

Mark Scheme

Summer 2013 (Results)

GCSE Engineering and Manufacturing
5EM03 3B
(Paper 3B: Food and Drink, Biological
and Chemical)

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Question	Answer	Mark
1(a)	<ul style="list-style-type: none"> • Iced Tea • Popcorn <p><i>If 3 boxes or more are crossed - no marks.</i></p> <p>(2 x 1)</p>	(2)
1(b)	<ul style="list-style-type: none"> • Shower Gel • Hair Conditioner <p><i>If 3 boxes or more are crossed - no marks.</i></p> <p>(2 x 1)</p>	(2)
(Total 4 marks)		

Question	Answer	Mark
2(a) 1	<ul style="list-style-type: none"> • Funnel • Plastic funnel <p><i>Accept any recognisable spelling (phonetic) of the answers above.</i></p> <p>(1 x 1)</p>	
2(a) 2	<ul style="list-style-type: none"> • Timer • Kitchen Timer • Cooking Timer • Timing clock • Kitchen timing clock • Oven timer • Egg timer <p>Do not accept 'clock' or 'kitchen clock'</p> <p><i>Accept any recognisable spelling (phonetic) of the answers above.</i></p> <p>(1 x 1)</p>	
2(b) 1	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • To measure the moisture in the air (1) at a specific temperature (1) • To calculate the amount of humidity (1) in a final prover / refrigerator (1) • To accurately measure the humidity levels (1) in a production area (1) • To provide relative humidity data (1) where this is important to the process (1) • Provides information relating to humidity levels (1) so that adjustments can be made to stay within the process specification (1) <p>Accept any appropriate response</p>	

Question	Answer	Mark
	<p>Do not accept references to 'temperature' without reference to 'humidity'.</p> <p>eg to provide relative humidity data (1) in a final prover used for bread production (1)</p> <p style="text-align: right;">(2 x 1)</p>	

<p>2(b) 2</p>	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • To sprinkle powders such flour, icing sugar etc evenly onto a work surface (1) to help get an even thickness when rolling biscuit mixes (1) • To apply a thin layer dusting of powder on table (1) to prevent sticking when rolling marzipan /pastry etc (1) • To lightly / evenly cover the top of a baked cake with icing sugar (1) to improve appearance (1) • To decorate cream buns with a thin coat of icing sugar (1) to increase sales (1) • Used to dust the top of Victoria sandwich cake with icing sugar (1) to make it more attractive to the customer(1) • Used to sprinkle flour (1) onto dough shapes prior to baking (1) <p>Accept any appropriate response</p> <p>e.g. Used to sprinkle a light dusting of flour on a worktop (1) when making scones to stop the mix sticking to the table (1)</p> <p style="text-align: right;">(2 x 1)</p>	<p>4</p>
<p>(Total 6 marks)</p>		

Question	Answer	Mark
<p>3</p>	<p>Award 1 mark for each key term correctly linked to a key area</p> <p>Key Term Key Area</p> <p>Computer-aided design</p> <p>Automated conveyors</p> <p>Modified enymes</p> <p>Embedded computers</p> <p>3D Prototyping</p> <p>Probiotics</p> <p>Flurorescers</p> <p>Information and communications technology (ICT)</p> <p>Control technology</p> <p>Modern materials</p> <p><i>No mark awarded where 2 or more lines are drawn from a term. Lines do not have to be straight but term and key area must be clearly linked.</i></p>	<p>(7)</p>
<p>(Total 7 marks)</p>		

Question	Answer	Mark
<p>4(a)</p>	<p>Appropriate two products such as e.g.</p> <ul style="list-style-type: none"> • jam doughnuts • baking powder • apple pies • chocolate chip muffins • digestive biscuits • ice cream • savoury flans • bread • window cleaner • soft drinks • washing up liquid • insect spray • detergent • ham/bacon • dried fruit • cheese • bread rolls <p>Accept references to appropriate packaging.</p> <p>A brand name of a specific product is acceptable</p> <p><i>This list is not exhaustive, accept any product that contains food and drink / biological and chemical ingredients or materials or has an association with the sector</i></p> <p style="text-align: right;">(2 x 1)</p>	<p style="text-align: right;">(2)</p>
<p>4(b)(i)</p>	<ul style="list-style-type: none"> • design • marketing • production planning • materials supply and control • processing/production • assembly/finishing • packaging/dispatch <p style="text-align: right;">(1 x 1)</p>	<p style="text-align: right;">(1)</p>
<p>4(b)(ii)</p>	<p>One mark for identifying benefit x 2 One mark for why x 2</p> <p>Appropriate benefit to the manufacturer e.g.</p> <p>design</p> <ul style="list-style-type: none"> • better designs (1) – can link other information into the process (1), or best designs can be maximized by simulation (1) • faster (1) – many CAD features such as copy, array can be used (1) or if mistakes made they can be quickly rectified (1) <p>marketing</p> <ul style="list-style-type: none"> • accurate information (1) – less mistakes made 	

