

Mark Scheme (Results)

Summer 2012

GCE Design and Technology  
Food Technology (6FT02)

Paper 01: Design and Technology in  
Practice

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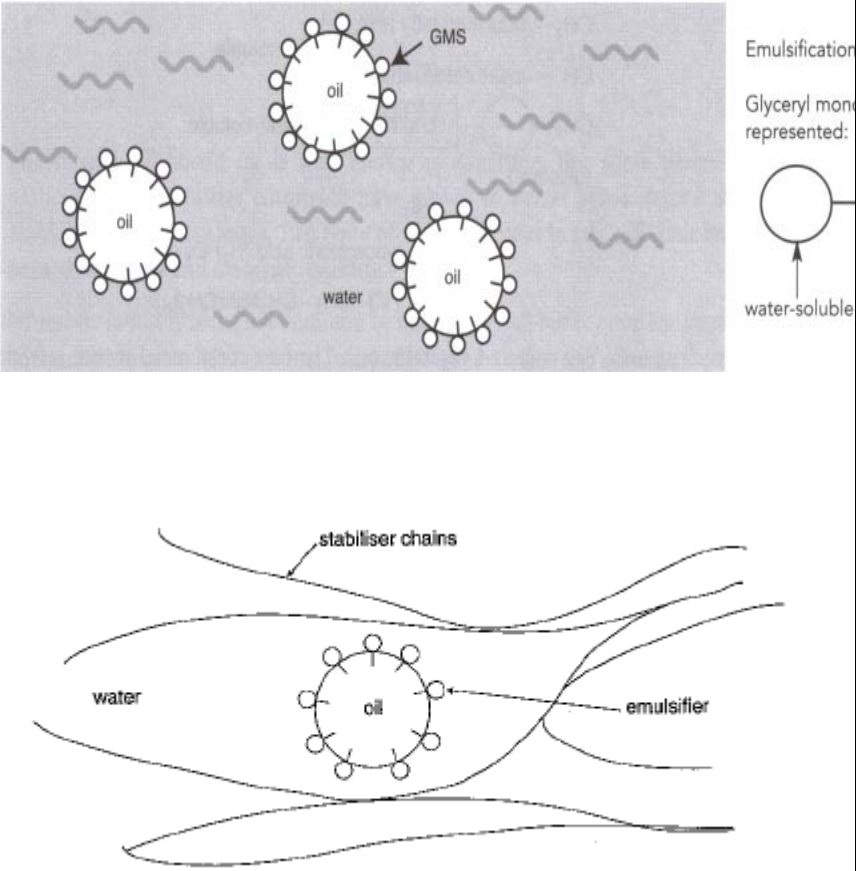
Question Number	Answer	Mark
1 (a)	<p>Any <b>two</b> from the following types of micro-organisms which are of significance in food technology, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• Bacterium / bacteria (1)</li> <li>• Moulds (1)</li> <li>• Yeast / yeasts(1)</li> <li>• Fungi(1)</li> </ul> <p><i>[Do not accept any named bacteria, unless bacteria/ mould/ yeast are mentioned].</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
1 (b)	<p>Any <b>two</b> from the following on why there is an increase in cases of food poisoning, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• Increase in food outlets (1)</li> <li>• Meals eaten away from home (1)</li> <li>• Eat more takeaways(1)</li> <li>• More food is prepared away from the kitchen/others (1)</li> <li>• Increase in size of menus(1)</li> <li>• Many foods being keep warm for too long (1)</li> <li>• Inaccurate / misunderstanding of how to cook food correctly (1)</li> <li>• Increase in intensive farming (1)</li> <li>• Bacteria easier to spread in close quarters (1)</li> <li>• Increase in use of convenience foods not properly prepared at home (1)</li> <li>• Consumer not following re-heated instructions(1)</li> <li>• Consumer not following storage instructions/Inaccurate food storage(1)</li> <li>• Confusion by consumers regarding date marks(1)</li> <li>• Insufficient training given to catering staff / chef (1)</li> <li>• Lack of basic cooking skills for some groups of population (1)</li> <li>• Increase consumption of organic foods (1)</li> <li>• Better reporting (1)</li> <li>• Greater public awareness (1)</li> <li>• Increased globalised food market (1)</li> <li>• Improved laboratory identification techniques(1)</li> <li>• Poor personal hygiene(1)</li> <li>• Poor food hygiene/Cross contamination(1)</li> <li>• Chemical contamination from</li> </ul>	(2)

	pesticides/cleaning materials(1) <ul style="list-style-type: none"> <li>• Lack of clean water in developing/poor countries(1)</li> </ul>	
		(2 x 1)

