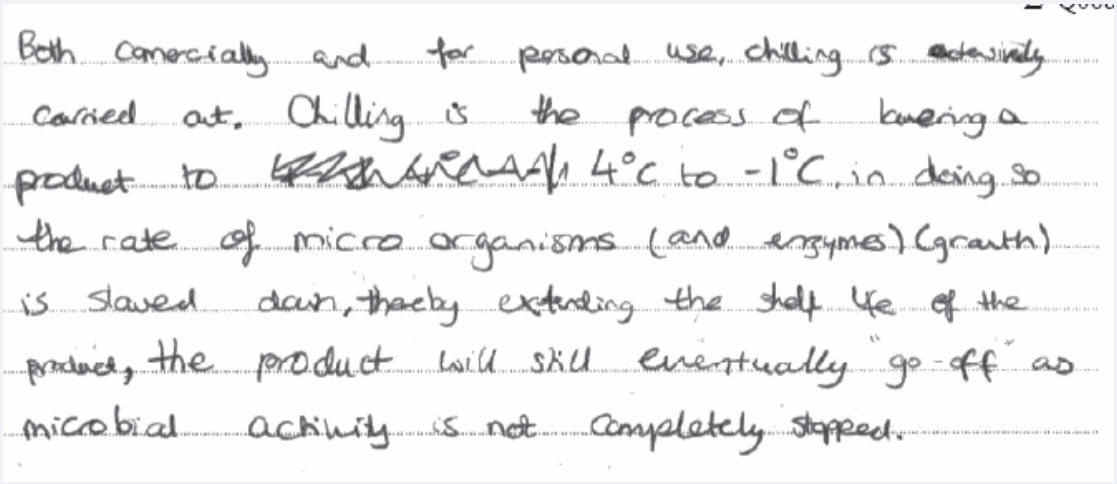
Examiner Tip

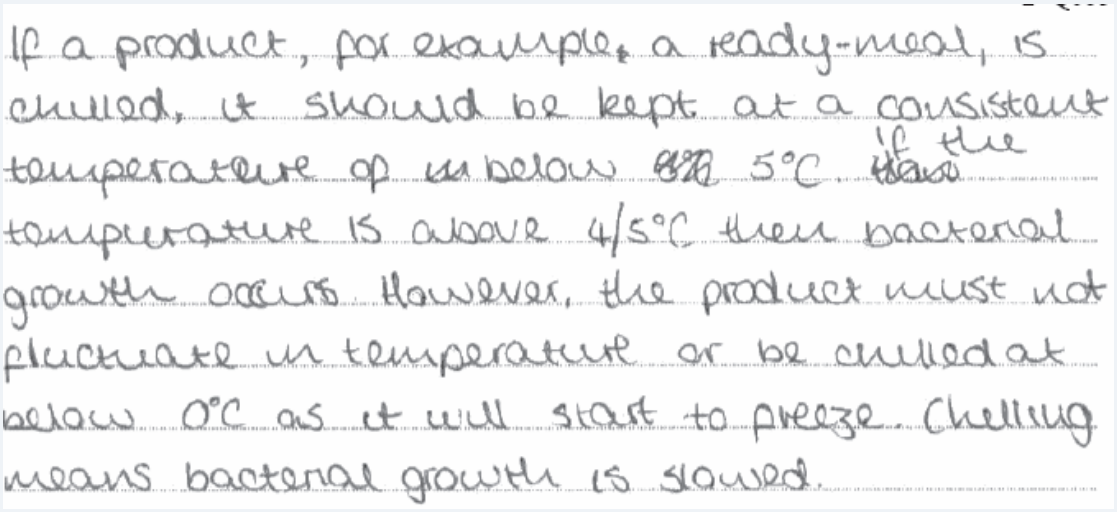
This is a discuss question but is worth more than two marks. Therefore the candidate can either give a response with a fully developed explanation / justification e.g. a response and an explanation / justification with two relevant points, or provide three discrete, relevant responses / points to the question.

Question 6(b) (2 marks)


Both comercially and for personal use, chilling is extensively carried out. Chilling is the process of lowering a product to 4°C to -1°C, in doing so the rate of micro organisms (and enzymes) (growth) is slowed down, thereby extending the shelf life of the product, the product will still eventually "go-off" as microbial activity is not completely stopped.