Question	Answer	Mark
	<p>in capturing data (1)</p> <ul style="list-style-type: none"> • better/accessible knowledge base (1) – easy data entry/data analysed easier (1) • speeds up the editing of marketing literature (1) – customers always kept up to date (1) <p>production planning</p> <ul style="list-style-type: none"> • easier or quicker planning (1) – computers are faster (1) • spreadsheets can be adapted as Gantt Charts (1) for planning – faster than human application (1) • accurate reading of planning sheets (1) – professional output (1) <p>materials supply and control</p> <ul style="list-style-type: none"> • buy best available materials (1) – use of internet (1) • waste control (1) – by monitoring processes and quality control of processes (1) <p>processing/production</p> <p>Answer could relate to the application of CAM and control technology such as:-</p> <ul style="list-style-type: none"> • energy conservation (1) – by control of energy into process (1) • waste control (1) – by monitoring processes and quality control of processes(1) • competitiveness (1) – faster rates of production/application of CAM techniques (1) • product consistency (1) – by control of processes (1) • cost control (1) – by less waste/faulty parts/ingredients (1) • efficiency (1) - by less waste/faulty parts?(1) ingredients • speed (1) – faster than human application (1) <p>assembly/finishing</p> <p>Answer could relate to the application of CAM and control technology such as:-</p> <ul style="list-style-type: none"> • energy conservation (1) – by control of energy into process (1) • waste control (1) – by monitoring processes and quality control of processes(1) • product consistency (1) – by control of processes (1) • cost control (1) – by less waste/faulty parts/ingredients (1) • efficiency (1) - by less waste/faulty parts/ingredients (1) speed (1) – faster than human application (1) <p>packaging/dispatch</p> <p>Answer could relate to the application of CAM and control technology such as:-</p> <ul style="list-style-type: none"> • packaging consistency (1) – by control of processes (1) • cost control (1) – by less waste/faulty 	

Question	Answer	Mark
	<p>parts/ingredients (1)</p> <ul style="list-style-type: none"> • efficiency (1) - by less waste/faulty parts/ ingredients (1) • speed (1) – faster than human application (1) • energy conservation (1) – by control of energy into process (1) • waste control (1) – by monitoring processes and quality control of processes (1) <p><i>Low response (1) or two low responses (2) or detailed response (2)</i></p> <p><i>If no answer or incorrect answer in 4(b)(i) then no marks awarded for 4(b)(ii).</i></p> <p style="text-align: right;">(2 x 1) (2 x 1)</p>	(4)
4(c)(i)	<p>Accept any appropriate modern material suitable for Product 1.</p> <p>e.g</p> <ul style="list-style-type: none"> • Doughnuts - emulsifiers, enzymes • Baking powder - acids, alkalis • Apple pies - modified starch, preservative • Chocolate chip muffins - guar gum, raising agent, stabilizer • Other appropriate materials / material currently used for the given product <p><i>Accept appropriate packaging materials.</i></p> <ul style="list-style-type: none"> • Tin, steel, aluminium, plastics, glass, card, polystyrene, film, cellophane. <p>Do not accept 'packaging ' without naming a specific material</p> <p><i>No answers/incorrect answer to 4(a) no marks for 4(c)(i)</i> <i>Markers need to refer to response in 4(a).</i></p> <p style="text-align: right;">(1 x 1)</p>	(1)

<p>4(c)(ii)</p>	<p>One mark for identifying change One mark for description</p> <ul style="list-style-type: none"> • functional characteristics (1) - weight (1) / size (1) / protection (1) / rigidity (1) • mechanical characteristics (1) - strength (1) / durability (1) • aesthetic characteristics (1) - surface finish (1) / texture (1) / colour (1)/ appearance (1) / flavour/taste (1)softness(1) • Meets requirements of intended markets (1) – appeal to target audience (1) • quality standards (1) – consistency (1) reliability (1) shelf life (1) • weight (1) – better strength to volume ratio (1) • Any other appropriate functional / mechanical / aesthetic characteristic relating to the change (1) <p>e.g. improves the texture (1) and shelf life of the product (1)</p> <p><i>If no answer or incorrect answer is given in 4(c)(i) no marks awarded for 4(c)(ii).</i></p> <p style="text-align: right;">(2 x 1)</p>	<p>(2)</p>
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(Total 10 marks)