<b>1(c)</b>	<p>Any <b>four</b> from the following principles of good kitchen hygiene:</p> <ul style="list-style-type: none"> <li>• Good personal hygiene / wear protective clothing / store outside garments in lockers/ wash hands prior to food preparation / cover cuts / remove jewellery / tie back / cover hair / remove nail varnish / stay away from kitchen for 48 hours after sickness / do not pick nose / do not pick spots / do not scratch skin / do not sneeze over food / do not smoke in kitchen(1)</li> <li>• Separate raw and cooked foods (1)</li> <li>• Use detergent and hot water to clean all equipment (1)</li> <li>• Clean surfaces/equipment(1)</li> <li>• Keep food covered (1)</li> <li>• Store high risk foods at the correct temperature (1)</li> <li>• Eliminate cross-contamination from equipment / utensils / work environment (1)</li> <li>• Prevent pests in the kitchen(1)</li> <li>• Keep pets out of kitchen (1)</li> <li>• In industry staff must be trained correctly in preventative measures (1)</li> <li>• Follow/enforce HACCP procedures (1)</li> <li>• In industry a code of conduct must be in place to monitor health and safety in the kitchen (1)</li> <li>• Restrict staff access between high and low risk areas. (1)</li> <li>• Keep food waste separate from food storage (1)</li> <li>• Keep cleaning materials away from food (1)</li> <li>• Planned kitchen design/ two doors between toilet and kitchen (1)</li> <li>• Access to running cold water (1)</li> <li>• Hand washing facilities (1)</li> <li>• Ensure stock rotation (1)</li> </ul> <p><i>[Only one personal hygiene rule accepted]</i></p>	
		(4 x 1)
	<b>Total for question</b>	<b>(8)</b>

Question Number	Answer	Mark
2(a)	<p>Maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• Tumbler mixer / tumbling(1)</li> <li>• Ribbon mixer (1)</li> <li>• Propeller (1)</li> <li>• Blade mixing (1)</li> <li>• Z mixing (1)</li> <li>• Whisking(1)</li> <li>• Homogenising (1)</li> <li>• Churning (1)</li> <li>• Blending (1)</li> <li>• Folding (1)</li> </ul> <p><i>[Do not accept mix /mixing]</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
2(b)	<p>Any <b>two</b> from the following, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• Make sure all the particles are the same size / uniform (1)</li> <li>• Consideration of weight of ingredients (1)</li> <li>• Follow product instructions to ensure correct consistency (1)</li> <li>• Prevent de-mixing of ingredients (1)</li> <li>• Premixing of smaller components (1)</li> <li>• Lower moisture content to prevent clumping (1)</li> <li>• The closer the particles are in size the easier the mixing process (1)</li> <li>• Accurate proportions of components (1)</li> <li>• Accurate weighing of components (1)</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(2)
2(c)	<p>Outline the benefits of the homogenisation of liquids:</p> <ul style="list-style-type: none"> <li>• It mixes liquids together (1)</li> <li>• It reduces the size of fat globules (1)</li> <li>• Prevents separation of oil and liquid (1)</li> <li>• Improves long term stability (1)</li> <li>• It give droplet uniformity/ even distribution(1)</li> <li>• Creates an emulsion (1)</li> <li>• Quick process(1)</li> <li>• Inexpensive process (1)</li> <li>• Consistency in sensory properties (1)</li> <li>• Improves mouth feel / texture (1)</li> </ul>	(4)

