

# Mark Scheme (Results)

Summer 2015

Pearson Edexcel  
GCE Design & Technology: Food  
Technology  
(6FT02/01)

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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.

Question Number	Answer	Mark
<b>1(a)</b>	Any <b>two</b> of the following examples from : <ul style="list-style-type: none"> <li>• Glucose</li> <li>• Maltose</li> <li>• Galactose</li> <li>• Lactose</li> </ul> (2 x 1)	<b>(2)</b>
<b>1(b)</b>	Any <b>two</b> of the following points: <ul style="list-style-type: none"> <li>• Irreversible (1)</li> <li>• Colour change (1)</li> <li>• Produces range of brown products (1)</li> <li>• Texture change / melts (1)</li> <li>• Method of heat transference affects outcome (1)</li> <li>• Can be heated as a solid or a solution(1)</li> <li>• Sugar decomposes (1)</li> <li>• Non-enzymic browning reaction occurs (1)</li> <li>• Sugar caramelises/caramelisation occurs (1)</li> </ul> (2x1)	<b>(2)</b>
<b>1(c)i</b>	Only answer: <ul style="list-style-type: none"> <li>• Pectin</li> </ul> (1x1)	<b>(1)</b>
<b>1(c)ii</b>	Any <b>three</b> of the following: <ul style="list-style-type: none"> <li>• Correct amount of sugar/65-68%sugar (1)</li> <li>• Proportion of fruit/sugar is equal (1)</li> <li>• Sufficient/correct amount of pectin(1)long pectin chains (1)</li> <li>• Sufficient number of methyl groups (1)</li> <li>• pH close to 3.0-3.5/correct pH(1)</li> <li>• Boiling (for correct amount of time) (1)</li> <li>• Addition of an acid (to lower pH) (1)</li> <li>• Ripeness of fruit/fruit not overripe(1)</li> <li>• Fruit with a high pectin content (any named fruit with high pectin content acceptable) (1)</li> <li>• Commercial pectin available (1)</li> <li>• Ratios of high/low pectin fruit for interesting flavour/texture combinations. (1)</li> </ul> (3x1)	<b>(3)</b>
<b>1(d)</b>	Any two of the following points: <ul style="list-style-type: none"> <li>• Amylose consists of up to 300 glucose units (1) in a straight chain (1) spiral structure(1)</li> <li>• Amylose starches gel easily (1) absorbs water (1) but are less stable than amylopectin (1)</li> <li>• Amylose molecules unwind /retrograde/ contract (1), the gel becomes opaque/like a pulpy sponge (1)</li> <li>• Retrogradation leads to elimination of water (1) from gel known as syneresis (1)</li> </ul>	

	<ul style="list-style-type: none"> <li>• Gel is unstable (1) when foods are frozen/and then evident on thawing (1)</li> <li>• Phosphate cross-bonding / modifying starch (1) reduces rate of retrogradation (1)</li> </ul> <p>(4x1)</p>	<b>(4)</b>
<b>Total for question</b>		<b>(12)</b>

Question Number	Answer	Mark
<b>2(a)</b>	<p>Any <b>two</b> of the following points:</p> <ul style="list-style-type: none"> <li>• Fruit is stored at room temperature (1) to soften the outer skin (1)</li> <li>• After cleaning (1) solvents can be used (1) to express oil from the peel (1)</li> <li>• Peel, juices and oil (1) run down ecuelle/copper funnel/collected (1)</li> <li>• On standing (1) oil rises to surface (1) and is removed (1)</li> <li>• Steam distillation increases yield (1)</li> </ul> <p>(2x1)</p>	<b>(2)</b>
<b>2(b)</b>	<p>Any <b>four</b> of the following points:</p> <p>Advantages</p> <ul style="list-style-type: none"> <li>• Allow a "clean label"</li> <li>• No artificial additives</li> <li>• Consumer confidence</li> <li>• Quality image</li> <li>• Perceived as less likely to cause allergic/intolerant reactions</li> <li>• Natural / authentic flavour</li> <li>• Sustainability</li> </ul> <p>Disadvantages</p> <ul style="list-style-type: none"> <li>• Variable in strength</li> <li>• Expensive</li> <li>• Unstable</li> <li>• Unreliable supply</li> <li>• Seasonal variation</li> </ul> <p>A balanced argument with at least one of each needed for full marks.</p> <p>(4x1)</p>	<b>(4)</b>
<b>Total for question</b>		<b>(6)</b>