Question	Answer	Mark
<p>5(a)(i)</p>	<p>An example</p> <ul style="list-style-type: none"> • materials supply • materials control • process control • storage • linking manufacturing equipment together • linking CNC machines together • monitoring quality • documentation control • workflow control • movement control • application within sector eg in line depositor, metal detector <p>Accept any appropriate response</p> <p style="text-align: right;">(1 x 1)</p>	<p>(1)</p>
<p>5(a)(ii)</p>	<p>One mark for benefit One mark for explanation</p> <ul style="list-style-type: none"> • reduced machine loading times (1) – automatic monitoring (1) • improve quality / accuracy / consistency (1) – control of processes (1) • reduced wastage (1) – optimised production 	

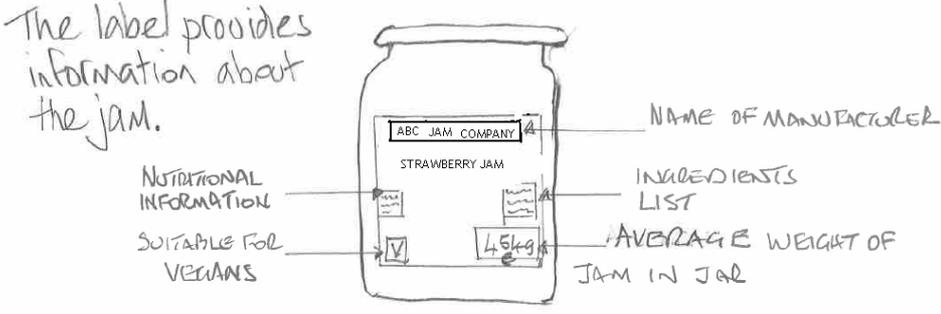
Question	Answer	Mark
	<p>methods (1)</p> <ul style="list-style-type: none"> • improved efficiency (1) – faster / quicker throughput (1) • better process control (1) – in process monitoring (1) • reduced labour (1) – automated processes (1) • lower costs (1) – reduced wastage / faster / continuous production / saves energy (1) • faster processes (1) – less manual input (1) • reduced health and safety risks (1) – machines can operate with a reduced manual input (1) <p><i>Do not accept 'easier' or 'faster' / 'quicker' without explanation.</i> <i>Low response (1) or two low responses (2) or detailed response (2)</i></p> <p style="text-align: right;">(1 x 2) (2 x 1)</p>	(2)
5(b)(i)	<p>Appropriate example</p> <ul style="list-style-type: none"> • to create virtual products • 2D / 3D modelling • show ideas • show new product concepts • simulation <p>Do not accept 'design' or 'designing' on its own.</p> <p>Accept responses relating to product or packaging</p> <p>Accept any appropriate response</p> <p style="text-align: right;">(1 x 1)</p>	(1)
5(b)(ii)	<p>One mark for benefit One mark for explanation</p> <ul style="list-style-type: none"> • accurate drawings (1) – through entry of accurate data on sizes (co-ordinates) (1) • quicker development time (1) – through simulation (1) • easier to communicate, i.e. ICT (1) – quick transfer of data (1) • easy to make modifications/edit/change (1) – no paper hard copies (1)/computer data (1) • lower initial development costs (1) – concurrent design processes (1) • easier storage of data/information and retrieval (1) – interaction with databases (1) • ability to convert from 2D to 3D (1) - faster modelling (1) <p>Accept responses relating to product or packaging</p> <p><i>Do not accept 'easier' without explanation</i> <i>Low response (1) or 2 low responses (1) e.g. its</i></p>	

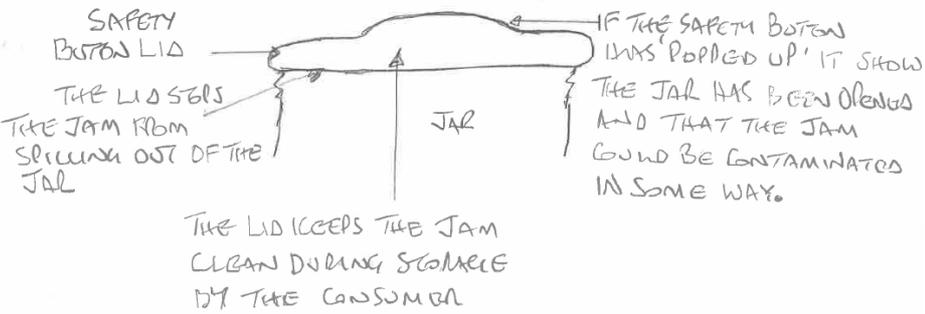
Question	Answer	Mark
	<p><i>quicker and more accurate – only one mark or detailed response (2)</i></p> <p>(1 x 2) (2 x 1)</p>	(2)
5(c)	<p>One mark for benefit One mark for explanation</p> <ul style="list-style-type: none"> • more consistent products (1) – accurate processes (1) • shorter order times (1) – faster production (1) • better quality (1) – can produce to tighter tolerances (1) • cheaper products (1) – less waste (1) • may have many variations on product design/model (1) – can be flexible production methods (1) • safer food to eat (1) - produced under hygienic conditions (1) • improved keeping qualities (1) usable life (1) <p><i>Do not accept 'easier' without explanation Low response (1) or 2 low responses (1) e.g. its quicker and more accurate – only one mark or detailed response (2)</i></p> <p>Answer must relate to the consumer</p> <p>(1 x 2) (2 x 1)</p>	(2)
(Total 8 marks)		