	<ul style="list-style-type: none"><li>• Improves flavour (1)</li><li>• Improves shelf life(1)</li></ul>	
	(4 x 1)	
	<b>Total for question</b>	<b>(8)</b>

Question Number	Answer	Mark
3(a)	<p>Any <b>two</b> from the following outline on how an emulsifier can prevent the separation of oil and water, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• Lowers surface tension / interfacial tension(1)</li> <li>• Emulsifier surrounds droplets/oil (1)</li> <li>• Prevents droplets joining up/coalescing(1)</li> <li>• Joins substances that contain both a hydrophilic (water loving) (1) and hydrophobic (water hating) molecules (1)</li> <li>• Joins substances that contain both lipophilic (fat loving) (1) and lipophobic (fat hating) molecules (1)</li> <li>• Allows the dispersion of tiny droplets of oil in water(1)</li> </ul> <p><i>Accept a clearly annotated diagram.</i></p>  <p style="text-align: right;">(2 x 1)</p>	(2)

<p><b>3(b)</b></p>	<p><b>Four</b> from the following description of the function of a stabiliser in ice cream, up to a maximum of <b>four</b> marks:</p> <ul style="list-style-type: none"> <li>• Binds/holds large quantities of water (1) by absorption (1)</li> <li>• Prevents the formation of large crunchy ice crystals(1) to give a smooth texture / mouth feel/ equal consistency/ taste(1)</li> <li>• Binds/holds large quantities of water (1)/ gives body to the product (1)</li> <li>• Ice cream thaws gradually (1) to reduce drip / to make it easier to eat / more palatable / improves melting resistant(1)</li> <li>• Aids the work of an emulsifier (1) to join ingredients (1)</li> </ul> <p><i>[Interlinked responses acceptable]</i></p> <p style="text-align: right;">(4 x 1)</p>	<p style="text-align: right;">(4)</p>
<p><b>3(c)</b></p>	<p><b>Four</b> from the following on why the following four additives are used in food processing, up to a maximum of <b>four</b> marks:</p> <p>Anti-caking Agents:</p> <ul style="list-style-type: none"> <li>• Added to powdered ingredients to keep them free flowing (1)</li> <li>• Prevents clumping / lumps forming in powdered ingredients (1)</li> <li>• Absorbs moisture (1)</li> </ul> <p>Solvents:</p> <ul style="list-style-type: none"> <li>• To extract oils from fruit (1)</li> <li>• To extract oils from vegetables(1)</li> </ul> <p>Sequestrants:</p> <ul style="list-style-type: none"> <li>• Binds up metal ions (1)</li> <li>• Reduces oxidative rancidity (1)</li> </ul> <p>Nutrients:</p> <ul style="list-style-type: none"> <li>• To replace nutrients lost through processing (1)</li> <li>• Fortification / to enhance nutritional properties (1)</li> <li>• Added to certain foods by Law / legal requirement (1)</li> </ul> <p style="text-align: right;">(4 x 1)</p>	<p style="text-align: right;">(4)</p>
<p><b>Total for question</b></p>		<p><b>(10)</b></p>



