

# Mark Scheme (Results)

## Summer 2010

GCE

GCE Design and Technology (AS)  
6FT02  
Paper 01 Design and Technology  
in Practice

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:
  - i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that means is clear
  - ii) select and use a form and style of writing appropriate to purpose and to complex subject matter
  - iii) organise information clearly and coherently, using specialist vocabulary when appropriate

Question Number	Answer	Mark
1(a)	<p>Any <b>two</b> from the following methods used for peeling vegetables, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• steam (1)</li> <li>• abrasion (1)</li> <li>• lye systems (1)</li> <li>• boiling water (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
1(b)	<p>Any <b>two</b> from the following examples of why size reduction of food materials is used in industry, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• to prepare raw materials for further processing (1)</li> <li>• to make heat penetration quicker (1)</li> <li>• to make heat reduction quicker (1)</li> <li>• to produce uniformity / consistency (1)</li> <li>• to meet product requirements (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
1(c)	<p>Any <b>four</b> from the following outline on homogenisation of milk, up to a maximum of <b>four</b> marks:</p> <ul style="list-style-type: none"> <li>• droplet breakdown produced by forcing liquid through a narrow opening at high velocity (1)</li> <li>• droplets are also reduced by pressure drop passing through the opening (1)</li> <li>• particle size of one liquid (fat) is reduced (1)</li> <li>• reduced particles are dispersed in the other liquid (1)</li> <li>• emulsifying system is naturally occurring, no emulsifier required (1)</li> </ul> <p style="text-align: right;">(4x1)</p>	(4)
<b>Total for question</b>		<b>8</b>

Question Number	Answer	Mark
2(a)	<p>Any <b>two</b> from the following groups of natural pigments, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• carotenoids / lycopene / xanthophylls (1)</li> <li>• chlorophylls / haemoglobins (1)</li> <li>• anthocyanins / flavones / tannins (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
2(b)	<p>Any <b>two</b> from the following problems associated with the use of natural pigments, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• naturally produced (1) results in variation of colour (1)</li> <li>• extraction process (1) can result in increased costs (1)</li> <li>• seasonal (1) availability (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
2(c)	<p>Any <b>four</b> from the following discussion on the use of MSG, to a maximum of <b>four</b> marks:</p> <ul style="list-style-type: none"> <li>• used as a flavour modifier / enhancer (1)</li> <li>• improves food palatability / acceptance (1)</li> <li>• 'round-off' flavours / suppresses strong onion flavour (1)</li> <li>• used mainly in Chinese cooking / canned and dried soups / canned meats and vegetables (1)</li> <li>• concern that use can lead to 'Chinese Restaurant Syndrome' (1)</li> </ul> <p style="text-align: right;">(4x1)</p>	(4)
<b>Total for question</b>		<b>8</b>

Question Number	Answer	Mark
3(a)	<p>Only answer on rancidity of fats, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• oxidative (1)</li> <li>• hydrolytic (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
3(b)	<p>Only answer on how a triglyceride is formed, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• consists of one molecule of glycerol (1)</li> <li>• combined with three fatty acid molecules (1)</li> <li>• contains three different fatty acids (1)</li> </ul> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> </div> <p style="text-align: right;">(3x1)</p>	(3)
3(c)	<p>Any <b>three</b> from the following outline on the process of hydrogenation of oils, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• oil is heated and stirred with a small amount of nickel (1)</li> <li>• hydrogen gas is bubbled through the oil (1)</li> <li>• unsaturated fatty acids take up hydrogen atoms (1)</li> <li>• removes some of the double bonds in the fatty acids (1)</li> <li>• process results in 'hardening' of oils to solid fats / effectively changes unsaturated fatty acids into saturated fatty acids (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)
<b>Total for question</b>		<b>8</b>