Question	Answer	Mark
6(a)	<p>Appropriate description containing two points:</p> <ul style="list-style-type: none"> • a piece of software / Microsoft Excel (1) • a method of organising /storing data /information (1) • carry out calculations (1) • displaying charts / graphs (1) • information is displayed in tabular form (1) • contains cells / rows (1) • can add up cells / rows / columns (1) • can perform computer operations such as copy / cut / paste / formatting (1) <p>Accept any appropriate response. <i>Do not accept repetitive responses</i> <i>Low response (1) or two low responses (2) or detailed response(2).</i></p> <p style="text-align: right;">(1 x 2) (2 x 1)</p>	(2)
6(b)(i)	<p>Traditional method databases have replaced such as:</p> <ul style="list-style-type: none"> • phone books / lists (1) • sales lists (1) • materials lists (1) • supplier data (1) • stock data (1) • buyers' guides (1) • logbook (1) • handwritten files / documents (1) • paper files / documents (1) • paper based/physical filing systems (1) <p>Accept any appropriate response</p> <p style="text-align: right;">(1 x1)</p>	(1)
6(b)(ii)	<p>One mark for advantage One mark for why</p> <ul style="list-style-type: none"> • convenience (1) – don't have to carry out calculations, manufacturers database does it for them (1) • cost savings (1) – manual costs reduced as information is visible (1) • time savings (1) – get answers in real time from the manufacturer (1) • less data entry (1) – can link databases together (1) • exploit market better (1) – compare customer data etc better (1) • has up to date information on products (1) – integrated systems, distributor to manufacturer (1) • professional development culture (1) - encourages employees to keep up to date with modern technology (1) • provides cost/supply data (1)- better stock 	(4)

Question	Answer	Mark
	<p>control (1)</p> <ul style="list-style-type: none"> • saves space (1) – keeps data secure (1) <p><i>Do not accept quicker, faster, easier, simple without explanation</i></p> <p>Accept any appropriate response</p> <p>Answers must be relevant to the retailer</p> <p style="text-align: right;">(2 x 2)</p>	
6b(iii)	<p>One mark for disadvantage One mark for why</p> <ul style="list-style-type: none"> • costly to install (1) – need computer skills (1) • costly to maintain (1) – IT maintenance people expensive (1) • can lose connectivity (1) – information temporary lost (1) • transfer of errors (1) – wrong data originally entered (1) • people may not get involved (1) – frightened of IT / lack IT skills (1) • IT skills replace research skills (1) – some of the knowledge base lost (1) • system can breakdown/fail (1)- data can be lost (1) • data can be 'hacked' (1)- viruses can be introduced (1) <p>Accept any appropriate response</p> <p>Answer must be relevant to the manufacturer</p> <p style="text-align: right;">(1 x 2)</p>	(2)
(Total 9 marks)		

Question	Answer	Mark
7(a)	<p>One mark for benefit Two marks for explanation</p> <ul style="list-style-type: none"> • easily reacts to risky situations (1) – applying particular outputs (1) to given inputs (1) • reduces danger (1) – part of the monitoring system (1) that reacts very quickly (1) • is likely to continue working over a period of time (1) – older technology may fail earlier (1) and cause accidents (1) • could save life or injury (1) - due to the speed of processing (1) and action /alert (1) <p>Accept responses relating to product safety or equipment safety</p> <p>Accept any appropriate response up to 3 marks for detail (1 x 3)</p>	(3)
7(b)	<p>One mark for benefit Two marks for explanation</p> <ul style="list-style-type: none"> • accurate control (1) – always responds (1) to given manufacturing situations (1) • allows dual tasking (1) – can have many inputs and outputs (1) allowing complex manufacturing tasks to be carried out (1) • increases production / output (1) – gives immediate reactions (1) to varying inputs (1) • changes in manufacturing space requirements (1) – older technology requires larger component parts (1) such as cabinets / wiring / switches / relays (1) • cost effective production (1) – reliable (1) and doesn't make mistakes (1) • can be used for analysis of manufacturing system / process (1) – allows improvements to be made (1) or find out what went wrong (1) • good waste control (1) – process monitoring / control (1) - fewer staff required lowers costs (1) • can detect faulty products (1) – tracks trends (1) and reacts accordingly (1) • faster product changeovers (1) more efficient production schedules (1) more consistent products reduce waste (1) <p>Accept any appropriate response up to 3 marks for detail (1 x 3)</p>	(3)
(Total 6 marks)		

