

Mark Scheme (Results)

Summer 2012

GCE Design and Technology  
Food Technology (6FT03)

Paper 01: Food Products, Nutrition  
and Product Development

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Question Number	Answer	Mark
1 (a)	<p><b>Two</b> of the following:</p> <ul style="list-style-type: none"> <li>• Dried milk/milk powder</li> <li>• Evaporated milk</li> <li>• Condensed milk</li> <li>• Butter</li> <li>• Cheese</li> </ul> <p>Reject</p> <ul style="list-style-type: none"> <li>• Milk</li> <li>• Cream</li> <li>• Skimmed milk</li> <li>• Homogenised milk</li> <li>• Yogurt</li> <li>• Concentrated milk</li> <li>• Concentrated milk</li> </ul> <p style="text-align: right;">(2x1)</p>	(2)
1 (b)	<p>Skimmed milk:</p> <ul style="list-style-type: none"> <li>• Milk from which almost all of the fat (1) has been removed/reduced(1)</li> <li>• Fat removed by using a centrifugal separator (1).</li> <li>• Difficulty in removing all fat so marked as no more than 0.1% fat (1)</li> <li>• Reference to fat soluble vitamin content being reduced (1).</li> </ul>	(3)
1 (c)	<p>Any <b>three</b> of the following:</p> <ul style="list-style-type: none"> <li>• During souring bacteria multiply (1) in the milk producing lactic acid (1) from lactose(1) which causes the pH to fall(1), milk becomes more acidic(1), and the casein separates out (1) protein coagulates separating from the liquid (1).</li> <li>• Allow 'milk curdles' (1), curds (1), whey (1)</li> <li>• Specific references to sensory properties: smell (1), texture change (1) and flavour (1).</li> </ul>	(3)
<b>Total for question</b>		<b>(8)</b>

Question Number	Answer	Mark
2(a)	<ul style="list-style-type: none"> <li>• <b>i) Calcium</b>- dairy products (1) milk (1) cheese (1) white bread (1)</li> <li>• canned sardines (1) green leafy vegetables (1)</li> <li>• <b>(ii)</b> formation and development of bones and teeth (1) contraction of</li> <li>• muscles including the heart (1) for nerve function (1) for blood</li> <li>• clotting(1), prevents osteoporosis/ osteomalacia/ rickets(1)</li> </ul>	(1) (1)
2(b)	<ul style="list-style-type: none"> <li>• <b>i) Zinc</b>-meat (1) seafood,(1) milk(1) cheese (1) eggs(1)seeds(1), wholegrain cereals(1), nuts (1) and pulses(1)</li> <li>• <b>(ii)</b> essential component of certain enzymes(1) concerned with energy metabolism (1) growth and tissue repair (1) normal reproductive functioning (1) wound healing (1)</li> </ul>	(1) (1)
2(c)	<ul style="list-style-type: none"> <li>• <b>i) Potassium</b>- named fruits (1)bananas (1), named vegetables (1)milk (1) meat(1) nuts(1) seeds(1) pulses(1)</li> <li>• <b>(ii)</b> used to control pH and osmotic pressure within the cells/ (1) electrolyte balance(1)/nerve function (1)</li> </ul>	(1) (1)
2(d)	<ul style="list-style-type: none"> <li>• <b>i) Iodine</b>- fish(1)/seafood(1)/iodised salt (1) milk(1)</li> <li>• <b>(ii)</b>essential for thyroid gland (1)/production of thyroxin(1)/ prevent goitre(1)</li> </ul>	(1) (1)
<b>Total for question</b>		<b>(8)</b>