Question Number	Answer	Mark
<p><b>4(a)</b></p>	<p>Any <b>two</b> from the following explanation on the following terms, up to a maximum of <b>four</b> marks:</p> <p>Quality control:</p> <ul style="list-style-type: none"> <li>• Checking/testing the quality of a product during and at the final stage of the production system (1) to ensure the product meets the specification / makes it safe to eat / meets consumer expectations / maintains reputation of company/organisation / part of the QA scheme (1)</li> <li>• Includes checking/testing of quality control points / visual inspections / weight / random sampling / metal detector tests / traceability / consistency in products and in batches(1)to meet QA standards (1)</li> </ul> <p>Quality Assurance:</p> <ul style="list-style-type: none"> <li>• Used to define the overall standard of a food product (1) because it helps to ensure a product has been manufactured within the technical product specification/ throughout the production process (1)</li> <li>• Ensures that manufacturer is meeting certain standards/Informs consumers / promise (1) for example giving a guarantee / meeting codes of practice / IQS / BSI standards/for quality / safety (1)</li> </ul> <p style="text-align: right;">(2 x 2)</p>	<p style="text-align: right;">(4)</p>
<p><b>4(b)</b></p>	<p>Any <b>six</b> from the following outline on the impact that the Food Safety Act 1990 has had the food industry, up to a maximum of <b>six</b> marks:</p> <ul style="list-style-type: none"> <li>• Covers the whole of the human food chain from the farm to the consumer (1)</li> <li>• Includes dietary supplements and tap water (1)</li> <li>• Covers ALL food premises / stalls / vehicles / food manufacturing / retailing / catering establishments (1)</li> <li>• Anyone involved in the handling of food for sale must be trained in food hygiene (1)</li> <li>• Anyone involved in the production of manufactured food for sale must be trained in food hygiene (1)</li> <li>• It is an offence for anyone to sell food that is unfit for human consumption (1)</li> <li>• It is an offence for anyone to possess for sale</li> </ul>	

	<p>food that is unfit for human consumption (1)</p> <ul style="list-style-type: none"> <li>• Food must not be falsely described(1)</li> <li>• Food must not be falsely advertised(1)</li> <li>• Food must not be falsely presented to mislead the consumer (1)</li> <li>• Covers ALL aspects of food production equipment (1)</li> <li>• Covers ALL aspects of food production environment (1)</li> <li>• Covers ALL aspects of food production workers employed within the food establishment (1)</li> <li>• Covers ALL aspects of food production packaging (1)</li> <li>• All food premises must be registered with the local authority (1)</li> <li>• EHOs and TSOs have the legal power to close an establishment (1)</li> <li>• EHOs and TSOs enforce the law (1)</li> <li>• Prosecution / breaking of law can lead to fines and imprisonment (1)</li> <li>• Gives government ministers powers to issue regulations regarding food composition / labelling / additives / hygiene (1)</li> <li>• Reference to time(1)/ cost/ money implications(1)</li> </ul> <p style="text-align: right;">(6 x 1)</p>	(6)
	<b>Total for question</b>	<b>(10)</b>

Question Number	Answer	Mark
<p><b>5(a)</b></p>	<p>Any <b>two</b> from the following on the property and food use of two complex polysaccharides, up to a maximum of <b>four</b> marks:</p> <p><u>Carrageen properties</u></p> <ul style="list-style-type: none"> <li>• Absorbs large quantities of water (1)</li> <li>• Thickener (1)</li> <li>• Forms firm gel (1)</li> <li>• Stabiliser (1)</li> <li>• Binding agent (1)</li> </ul> <p><u>Food use of Carrageen</u></p> <ul style="list-style-type: none"> <li>• Ice cream (1)</li> <li>• Syrup (1)</li> <li>• Processed cheese (1)</li> <li>• Salad dressing (1)</li> <li>• Sauces (1)</li> <li>• Sea weed (1)</li> <li>• Desserts/milk desserts (1)</li> </ul> <p><u>Pectins properties</u></p> <ul style="list-style-type: none"> <li>• Gelling /setting agent (1)</li> <li>• Alters texture (1)</li> <li>• Stabiliser (1)</li> </ul> <p><u>Food use of Pectins</u></p> <ul style="list-style-type: none"> <li>• Jams (1)</li> <li>• Jellies (1)</li> <li>• Fruit juices / Milkshakes (1)</li> </ul> <p style="text-align: right;">(2 x 2)</p>	<p style="text-align: right;">(4)</p>
<p><b>5(b)</b></p>	<p><b>Three</b> from the following statement of the term retro gradation, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• Occurs in gels (1)</li> <li>• The gel breaks down (1)</li> <li>• Network / structure contracts (1)</li> <li>• Liquid seeps/weep/separates from structure (1)</li> <li>• This is called syneresis (1)</li> <li>• The opposite of gelatinisation (1)</li> <li>• Reduces palatability (1)</li> <li>• Freezing (1)</li> <li>• Irreversible (1)</li> </ul> <p>/ mixing</p> <p style="text-align: right;">(3 x 1)</p>	<p style="text-align: right;">(3)</p>