Candidate scored one mark for mentioning that the rate of micro-organisms (and enzymes) is slowed down. One mark is also awarded for microbial activity is not completely stopped.

Question 6(b) (1 mark)


If a product, for example, a ready-meal, is chilled, it should be kept at a consistent temperature of or below 5°C. If the temperature is above 4/5°C then bacteral growth occurs. However, the product must not fluctuate in temperature or be chilled at below 0°C as it will start to freeze. Chilling means bacteral growth is slowed.

Candidate scored one mark for mentioning the chilling means bacterial growth is slowed. No marks for temperature. To say that above 4/5°C is not valid, we know that bacterial growth occurs at higher temperatures and the use of the word fluctuates does not add anything to the response.

Question 6(c)

Again, here is a question that has made an appearance in previous papers and is also in the sample materials. Yet it was not generally well answered. A few candidates scored at least two marks by referring to the process as a 'high temp. - short time' process. But far too many candidates referred to the sterilisation process and not the UHT process. It is true that the UHT process sterilises the product but the affects are very different to sterilisation. So referring to sterilisation affects, gained no credit. Candidates lost marks because they referred to the wrong process and showed an evident lack of knowledge and understanding about the UHT process.

Generalisations such as: 'makes product last longer', is not acceptable. How long is longer? Also referring to the process as a 'preservation process' is vague. All heat / cold treatments are preservation processes, as is the use of chemicals, additives and special packaging techniques. A few very good candidates scored the full three marks.

Question 7(a)

This question was not answered well. With the possibility that one maybe two excellent candidates scored the full three marks, many candidates failed to score on this question. The question is scientific, but it is question seven and should be the A grade decider. Candidates did not have know what hydrogen bonding was and its significance to gelatinisation. Many candidates referred to gelatinisation of starch and proceeded to outline the gelatinisation process. This is not what the question asked and was therefore not credited. The relationship between hydrogen bonding and gelatinisation of starch was what the examiner was looking for. Some candidates did manage to score one mark by referring to the formation of a 3D network and the trapping of water molecules and / or that water and starch would be needed for this process to happen.

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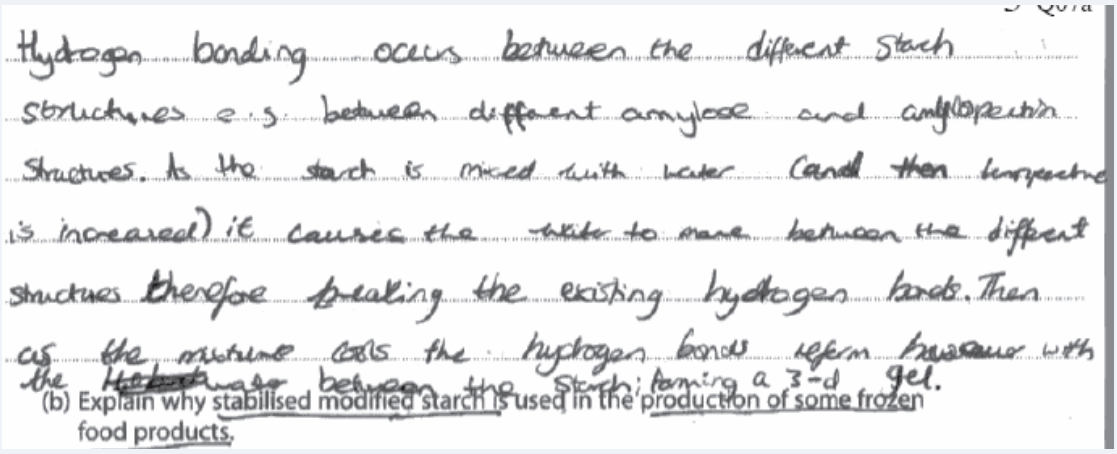
Examiner Tip

Describe questions, unlike discuss questions, usually but not always, require candidates to give a number of discrete points. Again, candidates need to look at the mark allocation. An even number (two, four, six marks, etc.) usually indicates that a response and a justification are required. An odd number (three, five, seven marks etc.) usually indicates that a list of bullet point responses, are required. Candidates should look to see how the answer spaces are laid out. Separate points e.g. 1, 2, 3 etc. usually indicate that a response and justification are required. A number of lines (with no numbering) usually indicate that a list of discrete points is acceptable.