Question Number	Answer	Mark
<b>3(a)</b>	<p><b>Four</b> of the following:</p> <ul style="list-style-type: none"> <li>• For (any named or category acceptable) tropical or sub-tropical fruit/reference to climacteric/non climacteric fruit (1)</li> <li>• Below certain temperatures around 13C (1)</li> <li>• The fruit's metabolism is disrupted (1)</li> <li>• Some enzymes stop working (1)</li> <li>• Toxic chemicals accumulate (1)</li> <li>• Cells die (1)</li> <li>• Discolouration/change in colour(1)</li> <li>• Flavour (1)</li> <li>• Texture changes (1)</li> <li>• Rots (1)</li> <li>• Bacterial decay(1)</li> <li>• Pitting on the skin (1).</li> </ul>	(4)
<b>3(b)</b>	<p><b>TWO</b> of the following:</p> <p>i) Warm air (oven/tunnel) drier (1)</p> <ul style="list-style-type: none"> <li>• Vegetables placed on trays (1)</li> <li>• Trays put on racks or trolleys (1)</li> <li>• Warm air blown over product using fans (1)</li> <li>• Within a tunnel (1)</li> </ul> <p>ii) Fluidised -bed drier (1):</p> <ul style="list-style-type: none"> <li>• Warm air blow upwards through product (1)</li> <li>• Air flow must be great enough to lift product into air flow or 'fluidise' it (1)</li> <li>• Product blown along by fan whilst drying (1)</li> </ul> <p>iii) Freeze drying /AFD(1)</p> <ul style="list-style-type: none"> <li>• Product frozen (1)</li> <li>• A strong vacuum applied (1)</li> <li>• Ice in product goes to water vapour/ sublimates (1)</li> </ul> <p>Specific dicing process described acceptable, but only allowed once:</p> <ul style="list-style-type: none"> <li>• Size reduction(1)</li> <li>• Even/consistent size(1)</li> <li>• Even/consistent shape(1)</li> <li>• Reference larger surface area (1)</li> </ul>	(2x3)
<b>Total for question</b>		<b>(10)</b>

Question Number	Answer	Mark
4(a)	<ul style="list-style-type: none"> <li>• Meat must be stored at chill temperatures/refrigeration (1)</li> <li>• Usually 5C or lower (1)</li> <li>• Lower temperatures approaching freezing will extend storage life (1)</li> </ul>	(2)
4(b)	<p>Any <b>three</b> of:</p> <ul style="list-style-type: none"> <li>• Protein</li> <li>• Fat</li> <li>• Iron</li> <li>• Zinc</li> <li>• Copper</li> <li>• Selenium</li> <li>• Vitamin A</li> <li>• B1/ Thiamine</li> <li>• B2/Riboflavin</li> <li>• B3/ Niacin</li> <li>• B6</li> <li>• B12</li> </ul>	(3)
4(c)	<p>Any <b>five</b> of the interlinked responses below:</p> <ul style="list-style-type: none"> <li>• During aging, enzyme systems(1) are active.(1)</li> <li>• Enzymes break down large molecules (1) particularly proteins (1) to release amino acids (1) and fats (1) to release fatty acids.</li> <li>• Meat flavour is developed (1) by the release of amino acids (1), free fatty acids (1) and nitrogen containing substances (1)</li> <li>• Myoglobin (1) darkens(1) in the presence of oxygen after death (1) causing colour change red to brown(1)</li> <li>• The actin filaments(1) become detached from the Z line (1) and tenderness increased/texture developed (1) but connective tissue is not broken down (1)</li> </ul>	(5)
<b>Total for question</b>		<b>(10)</b>

Question Number	Answer	Mark
5(a)	Protein: $100 \times 4 = 400 \text{kcal}$ or $100 \times 17 = 1700 \text{kJ}$ (1)  Carbohydrate: $100 \times 3.75 = 375 \text{kcal}$ or $100 \times 16 = 1600 \text{kJ}$ (1) (Or allowed) $100 \times 4 = 400 \text{kcal}$ or $100 \times 17 = 1700 \text{kJ}$ (1)  Fat: $100 \times 9 = 900 \text{kcal}$ or $100 \times 37 = 3700 \text{kJ}$ (1)  Total: $1675 \text{kcal}$ or $7000 \text{kJ}$ (1) (Or allowed) Total: $1700 \text{Kcal}$ or $7,100 \text{KJ}$ (1)	(4)
5(b)  QWC (i)	'Energy balance': <b>Six</b> of the following: <ul style="list-style-type: none"> <li>• If energy intake is greater than energy expenditure (1) weight is gained (1) as fat is stored in the body for energy (1) and the person is said to be in positive energy balance (1).</li> <li>• If energy intake is less than energy expenditure (1) weight will be lost as body fat store is used (1) the person is in negative energy balance (1).</li> <li>• In order for people to maintain their body weight (1) energy intake must equal energy expenditure (1)</li> </ul>	(6)
	<b>Total for question</b>	<b>(10)</b>

