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Exemplification Booklet

June 2009

GCE

GCE Design and Technology: Food Technology 6FT02

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Introduction

Summer 2009 saw the first sitting of some AS units of the new GCE2008 specifications. As support for teachers, this booklet has been prepared as an exemplification of how marks were awarded to the written paper for Design and Technology: Food Technology 6FT02 during the Summer 2009 examination. It features work produced by the candidates in the actual examination. It contains the questions and mark schemes, together with examples of student answers. It gives the marks awarded for each exemplar response plus commentary by senior examiners. It does not include exemplars for every question on the paper, but only those where contrasting levels of response could be produced.

Section 3(b)

(b) Describe **two** factors which influence the growth of micro-organisms. (4)

1

.....

.....

2

<p>3(b)</p>	<p>Any two from the following factors described which influence the growth of micro organisms, up to a maximum of four marks:</p> <ul style="list-style-type: none"> • nutrients (1) provided by growth medium (1) • pH (1) near neutral pH7 (1) • warmth (1) growth range (1) • oxygen (1) some need oxygen others don't (1) • time (1) numbers to grow to serious level / toxin production (1) • water activity (1) different water activity/ moisture levels (1) (2 x 2) 	<p>(4)</p>
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Examiner Tip

Describe questions worth two marks usually require two parts to the answer. This question asks candidates to describe two factors which influence the growth of micro-organisms. Therefore the examiner is looking for a factor and a reason why or how that factor influences micro-organisms growth.

Example 1: 4 marks

(b) Describe **two** factors which influence the growth of micro-organisms.

(4)

- 1 temperature: microorganisms have an optimum temperature where they are most active, too cool and they lie dormant, too hot and they are killed
- 2 pH: micro-organisms have an optimum pH. ~~the~~ conditions that are too acidic or too alkaline will reduce activity or kill them.



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Examiner Comments

This response scored the full marks as the candidate shows a good understanding of how temperature and pH influence microbial growth. Although temperatures are not given the candidate shows that micro-organisms are most active at an optimum temperature. And that if it is too cool they are dormant, too hot and they die. Again the candidate explains that micro-organisms have an optimum pH but if conditions are too acidic or alkaline this will reduce activity or result in death. This response shows the examiner that the candidate is aware that temperature and pH ranges are important in micro-organisms growth.

Example 2: 2 marks

(b) Describe **two** factors which influence the growth of micro-organisms. (4)

- 1 The amount of oxygen - If food is exposed to the air, micro-organisms may grow faster.
- 2 If the condition is warm and damp this increases the rate of micro-organism growth.



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Examiner Comments

Response scored two marks as two relevant factors were listed: oxygen and warmth. Candidate failed to gain the additional mark as the responses were too general. Warm / warmth was accepted for temperature but no second mark was awarded as the candidate did not explain how warmth could increase the rate of micro-organism growth. One mark awarded for the factor oxygen, but again no knowledge of how oxygen influences growth. Generalisations such as 'may grow faster', does not show the examiner that the candidate understands how oxygen or warmth affects micro-organisms growth.

Section 3(c)

(c) Outline how the correct industrial chilled storage of food may reduce the risk of food poisoning.

(4)

3(c)

Any **four** from the following outline correct industrial chilled storage of food may reduce the risk of food poisoning, up to a maximum of **four** marks:

- temperature must not exceed 4°C or bacteria can grow (1)
- do not over load / allow air to circulate for efficient functioning (1)
- prevent cross-contamination of raw and cooked foods by storing separately (1)
- store raw foods below cooked foods to avoid drip (1)
- raw foods should be in air-tight containers to avoid drip food /stored in clean suitable containers (1)
- operating temperature should be checked once a day and records kept (1)
- a good (FIFO) stock rotation system essential (1)
- regular cleaning (1)
- temperature of food must be reduced as quickly as possible (1)
- dont open the chiller/ constant temperature (1)

(4 x 1)

(4)



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Examiner Tip

Outline questions usually require the candidate to provide a list of key points up to the number of marks awarded. This question required candidates to show how the correct industrial chilled storage of food may reduce the risk of food poisoning. The examiner was looking for four key points about correct chilled storage.

Example 1: 4 marks

(c) Outline how the correct industrial chilled storage of food may reduce the risk of food poisoning.

(4)

Correct storage will ensure slowed down activity of bacteria. The industrial store will keep foods at ^{0-5°C.} ~~18°C~~ or lower. This takes bacteria out of their comfort zone. It is also important that foods are on the correct shelves in the chilled storage. Meats should be on the bottom shelf to ensure blood ^{and} ~~does~~ other juices do not drip onto other foods. Cooked and raw foods should be on separate shelves and hot foods should not be placed in storage as it could affect overall temperatures. (Total for Question 3 = 10 marks)

It is also important that all foods are covered.