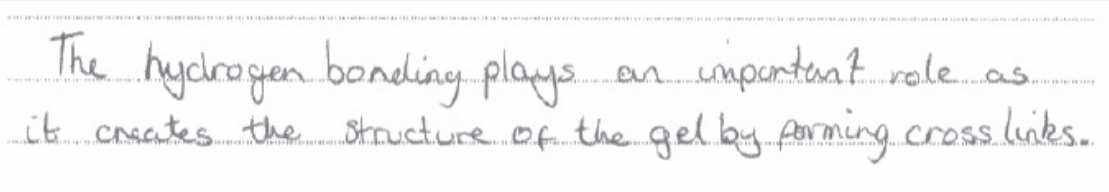
Question 7(a) (3 marks)


Hydrogen bonding occurs between the different starch structures e.g. between different amylose and amylopectin structures. As the starch is mixed with water (and then temperature is increased) it causes the water to move between the different structures therefore breaking the existing hydrogen bonds. Then as the mixture cools the hydrogen bonds reform however with the ~~Hydrogen~~ water between the starch; forming a 3-d gel.

(b) Explain why stabilised modified starch is used in the production of some frozen food products.

Candidate scored the full three marks by mentioning that hydrogen bonding occurs between different starch structures e.g. amylose and amylopectin for one mark; starch mixing with water (bonding) and moving between the structures as it is heated for one mark and one mark for the formation of a 3D network / trapping water and forming a gel.

Question 7(a) (1 mark)



Candidate scored one mark for mentioning that hydrogen bonding creates structure of gel by forming cross-links. Cross-links scored the mark, not creates structure of gel (candidates need to say what is being formed or how the gel is being formed). This candidate explained the answer.

Question 7(b)

This question was not answered well. Many candidates did not know what stabilised modified starch was and its uses in frozen food products. Also for some reason many candidates assumed that frozen foods meant ice cream. Therefore responses such as: 'prevents drip' and 'gradual thaw' were not credited. Many candidates did score one mark by referring to that time old response on modified starch, 'prevents syneresis'. Very few good candidates scored two marks plus.

Question 7(c)

This question was not well answered. Candidates focused in on the words 'physical characteristics' and 'protein' and not the physical characteristics of the food product that contains protein. Candidates therefore referred to the physical structure of protein, this was incorrect and not credited. Some candidates referred to nutrition and biological value, again this is not what the question asks. The examiner was looking for a discussing on denaturation / coagulation: foaming, sols, gels, setting, thickening, emulsifying, stabilising, binding, hydrogen bonding, gelation, retrogradation / syneresis and the Maillard reaction. A large number of candidates scored one mark by referring to denaturation, coagulation and / or the Maillard reaction. A few good candidates scored four marks plus. A few excellent candidates scored six marks plus.