5(c)	<p>State <b>three factors</b> that affect the thickening of starch in the food industry, up to a maximum of <b>three</b> marks:</p> <ul style="list-style-type: none"> <li>• Type of starch (1)</li> <li>• Quantity of starch (1)</li> <li>• Addition of salt (1)</li> <li>• Addition of an acid/ pH level (1)</li> <li>• Addition of sugar (1)</li> <li>• Temperature of liquid during production (1)</li> <li>• Duration of heating (1)</li> <li>• Agitation / stirring/ mixing (1)</li> <li>• Quantity of liquid / type of liquid (1)</li> </ul> <p style="text-align: right;">(3 x 1)</p>	(3)
<b>Total for question</b>		<b>(10)</b>

Question Number	Answer	Mark
<b>6(a)</b>	<p>Any <b>two</b> from the following description on two effects of slow freezing on food products, up to a maximum of <b>two</b> marks:</p> <ul style="list-style-type: none"> <li>• Allows water to be withdrawn from cell (1) to allow the cell to become dehydrated (1)</li> <li>• Loss of turgor pressure/structure on thawing (1) because cell membrane collapses/bursts/breaks (1)</li> <li>• Water forms large ice crystals in the cell (1) causing damage to the food product (1)</li> <li>• Upon thawing the liquid leaks out (1) followed by cellular collapse (1)</li> <li>• Causing reduction of palatability (1) and loss of texture(1)/flavour(1)/colour(1)/moisture (1)</li> <li>• Levels of m/o might increase (1) time/temperature permits growth (1)</li> </ul> <p style="text-align: right;">(2 x 2)</p>	(4)

<b>6(b)</b> <b>QWC (ii)</b>	<p>Any four from the following discussion on the processes and effects of the following freezing methods:</p> <p>Cryogenic freezing : Process:</p> <ul style="list-style-type: none"> <li>• Makes use of very cold /(-196°C) temperatures (1)</li> <li>• LiquifiedN<sub>2</sub>(1)</li> <li>• LiquifiedCO<sub>2</sub>(1)</li> <li>• Liquid gas is sprayed on to the food (1)</li> <li>• Very expensive process (1)</li> <li>• Used on high value products/luxury products (1)</li> <li>• Fast freezing process (1)</li> <li>• Food is on a conveyor belt in a tunnel (1)</li> <li>• Gases removed by fans (1)</li> <li>• Food pre-chilled(1)</li> <li>• Used on small food products (1)</li> </ul> <p style="text-align: right;">(2 x 1)</p> <p>Effects:</p> <ul style="list-style-type: none"> <li>• Thermal shock if not pre-chilled (1)</li> <li>• Thermal shock causes freezer burn/damage to product (1)</li> <li>• Maintains original flavour (1)</li> <li>• Helps retain texture (1)</li> </ul>	
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	<ul style="list-style-type: none"> <li>• Retain nutritional value (1)</li> <li>• Prolongs shelf life (1)</li> <li>• Dormant/slows down/retards growth of m/o (1)</li> <li>• CO<sub>2</sub> acts as a bacteriostat (1)</li> </ul> <p style="text-align: right;">(2 x 1)</p> <p>Plate freezing :</p> <p>Process:</p> <ul style="list-style-type: none"> <li>• Widely used in the food industry (1)</li> <li>• Normal food preparation (1)</li> <li>• Food placed into packaging (1)</li> <li>• Plates can be horizontal (1)</li> <li>• Plates can be vertical (1)</li> <li>• Plates are pressed tightly against the pack (1)</li> <li>• Contact between plates and package important (1)</li> <li>• Uniform package size aids freezing (1)</li> <li>• Air gaps delay heat transfer (1)</li> <li>• Is used for larger items (1)</li> <li>• Is used for bulk freezing (1)</li> <li>• Food is on a conveyor belt in a tunnel (1)</li> </ul> <p style="text-align: right;">(2 x 1)</p> <p>Effects:</p> <ul style="list-style-type: none"> <li>• Relatively inexpensive (1)</li> <li>• Freezer burn / damage to product if package damaged (1)</li> <li>• Cannot freeze irregular shaped items (1)</li> <li>• Fast freezing prevents large ice crystal formation (1)</li> <li>• Helps maintain original flavour (1)</li> <li>• Helps retain texture (1)</li> <li>• Retain nutritional value (1)</li> <li>• Prolongs shelf life (1)</li> <li>• Dormant/slows down/retards growth of m/o (1)</li> <li>• Allows the fishing industry to freeze at sea (1)</li> <li>• Immediate freezing of fresh produce/peas/fish (1)</li> <li>• Widely used in ready meal production/batch production/high volume production (1)</li> </ul> <p style="text-align: right;">(2 x 1)</p>	(8)
	<b>Total for question</b>	<b>(12)</b>