Question Number	Answer	Mark
3(a)	<p>Any <b>two</b> of the following</p> <ul style="list-style-type: none"> <li>• Esters /Consists of a glycerol molecule (an alcohol) (1), looks like a bent tuning fork(1)</li> <li>• Three <b>different</b> organic acids (1), <b>different</b> fatty acids(1)</li> <li>• A water molecule remains (1)</li> </ul> <div data-bbox="440 495 1128 848" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> </div> <p style="text-align: right;">(2x1)</p>	<b>(2)</b>
3(b)	<p>Any <b>one</b> of the following:</p> <ul style="list-style-type: none"> <li>• Addition of an anti-oxidant (1) to absorb oxygen/reduce formation of free radicals/form stable radicals (1)</li> <li>• Hydrogenation (1) prevents absorption of oxygen (1)</li> <li>• Store fats away from light (1) to prevent formation of free radicals (1)</li> <li>• Don't store fats in metals (1) because glass lined containers reduce the rate of reaction (1)</li> <li>• Remove oxygen from packaging (1) MAP/ Vacuum packaging improves shelf life (1)</li> <li>• Keep fats cool/below room temperature (1) because heat speeds up the reaction (1)</li> </ul> <p style="text-align: right;">(2x1)</p>	<b>(2)</b>
3(c)	<p>Any <b>six</b> of the following:</p> <ul style="list-style-type: none"> <li>• Unsaturated(1)</li> <li>• Essential fatty acids cannot be synthesized by the body (1)</li> <li>• EFAs are needed for maintenance of cell membranes (1)</li> <li>• Required for normal brain development/especially during foetal life/infancy (1)</li> <li>• Suggested evidence that Omega 3 can reduce risk of death from heart attacks (1) by decreasing tendency of blood to clot / reducing blood pressure (1)</li> <li>• It is suggested that Omega 6 EFA helps to lower blood cholesterol (1)</li> <li>• Deficiency implicated in skin disorders (1)</li> <li>• Intake of Omega 3 can be increased by eating more oily fish/ named oily fish (1)</li> </ul>	<b>(6)</b>

	<ul style="list-style-type: none"> <li>EFAs can be readily obtained from a varied diet focusing on the principles of the 'eat well' plate (1)</li> </ul>	
	(6x1)	
<b>Total for question</b>		<b>10</b>

Question Number	Answer	Mark
<b>4(a)</b>	Any <b>two</b> of the following: <ul style="list-style-type: none"> <li>Sun-drying (1)</li> <li>Warm air driers (1)</li> <li>Tunnel driers (1)</li> <li>Fluidised bed drying (1)</li> <li>Spray drying (1)</li> <li>Accelerated freeze drying/freeze drying (1)</li> <li>Roller/drum drier(1)</li> </ul>	<b>(2)</b>
<b>4(b)</b>	Any <b>two</b> of the following: <ul style="list-style-type: none"> <li>Easy to store (1)</li> <li>No specialist storage(1)</li> <li>Lightweight (1)</li> <li>Easy to transport (1)</li> <li>Long shelf life (1)</li> <li>Require minimal/no preparation (1)</li> <li>Quick to use/used to make meals quickly (1)</li> <li>Available all year round (1)</li> <li>Provides a wider variety to diet (1)</li> <li>Lower cost (with correct named food only) (1)</li> <li>Concentrated nutritional value (with correct named food only) (1)</li> <li>Improves flavour(1)</li> </ul>	<b>(2)</b>
<b>4(c)</b>	(One point and explanation for each part of question)  Size reduction: <ul style="list-style-type: none"> <li>Greater surface area (1) increases rate of water loss (1)</li> <li>Minimises shrinkage (1) reduces density of dried product (1)</li> <li>Facilitates rehydration (1) to improve quality of end product (1)</li> <li>Reduce nutritional loss (1) because it dries more rapidly (1)</li> </ul> Blanching: <ul style="list-style-type: none"> <li>Enzymes are very active (1) in the initial stages of drying process (1)</li> </ul>	