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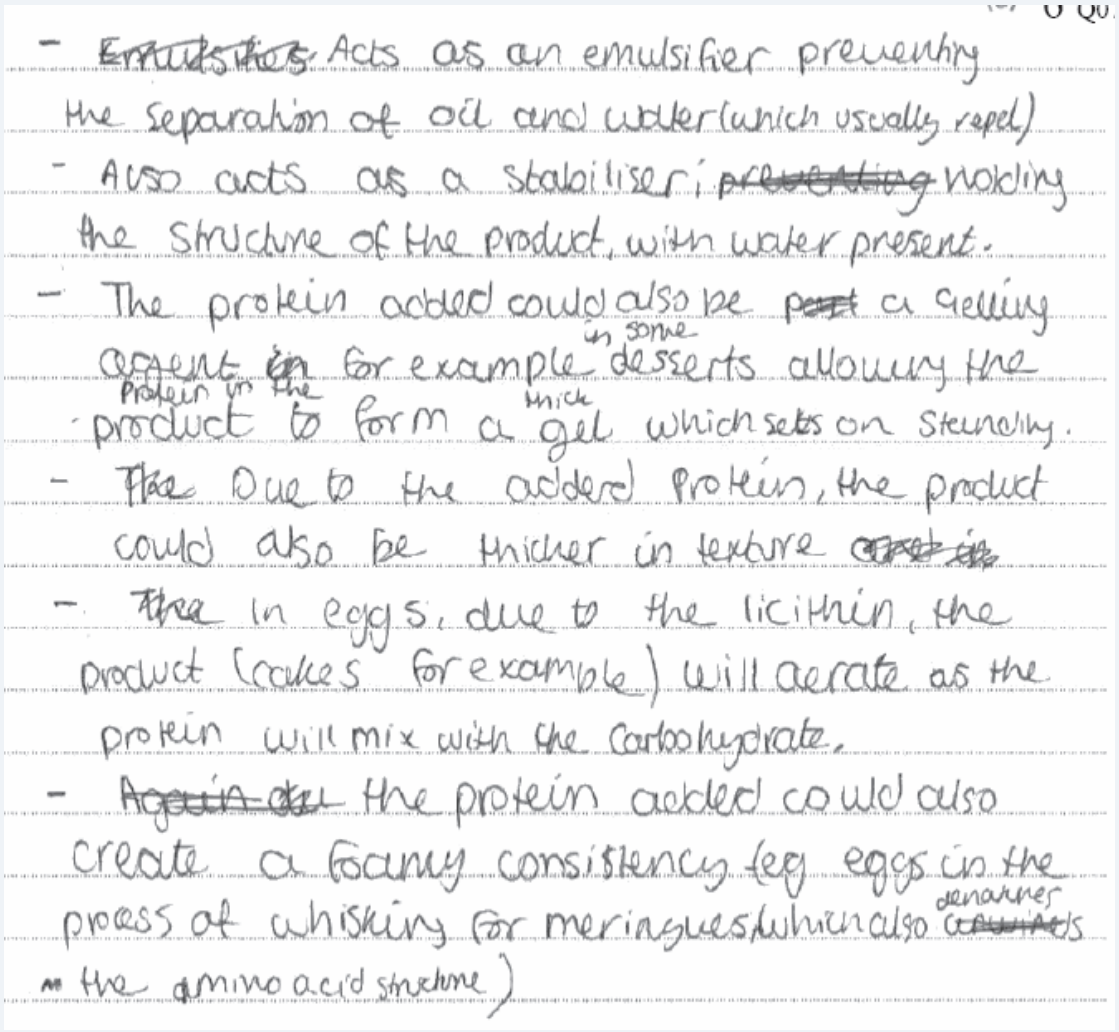
Examiner Tip

Evaluation questions, like analyse questions, usually require the candidate to look at the pros and cons of the question, (the advantages and disadvantages if you like). The examiner is looking for either a discussion type response or a list of discrete points.

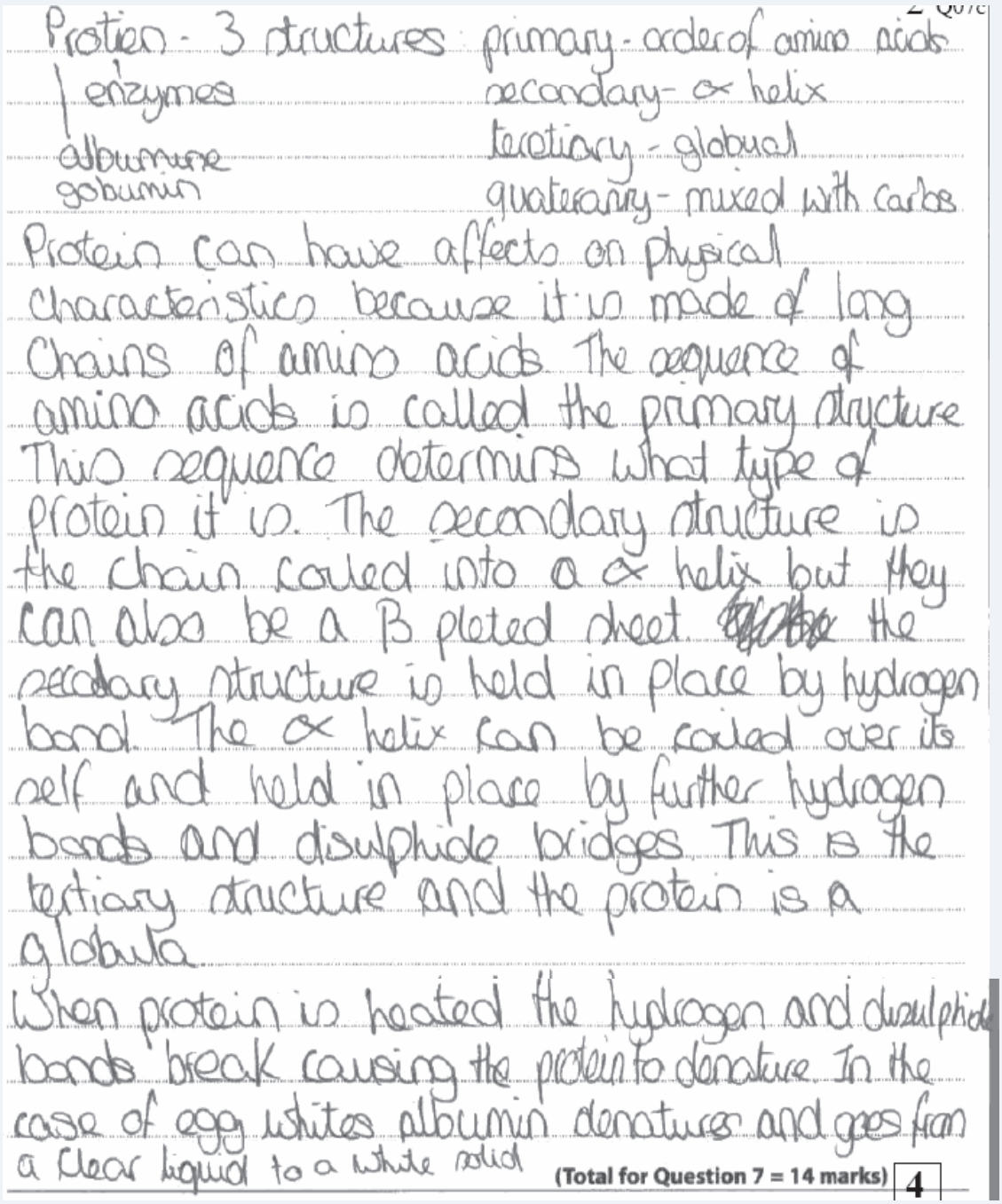
Question 7 (c) (6 marks)



