

Mark Scheme (Results) Summer 2008

GCE

GCE Design and Technology (6155) Paper 1

Unit 6155/01 - Further Study of Food Materials, Product and Processing

| Question Number | Answer | Mark |
|--------------------|--|----------|
| 1(a) | <p>changes to include any four of the following:</p> <ul style="list-style-type: none"> • mould growth on surface of cheese (1) • colour changes (1) • mould produces proteolytic enzymes (1) • flavours produced (1) • ammonia produced (1) • some fatty acids released from fat (1) • change in texture / moisture loss (1) • changes in smell (1) <p style="text-align: right;">(4x1)</p> | 4 |
| (b) | <ul style="list-style-type: none"> • Mould attack (1) leading to softening (1) or flavour changes (1) • Enzyme action (1) leading to discolouration (1) or flavour change (1) or cell disintegration (1) • chill injury (1) in tropical fruit (1) • atmosphere- high levels of carbon dioxide (1) • high temperatures encouraging microbial growth (1) <p style="text-align: right;">(4x1)</p> | 4 |
| Total Marks | | 8 |

| Question Number | Answer | Mark |
|--------------------|--|----------|
| 2(a) | <p>Any four of the following:</p> <ul style="list-style-type: none"> • to survive in the marketplace (1) • to keep ahead of the opposition (1) • to defend market share (1) • to promote up-to-date image (1) • to use equipment more fully (1) • to make use of new technology (1) • to use waste materials (1) • to diversify and offer alternatives (1) • to reposition in the market place (1) • to become eco-friendly (1) • to produce healthier alternatives (1) • increase consumer choice (1) • to reflect changes in the population (1) <p style="text-align: right;">(4x1)</p> | 4 |
| (b) | <p>Quality of design requires knowledge of consumers' preferences (1) and a united approach from all parts of the company to satisfy these preferences (1). Quality of design will result from production techniques and their costs (1) matching what consumers will pay (1).</p> <p style="text-align: right;">(4x1)</p> | 4 |
| Total Marks | | 8 |

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|--------------------|--|-----------|
| 3(a) | <ul style="list-style-type: none"> Layered not bleeding (1) e.g. three layers not mixing or exchanging colour or sinking Three different textures (1) e.g. crunchy, crispy, gelatinous, creamy, smooth, chewy, Appropriate use of ingredients (1) Combinations that compliment each other e.g. custard, cream and jelly in a trifle. Crispy biscuit base, smooth creamy semi set filling, fruit topping (1) <p style="text-align: right;">(3x1)</p> | 3 |
| (b) | <p>Modifications from:</p> <ul style="list-style-type: none"> Reduction of fat (1) Reduction of sugar (1) Increase in fibre (1) Use of fat substitutes (1) Artificial sweeteners (1) Use of bulking ingredients e.g. cellulose (1) <p style="text-align: right;">(3x1)</p> | 3 |
| (c) | <p>Any three from the following:</p> <ul style="list-style-type: none"> Colours (1) Flavours (1) Emulsifiers (1) Stabilisers (1) Sweeteners (1) Gelling agents (1) Preservatives (1) Acidity regulators (1) Antioxidants (1) Humectants (1) Thickeners (1) Starches (1) Gums (1) <p style="text-align: right;">(3x1)</p> | 3 |
| (d) | <p>any one from the following:</p> <ul style="list-style-type: none"> Chilling (1), store ideally below 4C (1) and above -1C (1) [allow below 8C as legal limit] Drying (1), blend dry ingredients (1), prevent ingress of moisture when packaged (1) Freezing (1), store below -18C (1) avoid fluctuating temperatures (1) Ambient (1), stable at room temperature due to formulation (1) use osmotically active substances such as sugar (1) Canning (1), product heat preserved in can (1), not affected by heat (1) <p style="text-align: right;">(3x1)</p> | 3 |
| Total Marks | | 12 |

| Question Number | Answer | Mark |
|--------------------|--|----------|
| 4(a) | <p>Two of the following:</p> <ul style="list-style-type: none"> • carcase stiffens (1) due to rigor mortis (1) • proteins combine (1) actin (1) myosin (1) glycogen broken down (1) to produce ATP (1) • anaerobic (1) glycolysis occurs (1) • lactic acid formed (1) and causes pH to fall (1) • enzymes break down large molecules (1) such as proteins (1) • ageing or conditioning (1) occurs leading to softening (1) <p style="text-align: right;">(2x1) (2x1)</p> | 4 |
| (b) | <p>Two of the following:</p> <ul style="list-style-type: none"> • rapid stiffening (1) due to rigor mortis (1) • low glycogen (1) therefore only small drop in pH (1) • rapid bacterial spoilage (1) due to higher pH (1) • odours produced (1) including ammonia (1) • rancidity (1) may develop in fatty fish (1) • trimethylamineoxide (1) converted to trimethylamine (1) • inosinic (1) acid breaks down to hypoxanthine (1) <p style="text-align: right;">(2x1) (2x1)</p> | 4 |
| Total Marks | | 8 |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 6 | <p>Answer to include name of vitamin (either symbol or name), main contribution to the diet and effects of deficiency or name of the resultant disease.</p> <p>Four of the following:</p> <p>(i) Name: Vitamin C (ascorbic acid) (1) Function: involved in production of connective tissue / absorption of iron / strengthens immune system / antioxidant / keeps bones skin and joints firm and strong (1) Deficiency: results in disease of scurvy (1)</p> <hr/> <p>(ii) Name: Vitamin B1 (thiamine) (1) Function: used as part of enzyme systems (co-enzyme) / energy production from carbohydrates / assist utilisation of protein (1) Deficiency: results in disease of beri-beri (1)</p> <hr/> <p>(iii) Name: Vitamin B2 (riboflavin) (1) Function: used as part of an enzyme / helps to maintain healthy skin / regulate body acidity / assists with conversion of fat, protein and carbohydrates in to energy (1) Deficiency: causes skin problems /mouth disorders (1)</p> <hr/> <p>(iv) Name: Vitamin B6 (pyridoxine) (1) Function: part of enzymes involved in the metabolism of proteins / balances sex hormones e.g. PMT and menopause / natural anti depressant / helps control allergic reactions (1) Deficiency: rare (1)</p> <hr/> <p>(v) Name: Vitamin B12 (cyanocobalamin / cobalamin) (1) Function: involved in formation of red blood cells / compliments absorption of iron / makes use of protein / essential for nerves endings / deals with toxicity in body (1) Deficiency: causes anaemia (1)</p> <hr/> <p>(vi) Name: Vitamin B3 (Nicotinic acid or niacin) (1) Function: acts as a co-enzyme / essential for energy production / maintenance of brain function and skin / helps balance blood sugar and cholesterol levels (1) Deficiency: causes pellagra (1)</p> | |