Question	Answer	Mark
<p>8(a)(i)</p>	<p>An answer that makes reference to any of the following points:</p> <ul style="list-style-type: none"> • Ingredients list (1) • Name /address of manufacturer, packer, seller details(1) • Contact details (1) • Weight(1) • Nutritional information/ energy values/calorie/traffic lights (1) • Storage advice eg conditions/'consume by' (1) • Allergies/suitability ie nuts, vegetarian, gluten, (1) • Container recycling information (1) • Sales appeal / attracting customers ie pictures ,colours, designs, logo (1) • Brand identity (1) • Usage/ serving suggestions (1) • Price information (1) • Locate bar code (1) • Country of origin (1) <p>The label provides information about the jam.</p>  <p>Nutritional information about the jam such as energy values, this helps with dietary planning. (1)</p> <p>How much jam there is in the jar, helps with price comparisons. (1)</p> <p>Name /address of manufacturer so they can be contacted easily. (1)</p> <p>Accept any appropriate response.</p> <p><i>Must have notes and sketches (notes or sketches only maximum 2 marks)</i></p> <p><i>1 x 1 mark low response, or up to 3 marks for detailed response</i></p> <p style="text-align: right;">(3 x 1)</p>	<p>(3)</p>
<p>8(a)(ii)</p>	<p>An answer that makes reference to any of the following points:</p> <ul style="list-style-type: none"> • tamper evident (1) • lid 'pops up' when seal is broken (1) • jam has been opened before sale (1) • possibility of jam being deliberately contaminated(1) • alerts to the possibility of product fault (1) • to prevent the jam spilling out (1) • to keep the jam clean (1) • prevents foreign body contamination (1) 	

Question	Answer	Mark
	<ul style="list-style-type: none"> • prevents mould growth (1) • 'best before information' date/information (1) • advice to customer (1) • increases shelf / usable life (1) • prevents air from reaching the jam (1) • prevents microbiological contamination (1) <p>Do not accept any references to 'name of product' or 'bar codes'</p> <p>Raise centre of lid –see sketch</p>  <p>When the centre of the lid has popped up it shows the jam has been opened and could be contaminated(1) The lid keeps the jam clean and free from contamination after it has been opened and is being stored (1) Helps prevent the jam from going mouldy (1)</p> <p>Accept any appropriate response.</p> <p><i>Must have notes and sketches (notes or sketches only maximum 2 marks)</i></p> <p><i>1 x 1 mark low response, or up to 3 marks for detailed response</i> (3 x 1)</p>	(3)
8(b)	<p>An answer that makes reference to any of the following points:</p> <ul style="list-style-type: none"> • flavour (1) • texture (1) • colour (1) • viscosity (1) • acidity (1) • sweetness (1) • nutrition (1) • aroma/smell (1) <p>The strawberries; provides a pleasant and popular fruit flavour.(1) gives fibrous texture to the jam which makes it pleasant to</p>	(3)

Question	Answer	Mark
	<p>eat.(1) gives a red colour to the jam that is easily recognised by customers.(1)</p> <p>Accept any appropriate response.</p> <p><i>Can be any combination of notes and sketches to achieve 3 marks</i></p> <p><i>1 x 1 mark low response, or up to 3 marks for detailed response</i> (3 x 1)</p>	
(Total 9 marks)		

Question	Answer	Mark
9(a)(i)	<ul style="list-style-type: none"> • Production planning / Planning <p><i>Do not accept 'production' on its own</i></p> <ul style="list-style-type: none"> • Material supply and control / Material supply / Material control / Material purchase/ Materials or ingredients buying <p><i>Do not accept 'supply' on its own</i></p> <p><i>Must be in this order</i></p> <p style="text-align: right;">(2 x 1)</p>	(2)
9(a)(ii)	<ul style="list-style-type: none"> • Packaging and dispatch • Packaging • Stage 7/stage seven • Seven / 7 <p style="text-align: right;">(1 x 1)</p>	(1)