Question Number	Answer	Mark
4(a)	<p>Any <b>two</b> from the following groups of micro-organisms which are of importance in food technology, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• bacteria (1)</li> <li>• yeasts (1)</li> <li>• moulds (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
4(b)	<p>Any <b>three</b> from the following explanation of the four stages in the bacterial life cycle, up to a maximum of <b>six</b> marks:</p> <ul style="list-style-type: none"> <li>• Lag phase (1) - bacterial growth is slow (1) due to bacteria establishing themselves in food medium (1)</li> <li>• Log phase (1) - rapid multiplication of bacteria (1) every 10-20 minutes by binary fission (1)</li> <li>• Stationary phase (1) - growth of bacteria is at a constant / no more growth (1) due to depletion of nutrients in food medium (1)</li> <li>• Death phase (1) - numbers of bacteria decline (1) due to death of bacteria (1)</li> </ul> <p style="text-align: right;">(3x2)</p>	(6)
4(c)	<p>Any <b>four</b> from the following discussion on rules for personnel hygiene which may prevent food poisoning in the food industry, up to a maximum of <b>four</b> marks:</p> <ul style="list-style-type: none"> <li>• cleanliness of hands in contact with food important / essential (1)</li> <li>• hair nets and protective clothing must be clean / changed often (1)</li> <li>• all cuts / grazes should be covered with a coloured waterproof dressing (1)</li> <li>• no spitting, smoking when handling / near food (1)</li> <li>• personnel must report cases of diarrhoea, vomiting, septic sores, discharges from the ear, nose and eye; carriers of disease must declare it (1)</li> </ul> <p style="text-align: right;">(4x1)</p>	(4)
<b>Total for question</b>		<b>12</b>

Question Number	Answer	Mark
5(a)	<p>Any two from the following discussion on the basic requirements in HACCP, up to a maximum of four marks:</p> <ul style="list-style-type: none"> <li>• analysis of the process (1) from raw materials to final distribution of product, identify possible physical, microbiological and chemical hazards throughout the complete process (1)</li> <li>• recognise CCPs (1) risk assessment identifies high, medium and low risk categories / once risks are established, preventative measures can be developed (1)</li> <li>• decide on target levels (1) prevention and control measures are identified for each CCP (1)</li> <li>• develop a monitoring system (1) observations and measurements are needed to ensure that the preventative measures have been implemented correctly / state clearly who, how and when monitoring is to be performed and recorded (1)</li> <li>• establish corrective action (1) if problem occurs a corrective action plan has to be put into effect (1)</li> <li>• install a verification process (1) microbiological and analysis of both intermediate and final products play an important role in verification of the safety of the product (1)</li> <li>• develop documentation (1) for HACCP to work efficiently, accurate documentation is essential / defence of 'due diligence' according to The Food Safety Act 1990 (1)</li> </ul> <p style="text-align: right;">(2x2)</p>	(4)
5(b)	<p>Any two from the following explanation on the requirements of effective food control, up to a maximum of four marks:</p> <ul style="list-style-type: none"> <li>• well qualified and appropriately experienced food control management (1) participating in the drawing up of specifications (1)</li> <li>• adequate trained staff (1) facilities (1) to do all the relevant inspection, sampling and testing of materials and monitoring of process conditions (1)</li> <li>• rapid feedback of information (accompanied where necessary by advice) to manufacturing personnel (1) thereby enabling prompt, corrective action to be taken (1)</li> <li>• traceability (1)</li> </ul> <p style="text-align: right;">(2x2)</p>	(4)
<b>Total for question</b>		<b>8</b>