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Examiner Comments

This response scored the full four marks as the candidate provided four ways on how correct chilled storage reduces the risk of food poisoning. Temperature, figure given; meat stored on bottom shelf to ensure blood (this tells the examiner that the meat is raw) will not drip; cooked and raw foods on separate shelves and no hot foods in storage. In fact candidate provided five reasons why correct industrial chilled storage of food may reduce the risk of food poisoning (important that all foods are covered). Only four marks can be awarded.

Example 2: 1 mark

(c) Outline how the correct industrial chilled storage of food may reduce the risk of food poisoning.

(4)

Chilled foods should be kept between 1°C and 4°C however it is still legal up to 8°C. ^{If} ~~Some~~ the products are stored correctly it inhibits micro-organism growth. ~~These~~ ^{These} temperatures cause the micro-organisms to be dormant and so safe to consume. Also industrial chilling methods can eliminate bacterial growth completely



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Examiner Comments

This response scored one mark only as the candidate focused on temperature only. They then proceeded to explain how temperature affects micro-organisms. But this is NOT what the question asks. Even though question shows a good understanding of how chilling affects micro-organisms, temperature is only one aspect of correct storage.

Question 5(b)

(b) Discuss the relative sweetness levels of sugars compared with sucrose.

(6)

5(b)

Any six marks from the following discussion on relative sweetness levels of sugars in comparison to sucrose, up to a maximum of six marks:

- sucrose taken as 100 (1)
- fructose is sweeter than sucrose / 170 (1)
- invert sugar (mixture of glucose and fructose) sweeter than sucrose / 130 (1)
- glucose not as sweet as sucrose / 75 (1)
- maltose not as sweet as sucrose (1) / 30 (1)
- glucose not as sweet as sucrose / 30 (1)
- lactose is much less sweet than sucrose / 15 (1)

(6 x 1)

(6)



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Examiner Tip

If the question is asking for a comparison then response must reflect this or give an indication that the subject being compared is being referred / referenced to. The key here is to make sure that the sweetness levels of sugars are being compared with sucrose. This question could have been answered either by writing a short essay style response or by listing the relevant sweetness levels of sugars with sucrose as the focus.

Example 1: 6 marks

(b) Discuss the relative sweetness levels of sugars compared with sucrose. (6)

170, 50, 30, 100

was
 Sucrose is the standard sweetness of 100.

Fructose is the sweetest of monosaccharides at 170.

Glucose has a sweetness level of 50.

Galactose and Maltose both have a sweetness level of 30.

Lactose has a sweetness level of 15.

~~for starch to~~

Sucrose has a higher sweetness level than ~~the~~ glucose, galactose and lactose.

Fructose ~~usually~~ found in fruit has a higher sweetness than sucrose.

170	100	50	30	30	15
Fructose	Sucrose	Glucose	Galactose	Maltose	Lactose
↑					↑
Sweetest					Not the sweetest



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Examiner Comments

This response scores full marks. The candidate starts by listing sucrose as 100. They mention that sucrose has a higher sweetness level than glucose, galactose and lactose. They also mention that fructose has a higher sweetness level than sucrose and finally the candidate shows through the use of a linear diagram that lactose is not the sweetest. Showing order of sweetness levels by use of numbers and indicating the correct order justified giving this candidate the full marks available. Use of numbers was not necessary e.g. fructose is 170. Candidates can still gain full marks by showing an understanding in their response. E.g. Fructose is the sweetest of all the sugars.

Example 2: 3 marks

(b) Discuss the relative sweetness levels of sugars compared with sucrose.

(6)

3 Q05b

Sucrose is measured at sweetness level 100 because it is almost pure sugar in its ~~to~~ raw state (99.9%). All other sugars are then have relative sweetness to this. Fructose is a much sweeter sugar so has a sweetness level 160 and glucose isn't as sweet so is at level 80. This then shows clearly the amount of sugar required to achieve the sweetness required. Having a ~~to~~ sucrose as the base sugar gives manufactures a clear understanding of how sweet other sugars are.

3



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Examiner Comments

This response scores three marks. Candidate gives the sweetness level of sucrose as 100 and then states that other sugars are relative to this. They then go on to explain that fructose is a much sweeter sugar and that glucose isn't as sweet. If figures are only slightly out e.g. fructose 160 instead of 170 they were still credited.

Example 1: 6 marks

6 (a) Explain **three** major differences between chilling and freezing as methods of preservation.