	<ul style="list-style-type: none"> <li>To inactivate enzymic action (1) to prevent flavour/texture/colour changes (1)</li> </ul> <p>Addition of preservatives:</p> <ul style="list-style-type: none"> <li>To extend shelf life (1) to retain quality (colour fade) (1)</li> <li>Addition of sulphites (1) to minimise enzymic browning (1)</li> <li>Addition of sulphites (1) to minimize non enzymic browning e.g. Maillard reaction (1)</li> </ul> <p style="text-align: right;">(3x2)</p>	<b>(6)</b>
<b>Total for question</b>		<b>(10)</b>

Question Number	Answer	Mark
<b>5 (a)</b>	<p>Any <b>two</b> of the following:</p> <ul style="list-style-type: none"> <li>Greatly extends storage life of food (1) because conditions for micro-organism growth are unfavourable (1)</li> <li>CA slows respiration (1) delays ripening (1) of fruit &amp; veg (1)</li> <li>Addition of 10-15% carbon dioxide (1) prevents formation of moulds (1)</li> <li>Higher concentrations of carbon dioxide / reduced oxygen (1) causes meat to lose bright red colour (1) due to loss of oxymyoglobin (1) Reduce oxidative rancidity(1)</li> </ul> <p style="text-align: right;">(2x2)</p>	<b>(4)</b>
<b>5(b)</b>	<p>Comparison of</p> <p><b>STERILISATION:</b></p> <ul style="list-style-type: none"> <li>Destroys most micro-organisms (1)</li> <li>Destroys most spores (1)</li> <li>Flavour change / can give a strong cooked flavour (e.g. in milk) (1)</li> <li>Aftertaste can be altered (1)</li> <li>Aroma can be altered (1)</li> <li>Alters colour (1)</li> <li>Reduces nutritive value (1), Vit C / Vit B group / B<sub>12</sub> / Thiamin / Riboflavin (1)</li> <li>Reduces biological value of protein (1)</li> <li>Extends shelf life longer than pasteurisation / a week without refrigeration (1)</li> </ul> <p><b>PASTEURISATION:</b></p> <ul style="list-style-type: none"> <li>Kills pathogenic /harmful organisms (1) particularly mycobacterium tuberculosis / TB organism (1)</li> <li>Kills some spoilage organisms (1)</li> </ul>	



	<ul style="list-style-type: none"> <li>• Shorter shelf life than sterilisation (1)</li> <li>• Little damaging effect (1)</li> <li>• Minimal flavour change (1)</li> <li>• Loss of Vit C / Thiamin / B<sub>12</sub> / Riboflavin</li> <li>• Protein denatures (1)</li> <li>• Fat globules agglomerate (1) rise to surface / separate (1)</li> </ul> <p>NOTE: answers must be linked and related at least one response from each method is essential for maximum marks</p> <p>(3x2)</p>	<b>(6)</b>
<b>Total for question</b>		<b>(10)</b>