Question Number	Answer	Mark
6(a)	<p>Any <b>three</b> from the following assessment on the use of low density polythene (plastic) as a food packaging material, up to a maximum of <b>three</b> marks:</p> <p>Advantages:</p> <ul style="list-style-type: none"> <li>• good clarity / visibility (1)</li> <li>• relatively cheap in comparison to metal, glass (1)</li> <li>• good heat sealing quality / easy to seal (1)</li> <li>• good water vapour resistance / retains moisture (1)</li> <li>• strength / thin but very strong (1)</li> <li>• low temperature resistance / can freeze (1)</li> <li>• properties can be improved by laminating with other films (1) e.g. (polyamide/nylon) creates good oxygen barrier (1)</li> <li>• lightweight (1) reduced transportation costs (1)</li> <li>• printable (1)</li> <li>• recyclable (1)</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• not a good oxygen barrier / O<sub>2</sub> can seep in and result in microbial deterioration (1)</li> <li>• cannot withstand temperatures about 90°C / not suitable for boiling, microwaving, ovens (1)</li> <li>• not biodegradable (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)
6(b)	<p>Any <b>three</b> from the following discussion on the principles of chilled storage, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• reduces spoilage by micro-organisms and enzymes (1)</li> <li>• inhibits the growth of thermophilic organisms (1)</li> <li>• psychophilic organisms can still grow (1)</li> <li>• moulds, yeasts and some enzymes can still grow (1)</li> <li>• slows down but does not stop deterioration of food (1)</li> <li>• can affect storage quality of some foods, e.g. chill damage to tropical fruits / discolouration (1)</li> <li>• extend shelf live by a few days (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)

6(c)	<p>Any six from the following explanation on how the process of U.H.T. effects commercially produced food products, up to a maximum of six marks:</p> <ul style="list-style-type: none"> <li>• nature of product determines temperature and holding time (1) /temperature range 134 - 145°C (1) / holding range 1 - 3 seconds (1) HTST (1)</li> <li>• a sterilisation process (1) but very slight effect on flavour (1) nutrition (1) and quality (1)</li> <li>• shelf life dependant on contents (1), range 6 - 24 months (1)</li> <li>• ambient storage (1)</li> <li>• long / very long / extremely long storage or long shelf life (1)</li> </ul> <p style="text-align: right;">(6x1)</p>	(6)
	<b>Total for question</b>	<b>12</b>

Question Number	Answer	Mark
7(a)	<p>Any <b>three</b> from the following description on how hydrogen bonding plays an important role in gelatinisation, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• water molecules possess the ability to form bonds / known as hydrogen bonds / water molecules bond with other water molecules or with molecules of other substances (1)</li> <li>• starch consists of long chains of glucose units and contains many hydroxyl groups (1)</li> <li>• hydroxyl groups can form hydrogen bonds with water molecules (1)</li> <li>• amylose structure allows for better hydrogen bonding with adjacent amylose / amylopectin more difficult / amylopectin and water molecules (1)</li> <li>• a loose and irregular network is formed in which water molecules are immobilised in network voids / by the weak electrostatic forces of hydrogen bonding (1)</li> <li>• produces a more stable / strong structure (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)
7(b)	<p><b>three</b> from the following explanation why stabilised modified starch is used in the production of some frozen food products, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• freeze-thaw stability (1)</li> <li>• reduces retrogradation / syneresis (1)</li> <li>• ensures extended shelf life / improved texture / mouth feel after thawing (1)</li> </ul> <p style="text-align: right;">(3x1)</p>	(3)

7(c)	<p>Any <b>eight</b> from the following analysis on how the presence of protein in a food product effects its physical characteristics, up to a maximum of <b>eight</b> marks:</p> <p>Advantages:</p> <ul style="list-style-type: none"> <li>• affects at hydrogen bonding (1)</li> <li>• effective at forming sols / gels (1)</li> <li>• can act as thickening /stabilising / emulsifying agent (1)</li> <li>• has ability to hold large quantities of water (1)</li> <li>• can coagulate (set) at low temperatures (1)</li> <li>• denaturation can result in desirable properties e.g. foaming / binding / setting (1)</li> <li>• colloidal character important in connection with the colloidal food systems of milk / butter / ice cream (1)</li> <li>• Maillard reaction (1)</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• protein easily destroyed and changes irreversible / denatured (1)</li> <li>• gels susceptible to retrogradation / syneresis (1)</li> </ul> <p style="text-align: right;">8x1</p>	(8)
	<b>Total for question</b>	<b>14</b>
	<b>Total marks for paper:</b>	<b>70</b>

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