<p>9(b) (i)</p>	<p>Appropriate descriptions including three of the following points (statements must be applicable to the jars of strawberry jam):</p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Development of the design brief (1) • Design specification for the mass produced jars of strawberry jam (1) • Listing design criteria (1) • Listing performance requirements (1) • Use of internet/websites to investigate existing designs (1) • Sketches are produced by hand (1) • Initial design ideas are produced (1) • Development of design ideas (1) • Modelling ideas using ICT (1) • Using CAD software (1) • Prototyping before manufacture (1) • Sourcing materials/supplies/consumables/ ingredients (1) • Costing resource requirements (1) • Communicating with client/customer (1) <p>Any other appropriate response including references to labels and packaging / jar / lid design</p> <p>e.g. The stage where the design brief for the mass produced jars of strawberry jam would be created (1) and where prototype samples would be developed (1), by hand and using CAD software (1), in order to model the images of the jars of strawberry jam prior to manufacture (1).</p> <p><i>Up to 3 marks</i> <i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	<p style="text-align: right;">(3)</p>
<p>9(b) (ii)</p>	<p>Appropriate descriptions including three of the following points (statements must be applicable to the jars of strawberry jam):</p> <p><u>Marketing</u></p> <ul style="list-style-type: none"> • Gathering consumer opinion (1) • Calculating products costs (1) • Developing market plan (1) • Using market research (1) • Developing a competitive edge (1) • Advertising the jars of strawberry jam (1) • Promoting the jars of strawberry jam (1) • Carrying out questionnaires / surveys/ taste tests / sampling (1) • Pricing for the target market (1) 	

	<ul style="list-style-type: none"> • Using trade/electronic (internet, email) media (1) • Identifying gaps in the market (1) <p>Any other appropriate response</p> <p>e.g. The stage where the advertising and promotion (1) of jars of strawberry jam is carried out following a range of market research strategies (1) to gather consumer opinion (1).</p> <p>e.g. The stage where the manufacturer uses a range market research strategies (1) to gather people's opinions (1) to be able to advertise and promote (1) the jars of strawberry jam.</p> <p><i>Up to 3 marks</i> <i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	(3)
(Total 9 marks)		

Question	Answer	Mark
10(a)	<ul style="list-style-type: none"> • pectin <p><i>Accept any recognisable spelling (phonetic) of the answer above.</i></p> <p style="text-align: right;">(1 x 1)</p>	(1)

10(b)(i)	<p>Any three of the following:</p> <ul style="list-style-type: none">• cleaning the strawberries• crushing the strawberries• chopping the strawberries• sieving the strawberries (removal of seeds)• pasteurizing the strawberries• selecting ingredients• adding ingredients to the boiler• blending/stirring/mixing• sterilising the jars• filling the jars• lid application (lidding) /sealing the jars• cooling the jars of jam• label application• packing filled jars into outer cases <p>Any other appropriate response</p> <p>1 mark per response up to 3 <i>Accept any recognisable spelling (phonetic) of the answers above. (3x1)</i></p>	(3)
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<p>10(b)(ii)</p>	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • ensures the jam is made to specification • a more consistent product • controls the amount of ingredients used • assists with stock rotation • assists with ordering • controls costs • reduces wastage • reduces re-work • product quality maintained • product characteristics are controlled eg colour, viscosity, flavour / taste, acidity, sweetness • meets customer expectations • fewer complaints <p>Any other appropriate response e.g. ensures the jam is made to the specification (1) and is more consistent (1) which reduces customer complaints(1).</p> <p><i>Up to 3 marks</i> <i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	<p style="text-align: right;">(3)</p>
<p>10(b)(iii)</p>	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • lower cooking temperatures needed • reduces undesirable changes in the colour of the jam • reduces vitamin C loss • preserves aroma / smell • better control of flavor • better control of viscosity/flow/spread • much quicker production rate • lower energy usage • can be automated easily • saves money as it is quicker • lower costs • better quality • more consistent product • smaller cooking losses • safer when manufacturing (closed boiling pans) • cleaner process • reduced risk of contamination • increased consumer satisfaction <p>Any other appropriate answer e. g. lower cooking temperatures (1) reduces undesirable changes in the colour of the jam(1) and can save money as it is a quicker method (1)</p>	<p style="text-align: right;">(3)</p>

	<p><i>Up to 3 marks</i> <i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	
(Total 10 marks)		