(6)

- 1 Chilling only retards microbial growth, micro-organisms can still grow over a period of time freezing makes the micro-organisms dormant.
- 2 Chilling involves storing the product in the range -1 to 4°C , freezing involves storage below -18°C .
- 3 Chilling a product only allows a shelf life of approximately 5 days whereas freezing a product can be stored for 3-6 months.



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Examiner Comments

This response scored the full six marks. The candidate clearly compares chilling and freezing and shows a good understanding of how temperature affects preservation. Candidate shows that micro-organisms can still grow at chilling temperatures but freezing renders them dormant. Correct temperature range for both chilling and freezing are given. Approximate life span of products is also clearly indicated.

Example 2: 3 marks

- 6 (a) Explain **three** major differences between chilling and freezing as methods of preservation. (6)

- 1 Chilling - Food is stored at temperature is dropped to ~~0~~ 0-5°C.
- Freezing - Food is stored at below 0°C.
- 2 Chilling - Food is preserved ~~at~~ for a couple of days. only lasts a couple of days
- Freezing - Food can be frozen for as long as you like.
- 3 Chilling - keeps product fresh.
- Freezing - kills enzymes = di-activates enzymes.



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Examiner Comments

This response scored three marks because the candidate was too general in their response. They did compare chilling and freezing and provide three differences but responses showed a lack of knowledge. Marks were awarded for: correct chilling temperature; chilling preserves for a couple of days; freezing deactivates enzymes. Freezing below 0°C is not good enough. What does the candidate mean by below 0°C, -100°C, -1°C? At this level candidates should provide or show an understanding of the freezing temperature range: -18°C to -30°C. Also, freeze for as long as you like, is meaningless and incorrect. Chilling does not keep products fresh. Finally, freezing does not kill enzymes but one mark was awarded for deactivates enzymes.

Example 1: 6 marks

(b) Describe the use of **three** different chemical methods of food preservation.

1. Vinegar (ethanoic acid) can be used to preserve as its ⁽⁶⁾ ^{chemical} formula is CH_3COOH , but the COOH dissociates itself & enters the bacterial cell, which then interrupts the cell's metabolism, this method is the 'dissociated acid' method.
2. Salt can be used as it soaks up water & so not leaving enough water for the bacteria to grow & reproduce, therefore when the bacteria lands on the food product the water will leave the cell due to osmosis, ^{causing} ~~leaving~~ it to dehydrate.
3. Sugar can be used, such as the pectin used in jam, ~~as~~ as 60% of the mixture/solution is sugar it isn't leaving enough water for the cell to reproduce, ~~so~~ ^{& so} the water moves out of the bacterial cell due to osmosis ^{as} the water moves from an area of ^{high} ~~low~~ concentration to an area of low concentration.
- (Total for Question 6 = 12 marks)



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Examiner Comments

This response scored the full six marks as the candidate shows an excellent understanding of how their three chosen chemical methods can preserve. No marks were awarded for naming a method, both marks were awarded for showing a good understanding of how the named chemical could preserve. Candidate scored two marks for showing that the COOH dissociates itself and interrupts cell metabolism. Another two marks were scored for showing that salt has the ability to soak up water making it unavailable for the bacteria to use and that the process of osmosis results in cell dehydration. Finally a further two marks were awarded as the candidate shows that 60% sugar solution results in water being unavailable for bacterial reproduction as the water moves out of the cell due to osmosis.

Example 2: 2 marks

(b) Describe the use of **three** different chemical methods of food preservation.

(6)

- 1 Adding ~~acids~~ acids can help the performance of products. By changing the 2 Q06b1
pH of the product microbes are less likely to grow, ~~and~~ as microorganisms are
unfavourable towards acidic pH's. Acid can also prevent enzyme action.
When acid is added it can enhance flavour and colour within the food.
- 2 Adding additives like lecithin ~~can be~~ from eggs can help ~~stabilise~~ ~~acids~~ 0 Q06b2
emulsify ~~the~~ a product ~~and~~ ~~the~~ another additive like Modified starch can help
thicken a product and keep the viscosity throughout the cooking of the product.
Modified starch can also prevent syneresis. Adding additives can prevent processes.
- 3 ~~By~~ By baking the product in a sodium hydroxide solution 0 Q06b3
the product is free from any ~~more~~ dangerous microorganisms which could lead
to food poisoning.



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Examiner Comments

This response scored two marks as the candidate showed some understanding of why/how their chosen chemical method preserved. Although a little unclear in their response this candidate scored one mark for mentioning that acids can change the pH and that micro-organisms would be unlikely to grow as they do not like acidic conditions. The other two answers are incorrect. Candidate goes on to discuss emulsifying, modified starch and baking as chemical methods of preservation.