Question Number	Answer	Mark
<b>6(a)</b>	<ul style="list-style-type: none"> <li>• Time control (1) <ul style="list-style-type: none"> <li>• time between cooking and cooling (90 minutes) (1)</li> </ul> </li> <li>• Temperature control (1) <ul style="list-style-type: none"> <li>• 8 degrees and below (ideal is 1-4) (1)</li> <li>• core temperature must be at 72 degrees for 2 minutes (1)</li> </ul> </li> <li>• Ingredients (1) <ul style="list-style-type: none"> <li>• test microbial content (1)</li> <li>• source of ingredients from reputable supplier (1)</li> <li>• purchasing ingredients (1)</li> <li>• separation of high risk – low risk foods (1)</li> </ul> </li> <li>• Storage (1) <ul style="list-style-type: none"> <li>• keep chilled food out of danger zone temperature range (5-63 degrees centigrade) (1)</li> </ul> </li> <li>• Traceability (1) <ul style="list-style-type: none"> <li>• 'Farm to fork' – data tracking of ingredients throughout production process (1)</li> </ul> </li> <li>• Stock rotation (1) <ul style="list-style-type: none"> <li>• date marks regulations adhered to (1)</li> </ul> </li> <li>• Food handling (1) <ul style="list-style-type: none"> <li>• Personal hygiene monitored (1)</li> <li>• Preventing cross contamination (1)</li> </ul> </li> <li>• Sampling (1) <ul style="list-style-type: none"> <li>• Microbial testing (1)</li> <li>• Sensors and metal detection (1)</li> </ul> </li> </ul> <p>Maximum 2 marks if no development</p>	<b>(4)</b>

	Reward any sensible/correct answer. (2x2)	
<b>6(b)</b>	<p>Any <b>four</b> of the following explanations, up to a maximum of two marks for each bullet point</p> <ul style="list-style-type: none"> <li>• Rapid freezing causes water outside cell to freeze first (1) rapidly followed by freezing of water in cells (1)</li> <li>• Quick freezing produces small ice crystals (1) which don't cause high concentration of solutions within cells (1) which don't lead to damage/ retains quality of product (1)</li> <li>• During thawing of quick frozen foods water is held within the cells (1) retains better texture (1)</li> <li>• Slow freezing allows water to be withdrawn from cells (1), cells become dehydrated (1)</li> <li>• Slow freezing leads to large ice crystals forming outside the cells (1) these push into/damage cells (1)</li> <li>• Cells lose turgor pressure after slow freezing (1) and collapse (1)</li> <li>• On thawing large ice crystals produce lot of water (1) which is not in cells (1) gives watery texture to product (1) pool of water/"drip" around fish (1)</li> <li>• Slow freezing causes concentration of substances in cells (1) these damage other cellular constituents (1)</li> </ul>	<b>(8)</b>
	<b>Total for question</b>	<b>(12)</b>

Question Number	Answer	Mark
<b>7</b>	<p>Any <b>ten</b> points from the following:</p> <ul style="list-style-type: none"> <li>• Allows two immiscible liquids (1) (oil and water) to combine (1) e.g. in mayonnaise/other example (1)</li> <li>• Enables dispersion (1) of oil in water/water in oil (1)</li> <li>• Emulsifier has part which is hydrophilic/attracted to water (1) and part which is hydrophobic/water hating (1)</li> <li>• The emulsifier surrounds droplets of oil (1), hydrophilic part is in the water (1) and hydrophobic part is in the oil (1)</li> <li>• The emulsifier prevents oil droplets coalescing/joining together (1) and separate (1)</li> <li>• Improves sensory qualities (1)</li> </ul>	<b>(10)</b>

	<ul style="list-style-type: none"> <li>• Emulsifying agent can act as a preservative (1)</li> <li>• Emulsifiers help to give a consistent and high quality dough in breadmaking. (1)</li> <li>• They stabilise the dough (1) so that it can be processed in the bakery (1) and reduce the rate at which bread goes stale (1)</li> <li>• Emulsifiers are also used to "condition" the dough (1)</li> <li>• Emulsifiers interact with the gluten (1) to strengthen this gluten network (1) and give the bread a good texture. (1)</li> <li>• Emulsifiers help retain water (1)</li> <li>• Named emulsifiers acceptable with linked example in food production: <ul style="list-style-type: none"> <li>• Lecithin (1)</li> <li>• GMS (1)</li> <li>• mono and diglyceride (1)</li> </ul> </li> </ul>	
	<b>Total for question</b>	<b>(10)</b>