- ~~Emulsifiers~~ Acts as an emulsifier preventing the separation of oil and water (which usually repel)
- Also acts as a stabiliser; ~~preventing~~ holding the structure of the product, with water present.
- The protein added could also be ~~part~~ a gelling agent ~~in~~ for example in some desserts allowing the protein in the product to form a thick gel which sets on steadily.
- ~~The~~ Due to the added protein, the product could also be thicker in texture ~~and~~
- ~~The~~ In eggs, due to the licithin, the product (cakes for example) will aerate as the protein will mix with the carbohydrate.
- ~~Again due~~ the protein added could also create a foamy consistency (eg eggs in the process of whisking for meringues) which also denatures ~~and~~ (as the amino acid structure)

Candidate scored six marks out of a possible eight by mentioning: emulsifying, stabilising and thickening for one mark; one mark for holding structure; one mark for gelling (gels) / sets; one mark for aerate; one mark for creates foam and one mark for denature.

Question 7(c) (2 marks)



Protien - 3 structures: primary - order of amino acids
enzymes — secondary - α helix
albumine — teretiary - global
gobumin — quaterany - mixed with carbs

Protein can have affects on physical characteristics because it is made of long chains of amino acids. The sequence of amino acids is called the primary structure. This sequence determins what type of protein it is. The secondary structure is the chain coiled into a α helix but they can also be a β pleted sheet. the secdary structure is held in place by hydrogen bond. The α helix can be coiled over its self and held in place by further hydrogen bonds and disulphide bridges. This is the tertiary structure and the protein is a globula.

When protein is heated the hydrogen and disulphide bonds break causing the protein to denature. In the case of egg whites albumin denatures and goes from a clear liquid to a white solid

(Total for Question 7 = 14 marks) **4**

Candidates scored two marks. One mark for mentioning denature and one mark for giving an example of (denaturation/coagulation) egg white going white when heated. The rest of the answer scored no marks as the examiner was not looking for the structure of protein.

Summary

Overall, this series produced many good responses and many candidates should be congratulated for their efforts. Marks were generally good on the easier questions. However, the technical and scientific questions are posing a big problem for very many candidates. Future candidates are advised to focus on this type of question in order to perform well across the whole paper.

Grade Boundaries

Grade	Max. Mark	A	B	C	D	E	N	U
Raw boundary mark	70	37	32	28	24	20	16	0
Uniform boundary mark	80	64	56	48	40	32	24	0

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