Question	Answer	Mark
11(a)(i)	<p>An explanation that makes reference to two of the following points.</p> <ul style="list-style-type: none"> • Monitor • Adjust • Changing • Intervention • To keep within specification • Use of PLC • Use of embedded computers • Data comparison • Data collection • Closed loop/feedback <p>Eg The active changing of the process parameters (1) based on the results on process monitoring (1) Eg Monitors the manufacturing/production process (1) so the product meets its specification (1)</p> <p style="text-align: right;">(1x2)</p>	(2)
11(a)(ii)	<p>One mark for identifying reason x 2 One mark for explanation x 2</p> <ul style="list-style-type: none"> • reduced customer complaints (1) – better quality products(1) • control of costs (1) cheaper product/ more profit (1) • avoids faulty products being made(1) – early detection (1) • increased sales(1) – consistent product (1) • user confidence (1) – less returns (1) • reduced waste/rework(1) – control of manufacturing process (1) • reliable product (1) – monitoring standards testing / product (1) • more efficient / faster production (1)- increased customer satisfaction (1) • improved product (1) and employee safety (1) • to alert the manufacturer of errors (1) – stop faulty product being made (1) <p>Any other appropriate response</p> <p style="text-align: right;">(2 x 2)</p>	(4)

Question	Answer	Mark
11(b)	<p>One mark for identifying QC used x 2 One mark for description x 2</p> <ul style="list-style-type: none"> • check physical damage (1) – by visual inspection (1) • dimensional/size checks (1) – by direct measurement or gauging (1) • weight checks (1) – by direct measurement using scales (1) • checking soluble solids(1) - using a refractometer(1) • processing temperature checks(1) - using digital thermometers(1) • boiling times (1) - and conditions checks (1) • colour checks (1) - taste/flavour checks (1) • viscosity checks(1) - 'spreading'/flow checks (1) • pH checks (1) - using meter (1) • microbiological checks (1) - using rapid or traditional methods (1) • shelf life tests (1) - over prolonged periods and various conditions (1) • scanning for foreign bodies (1) - using x-ray machines (1) • label inspections (1) coding checks (1) <p>Any other appropriate answer</p>	<p>(2 x 2) (4)</p>
(Total 10 marks)		

Question	Answer	Mark
12(a)(i)	<p>Any two from:</p> <ul style="list-style-type: none"> • Higher level of skills (1) • Better educated (1) • Higher level of development skills required (1) • Updated and recently trained (1) • More flexible (1) <p>Response must relate to type of work force and not size. Any other appropriate answer</p> <p style="text-align: right;">(2 x 1)</p>	(2)
12(a)(ii)	<p>One mark for change identified x 2 One mark for description x 2</p> <ul style="list-style-type: none"> • cleaner / more hygienic (1) – tidier processes / contained process (1) • safer (1) – machines can self regulate / work less likely to be done by humans / machines do not tire and become dangerous (1) • quieter (1) – processes can be enclosed (1) • healthier (1) – processes can monitor the environment and react accordingly (1) • noise pollution (1) – can be quieter / can be noisier (1) <p>Any other appropriate answer</p> <p><i>Low response or two low responses (1), detailed response (2)</i></p> <p style="text-align: right;">(2 x 2)</p>	(4)
12(a)(iii)	<p>One mark for identifying benefit One mark for explanation</p> <ul style="list-style-type: none"> • technology that is less dependent on finite resources (1) - makes efficient use of finite resources (1) • materials will be available for longer (1) - can use sustainable alternatives (1) • green materials have been developed (1) – that can biodegrade (1) • reduced wastage in production (1) - less materials used in production / resulting in less waste thrown into landfill (1) • reduce rework/waste (1) - ability to adapt process (1) • products last longer (1) – more appropriately designed / produced better (1) • machines can be systems based (1) – allows for energy recovery (1) • more recyclable materials available (1) especially packaging such as glass (1) • reductions in pollution (1) reduced transport 	(2)

Question	Answer	Mark
	<p>requirements (1)</p> <p>Any other appropriate answer</p> <p><i>Low response or two low responses (1), detailed response (2)</i></p> <p style="text-align: right;">(2 x 1)</p>	
12(b)	<p>A description that makes reference to any four of the following:</p> <ul style="list-style-type: none"> • bar code use can be automated (1) • assists with producing picking lists (1) • automatically update stock records (1) • data produced assists with production planning (1) • prevents theft (1) • reduces human error (1) • enables tracking to be used after dispatch (1) • enables deliveries to be 'batched' together (1) • enables complaints to be traced (1) • assists in coordinating product re-calls (1) <p>Any other appropriate answer</p> <p><i>Low response (1) or four low responses (4) or detailed response (4).</i></p> <p style="text-align: right;">(4 x 1) (1 x 4)</p>	(4)
(Total 12 marks)		

