

Mark Scheme (Results)

Summer 2012

GCE Design and Technology
Food Technology (6FT02)

Paper 01: Design and Technology in
Practice

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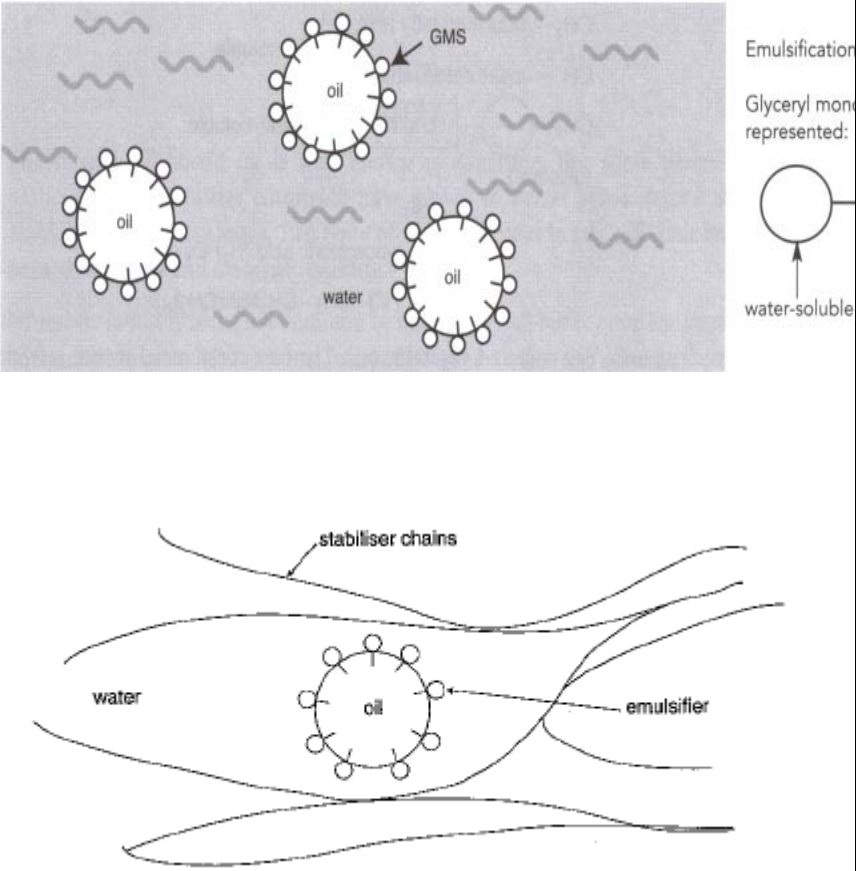
Question Number	Answer	Mark
1 (a)	<p>Any two from the following types of micro-organisms which are of significance in food technology, up to a maximum of two marks:</p> <ul style="list-style-type: none"> • Bacterium / bacteria (1) • Moulds (1) • Yeast / yeasts(1) • Fungi(1) <p><i>[Do not accept any named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

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

1(c)	Any four from the following principles of good kitchen hygiene: <ul style="list-style-type: none"> • 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) • Separate raw and cooked foods (1) • Use detergent and hot water to clean all equipment (1) • Clean surfaces/equipment(1) • Keep food covered (1) • Store high risk foods at the correct temperature (1) • Eliminate cross-contamination from equipment / utensils / work environment (1) • Prevent pests in the kitchen(1) • Keep pets out of kitchen (1) • In industry staff must be trained correctly in preventative measures (1) • Follow/enforce HACCP procedures (1) • In industry a code of conduct must be in place to monitor health and safety in the kitchen (1) • Restrict staff access between high and low risk areas. (1) • Keep food waste separate from food storage (1) • Keep cleaning materials away from food (1) • Planned kitchen design/ two doors between toilet and kitchen (1) • Access to running cold water (1) • Hand washing facilities (1) • Ensure stock rotation (1) <p><i>[Only one personal hygiene rule accepted]</i></p>	
		(4 x 1)
	Total for question	(8)

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

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

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

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

Question Number	Answer	Mark
<p>4(a)</p>	<p>Any two from the following explanation on the following terms, up to a maximum of four marks:</p> <p>Quality control:</p> <ul style="list-style-type: none"> • 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) • 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) <p>Quality Assurance:</p> <ul style="list-style-type: none"> • 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) • 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) <p style="text-align: right;">(2 x 2)</p>	<p style="text-align: right;">(4)</p>
<p>4(b)</p>	<p>Any six from the following outline on the impact that the Food Safety Act 1990 has had the food industry, up to a maximum of six marks:</p> <ul style="list-style-type: none"> • Covers the whole of the human food chain from the farm to the consumer (1) • Includes dietary supplements and tap water (1) • Covers ALL food premises / stalls / vehicles / food manufacturing / retailing / catering establishments (1) • Anyone involved in the handling of food for sale must be trained in food hygiene (1) • Anyone involved in the production of manufactured food for sale must be trained in food hygiene (1) • It is an offence for anyone to sell food that is unfit for human consumption (1) • It is an offence for anyone to possess for sale 	

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

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

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

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

6(b) QWC (ii)	<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"> • Makes use of very cold /(-196°C) temperatures (1) • LiquifiedN₂(1) • LiquifiedCO₂(1) • Liquid gas is sprayed on to the food (1) • Very expensive process (1) • Used on high value products/luxury products (1) • Fast freezing process (1) • Food is on a conveyor belt in a tunnel (1) • Gases removed by fans (1) • Food pre-chilled(1) • Used on small food products (1) <p style="text-align: right;">(2 x 1)</p> <p>Effects:</p> <ul style="list-style-type: none"> • Thermal shock if not pre-chilled (1) • Thermal shock causes freezer burn/damage to product (1) • Maintains original flavour (1) • Helps retain texture (1) 	
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	<ul style="list-style-type: none"> • Retain nutritional value (1) • Prolongs shelf life (1) • Dormant/slows down/retards growth of m/o (1) • CO₂ acts as a bacteriostat (1) <p style="text-align: right;">(2 x 1)</p> <p>Plate freezing :</p> <p>Process:</p> <ul style="list-style-type: none"> • Widely used in the food industry (1) • Normal food preparation (1) • Food placed into packaging (1) • Plates can be horizontal (1) • Plates can be vertical (1) • Plates are pressed tightly against the pack (1) • Contact between plates and package important (1) • Uniform package size aids freezing (1) • Air gaps delay heat transfer (1) • Is used for larger items (1) • Is used for bulk freezing (1) • Food is on a conveyor belt in a tunnel (1) <p style="text-align: right;">(2 x 1)</p> <p>Effects:</p> <ul style="list-style-type: none"> • Relatively inexpensive (1) • Freezer burn / damage to product if package damaged (1) • Cannot freeze irregular shaped items (1) • Fast freezing prevents large ice crystal formation (1) • Helps maintain original flavour (1) • Helps retain texture (1) • Retain nutritional value (1) • Prolongs shelf life (1) • Dormant/slows down/retards growth of m/o (1) • Allows the fishing industry to freeze at sea (1) • Immediate freezing of fresh produce/peas/fish (1) • Widely used in ready meal production/batch production/high volume production (1) <p style="text-align: right;">(2 x 1)</p>	(8)
	Total for question	(12)

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

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

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