Question Number	Answer	Mark
<b>7(a)</b> <b>QWC</b>	<p><b>Any six from</b> the following list linked to the importance of amino acids in the diet, up to a maximum of <b>six</b> marks:</p> <ul style="list-style-type: none"> <li>• Proteins are built from units of amino acids (1)</li> <li>• Amino acids important for cell structure/growth/repair/</li> <li>• Physiological: enzymes/hormones(1)</li> <li>• 20 amino acids found in food proteins (1)</li> <li>• HBV/LBV description (1)</li> <li>• Essential amino acids cannot be made in the body (1)</li> <li>• Essential amino acids mainly found in animal proteins (1)</li> <li>• Only plant source is soya beans (1)Quinoi/Quorn (1)</li> <li>• Quorn is another HBV protein food product made from edible fungus; myco-protein and bound together with egg. Processed into different shapes, it can be used to replace or extend meat dishes.</li> <li>• Importance of soya for vegetarians (1)</li> <li>• 9/10 essential amino acids for children (1)</li> <li>• 8 essential amino acids for adults (1)</li> <li>• Animal/soya/Quorn sourced amino acids are of high biological value (1)</li> <li>• Low biological value protein foods have one or more essential amino acids missing(1)</li> <li>• Importance of a diet containing essential and non-essential acids (1)</li> <li>• Importance of wide range of amino acids (1)</li> <li>• Amino acid deficiency (kwashikior) widespread in developing countries (1)</li> </ul> <p style="text-align: right;">(6 x 1)</p>	<p>(6)</p>
<b>7(b)</b> <b>QWC</b>	<p>Any <b>six</b> on the following discussion on the characteristics of enzymes, up to a maximum of <b>six</b> marks:</p> <p>Action:</p> <ul style="list-style-type: none"> <li>• Are organic catalysts (1)</li> <li>• Operate by speeding up a chemical process / reaction(1)</li> <li>• Remain unchanged at the end of the reaction (1)</li> <li>• Action is highly specific on a given substrate(1)</li> <li>• Selective on a given enzyme (1)</li> </ul>	

	<ul style="list-style-type: none"> <li>• An enzyme will catalyse only one reaction(1)</li> <li>• Likened to a 'lock-and-key' effect (1)</li> <li>• Requires a co-enzyme (usually vitamins) to make reaction possible (1)</li> <li>• Sometimes needs an activator (1)</li> <li>• Can be denatured / deactivated (1)</li> <li>• Sensitive to effects of temperature (1)</li> <li>• Sensitive to effects of pH (1)</li> <li>• Sensitive to effects of salt concentrations (1)</li> <li>• Sensitive to effects of exclusion of oxygen (1)</li> <li>• Causes browning on the cut surface of some fruit and vegetables (1)</li> <li>• Blanching inactivates (1)</li> <li>• Linked to the conditioning of meat (1)</li> <li>• Linked to food spoilage (1)</li> <li>• Linked to the inversion of sugar (1)</li> </ul> <p style="text-align: right;">(6 x 1)</p>	(6)
	<b>Total for question</b>	<b>(12)</b>
	<b>Total marks for paper</b>	<b>70</b>



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