Question 7

7 Discuss the importance of good manufacturing practice (GMP) in the food industry.

7 Any **ten** marks from the following discussion on the importance of GMP in the food industry, up to a maximum of **ten** marks:

- GMP is an all-embracing management operation (1) that ensures that food products are manufactured to consistent quality standards (1)
- GMP embraces both the total manufacturing process (1) and the quality assurance procedures aimed at maintaining quality (1)
- Both of these components must be well designed (1) and effectively implemented (1)
- GMP involves effective manufacturing operations (1) whereby every aspect of the manufacture/resources/facilities are fully specified in advance (1), effective manufacturing operations include: specifications / HACCP / trained staff / procedures / premises / equipment / materials / systems (1)
- GMP involves effective food control (1) whereby management / staff (1) are involved in drawing up specifications / inspection / sampling / testing / monitoring / feedback of process (1)
- GMP involves responsible management (1) policy firmly stated / continuously pursued by everyone (1)
- The ability to demonstrate that the principles of GMP have been fully and effectively implemented (1) could assist a manufacture in defending a prosecution (1)

(10)

Example 1: 9 marks

7 Discuss the importance of good manufacturing practice (GMP) in the food industry.

GMP is the umbrella above quality control and quality assurance.

Good manufacturing practice is very important in the food industry as it ensures many things of the food product from end to end. It ensures that the equipment is safe, but also that the food is of a good quality and safe to eat.

Good manufacturing practice is the umbrella above quality control and quality assurance.

Quality control makes sure that the food is of a good quality. Quality control involves checking that the equipment is safe and making sure that the staff are well trained. It also involves checking the products like such as the color, size or weight. To do this random sampling ^{could} be used. The product could also be checked against a color chart or it could be weighed. The equipment could also be monitored and checked regularly. So can the staff and the process.

Quality assurance makes sure that the product meets the specification, it also makes sure that the product meets all the legal requirements.

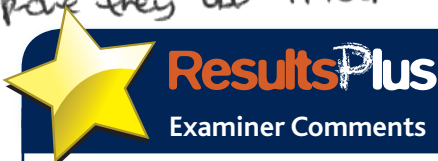
All of this is important so that the customer firstly ^{or satisfied} is happy with the product, and so that the product they buy will ~~also~~ always taste and look the same. It is also to ensure that each product is the same, for example that in a pack of bunnies that ~~they~~ ^{they} are all the same size.

GMP is also important to ensure that the food is safe to eat. GMP ensures that food poisoning will not occur, to avoid any legal problems or being sued; ~~and to ensure that~~ It's also ~~ensures that~~ important that food poisoning doesn't occur as they want people to continue buying their products and have a good reputation.

GMP is also important as it includes HACCP, hence this is important as it means that hazards are recognised and the ~~manufacturer~~ ^{manufacturer} is able to make corrective action if a hazard was to occur. This ensures the safety of the staff but also the product. The seventh point of HACCP is documentation. This (Total for Question 7 = 10 marks)

is important because if there was a problem a manufacturer has documentation ~~to~~ ^{to} to prove they use HACCP and GMP.

TOTAL FOR PAPER = 70 MARKS



Examiner Comments

This response scored nine marks as the candidate focused on and explained a number of aspects of Good Manufacturing Practice. Marks were awarded for good quality; umbrella above quality control and quality assurance; staff well trained; checking and monitoring (equipment/products); meeting the specification; products looking and tasting the same (consistency); includes HACCP/legal requirements; taking corrective action and the importance of documenting.

Example 2: 2 marks

7 Discuss the importance of good manufacturing practice (GMP) in the food industry. 2 Q07

Good manufacturing practice ~~is~~ (GMP) in the food industry to day is very important, in the success of manufacturing food ~~and~~ it has to day.

The manufacturing process of food ensures that people are buy and reseving the best quality of the product they could. This would envole using HACCP - Hazard, Analysis, Critical, control Point. These make sure that the product was made and disstrited correctly. Trying to make sure that the food products weren't contaminated and a much cleaner and healthier way to manufatur.

There is a grate demand of high quality goods wanted, and with out the ^{good} manufacturing practice this wouldn't be possible.

I found that products which haddent gone through this process weren't



as good as the products which had been.

The manufacturing process also helps detect things which shouldn't be in or on the product. It sends the food through large scale metal detectors and is also humanly checked as well.

What with out ~~this~~ manufacturing practice we would have the high quality product we reserve to day. It also ensure the safety, environment, information recycling and the right to education about products are produces to help the consumers learn about the food they eat.

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Examiner Comments

This response scored two marks as the candidate focused on only two aspects of Good Manufacturing Practice. Quality and HACCP was the focus of this essay. The candidate failed to score any further marks as they either repeated the focus e.g. metal detection which is part of HACCP or simply waffled.

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