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| 6 con't | <p>(vii) Name: Folate (folic acid) (1) Function: involved in the synthesis of amino acids / prevention of neuro-stem defects / assist with red blood cell formation (1) Deficiency: causes type of anaemia with enlarged red blood cells / neuro-stem defects e.g. spinal bifida (1)</p> <hr/> <p>(viii) Name: Vitamin A (retinol) (1) Function: required for growth and normal development / night vision / healthy retina / mucous membrane / antioxidant (1) Deficiency: causes damage to night vision (1)</p> <hr/> <p>(ix) Name: Vitamin D (calciferols) (1) Function: involved in calcium absorption in the body / maintains healthy bones, teeth and skin (1) Deficiency: causes rickets (1)</p> <hr/> <p>(x) Name: Vitamin E (tocopherol) (1) Function: involved in metabolic processes / antioxidant / helps body use oxygen / prevents blood clots / improves wound healing and fertility (1) Deficiency: is rare and results in anaemia (1)</p> <hr/> <p>(xi) Name: Vitamin K (naphthoquinone) (1) Function: involved in blood coagulation (1) Deficiency: is rare and results in uncontrolled bleeding / longer term, bone malformation (1)</p> <p style="text-align: right;">(3x1) (3x1) (3x1) (3x1)</p> | 12 |
| | Total Marks | 12 |

| Question Number | Answer | Mark |
|--------------------|---|-----------|
| 7(a)(i) | Description should include reference to: <ul style="list-style-type: none"> • strengthen bones and teeth (1) • work with vitamin D (1) <p style="text-align: right;">(2x1)</p> | 2 |
| (a)(ii) | Three of the following: <ul style="list-style-type: none"> • protein (1) • vitamin B12 (1) • vitamin A (1) • vitamin D (1) • vitamin B2 (1) • Phosphorous (1) • Fat (1) <p style="text-align: right;">(3x1)</p> | 3 |
| (b)(i) | Physical description should include: <ul style="list-style-type: none"> • exists as bodies called 'micelles' (1) • colloiddally dispersed in milk (1) <p style="text-align: right;">(2x1)</p> | 2 |
| (b)(ii) | Chemical description should include: <ul style="list-style-type: none"> • mixture of proteins containing phosphate (1) • calcium sensitive casein in centre of micelle (alternative: alpha-s casein) (1) • outer layer protected by Kappa-casein (1) <p style="text-align: right;">(3x1)</p> | 3 |
| Total Marks | | 10 |

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|---------------------------------|---|-----------|
| 8(a) | <p>Answer must include clear description of a gelling system, one of the following:</p> <ul style="list-style-type: none"> • Alginate(1) explanation of 'junction zone' (1) and role of calcium(1) in cross-linking to form three-dimensional network(1) • Starches(1) need to heat to gelling temperature (1) role of hydrogen-bonding (1) to make three-dimensional network (1) • Gelatine (1) needs to melt(1) then orientate molecules to cross-link on cooling(1) to make three-dimensional network (1) • Pectin (1), high methoxyl pectin (1) sugar (1), and acid (1) <p style="text-align: right;">(4x1)</p> | 4 |
| (b) | <p>Requires the use of a pre-gelatinised(1) starch(1) mix with water to thicken irrespective of temperature(1) and not be affected by other ingredients (1)</p> <p style="text-align: right;">(4x1)</p> | 4 |
| (c)(i) | <ul style="list-style-type: none"> • Xanthan gum (1) <p style="text-align: right;">(1x1)</p> | 1 |
| (c)(ii) | <p>Flavours must not be bound up or masked by other ingredients (1) product must lose thickness or viscosity quickly(1) by using thixotropic ingredient (1)</p> <p>Candidates may also mention 'use of encapsulation' (1)</p> <p style="text-align: right;">(3x1)</p> | 3 |
| Total Marks for question | | 12 |
| Total marks for paper | | 80 |