Question Number	Answer	Mark
<p><b>6</b></p> <p><b>QWC</b></p>	<p>Modified starches:</p> <p><b>Twelve</b> points from the following:</p> <ul style="list-style-type: none"> <li>• <b>Nature:</b> Unmodified starch is widely used in cooking however has limited use in food manufacture (1) it can be modified to improve or repress its inherent properties (1) thickening (1), stability (1), mouth feel (1), gelling properties (1).</li> <li>• <b>Cross-bonded (linked) (1):</b> Cross-link between starch molecules with phosphate (1) to strengthen tender starches (1) /starch with high proportion of amylase (1) takes on properties of those with higher amylopectin (1). Cross-linking helps control texture of starch (1) and provides tolerance to the effects of heat (1), acid (1)and agitation (1)in a wide range of food products (1) canned foods(1)HTST processed foods(1) salad dressings(1). Helps to prevent separation or syneresis (1) which occurs after freezing (1) or heat processing (1).</li> <li>• <b>Pre-gelatinised starches (1):</b> Used in instant or quick-cook products (1) such as desserts (1), custard (1)and soups (1) sauces (1) gravy(1) pot noodles (1), as starch is previously gelatinised then thickens instantly(1) when in contact with water (1)</li> <li>• <b>Stabilised starches (1):</b> Starches electrostatically charged with same charge (1) so starch molecules repel each other (1) and prevent retrogradation (1) and separation (1). Used in frozen products (1) as has freeze / thaw stability (1) ready meals (1).</li> <li>• <b>Acid-modified (1):</b> Starch is treated with acid producing lower viscosity (1) and clearer starch pastes (1), used for products which are filled or pumped (1) such as fillings (1) or sauces (1)jelly sweets (1) imitation cheese spreads(1)</li> </ul>	<p>(12)</p>
	<p><b>Total for question</b></p>	<p><b>(12)</b></p>



Question Number	Answer	Mark
7	<p>Cheese-making:  <b>Twelve</b> points from the following: Explanations must follow named stage of the process:</p> <ul style="list-style-type: none"> <li>• Milk maybe pasteurised (1) to reduce the bacteria (1) found and placed in large vat (1).</li> <li>• Starter culture of lactic acid bacteria added (1) to convert lactose (1) to lactic acid (1) (accept bacterial names <i>Lactococcus cremoris</i> and <i>lactis</i>)(1).</li> <li>• Milk held at slightly above room temperature/ or 25C (1) to allow bacteria to grow (1)</li> <li>• Lactic acid is produced (1) to allow the pH fall (1)</li> <li>• At right level of acidity (0.2%) (1), rennet is added (1) to coagulate the protein (1) in about 20 minutes (1).</li> <li>• The coagulated protein forms curds (1) which results in separation of liquids (1) and solids (1).</li> <li>• Curds form into solid mass which is cut into cubes (1) to allow for further drainage of whey/liquids (1)</li> <li>• The temperature of the vat is increased to about 40C (1) to make the curds contract (1) and expel the liquid whey (1) which is drained away (1).</li> <li>• The curds coalesce and form slabs(1) which are turned (1) every 15 minutes (1) (cheddaring) (1) to make the texture develop (1)</li> <li>• The slabs are milled (1) into small pieces (1) to allow for easier distribution of salt (1) and more whey is lost(1)</li> <li>• Salt is added to help preservation(1) and flavour (1)</li> <li>• The milled 'green cheese'(1) is filled into moulds (1) to allow for different sizes of product (1).</li> <li>• The moulds are pressed (1) for 1 or 2 days (1) to further expel liquid/whey (1)</li> </ul>	(12)

	<ul style="list-style-type: none"> <li>• Blue cheeses are inoculated with mould (1) [<i>Penicillium roquefortii</i>] (1)</li> <li>• The cheese is ripened (1) at 10C (1) for about 3 months (1) or longer for strong cheese (1) to allow for flavour development (1)</li> <li>• Enzymes break down large molecules (1) particularly proteins (1) to release amino acids (1) and fats (1) to release fatty acids.</li> <li>• Cheese flavour is developed (1) by the release of amino acids (1) and free fatty acids (1).</li> <li>• Texture development (1)</li> </ul>	
	<b>Total for question</b>	<b>(12)</b>
	<b>Total for paper</b>	<b>70</b>

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