Question	Answer	Mark
<p>13</p>	<p>An explanation that makes reference to four of the following points:</p> <p>Customer satisfaction may be increased due to:</p> <ul style="list-style-type: none"> • better flavour • better colour • extends the life-time of product • more appealing / better appearance • modern materials can be cheaper / reduced cost / price • products can be processed easier so better quality product is made • less likely to deteriorate so safer to eat • less quantities/ amounts need to be used • more healthy products more be made • more nutritious products can be made • more consistent products can be produced • reduced waste <p>Any other appropriate answer</p> <p>Customer satisfaction may be decreased due to:</p> <ul style="list-style-type: none"> • changes in texture • changes in taste/flavour eg more acidic, less sweet • may only be one supplier/ manufacturer <p>Accept responses relating to packaging</p> <p>Any other appropriate answer</p> <p>Answer can be all positive or a mixture of positive and negative <i>Low response (1) or detailed response (up to 4)</i> (4 x 1)</p>	<p>(4)</p>

(Total 4 marks)

Question	Answer	Mark
<p>14</p> <p>QWC i, ii, iii</p>	<p>Indicative Content Discussion to address the following:</p> <ul style="list-style-type: none"> • <i>Issue</i> <ul style="list-style-type: none"> ▪ Use of ICT in production processes allows more flexible methods to be utilised and improves profitability meaning sales have flexibility to reduce prices if necessary or 	

Question	Answer	Mark
	<p>more money can be directed at marketing new opportunities to sell the jars of strawberry jam.</p> <ul style="list-style-type: none"> • <i>Development</i> <ul style="list-style-type: none"> ▪ Manufacturer needs to balance variation of product range with economies of scale ▪ Could lead to extra production capacity required by extra success of marketing ▪ Marketing and sales may need extra effort to deal with the increased efficiency of the production processes ▪ Targeting of products into the market place would be easier • <i>Issue</i> <ul style="list-style-type: none"> ▪ Use of modern and smart materials enabling a superior type of jars of strawberry jam to be made more efficiently, marketed and sold for a higher profit meaning sales have flexibility to reduce prices if necessary or more money can be directed at marketing new opportunities to sell the jars of strawberry jam. ▪ • <i>Development</i> <ul style="list-style-type: none"> ▪ Improve profitability by creating a more functional / aesthetically pleasing / durable jars of strawberry jam which could be marketed as such ▪ More efficient production processes to be used, helping profitability ▪ Superior product may generate more sales which means the sales team would have more customers to deal with ▪ Marketing would need to keep abreast of the better products produced using modern and smart materials and continually invest in new marketing materials. • <i>Issue</i> <ul style="list-style-type: none"> ▪ Use of systems and control technology enabling more efficient production which improves profitability meaning sales have flexibility to reduce prices if necessary or more money can be directed at marketing new opportunities to sell the jars of strawberry jam. • <i>Development</i> <ul style="list-style-type: none"> ▪ Only likely to affect processes and profitability when improvements in the manufacturing environment are made ▪ Any cost reduction achieved within the 	

Question	Answer	Mark
	<p>processes can be passed on to the customer, generating more sales for the sales team to deal with.</p> <p>Or other appropriate answer/s</p> <p>Example answer (Level 3): Manufacturers can use ICT in the production processes, making them more efficient and therefore more profitable. The more efficient processes could lead to extra effort required to market and sell the jars of strawberry jam. Modern or smart materials could be used to improve profitability by creating a superior jar of strawberry jam which could be marketed as such with a hope that it would increase sales. The use of these materials would also enable more efficient production processes to be used, also helping raise output that would be available for selling however marketing would need to keep the market place updated about any new materials used in the jars of strawberry jam. Manufacturers could use systems and control technology to improve the efficiency of the production processes and potential increase in profitability. This success could lead to more items being available for sale which would increase the work capacity of the sales team. Alternatively this extra profit could used to fund more targeted marketing campaigns to increase the market share of the jars of strawberry jam.</p> <p style="text-align: right;">(6 x 1)</p>	(6)
(Total 6 marks)		

Level	Mark	Descriptor
	0	No material deserving of reward
1	1-2	The learner identifies at least two effects on marketing and selling caused through improvements to production process or profitability. The learner shows some understanding of the issues. The learner uses everyday language and the response lacks clarity and organisation. Spelling, punctuation and the rules of grammar are used with limited accuracy.
2	3-4	The learner gives a brief description of at least two effects on marketing and selling, or a detailed description of one effect caused through improvements to production process or profitability. The learner uses some technological / manufacturing terms and shows some focus and organisation. Spelling, punctuation and the rules of grammar are used with some accuracy. Some spelling errors may still be found.
3	5-6	The learner gives a detailed explanation of two or more effects on marketing and selling caused through improvements to production process or profitability. The learner uses a range of appropriate technological / manufacturing terms and shows good focus and organisation. Spelling, punctuation and the rules of grammar are used with considerable accuracy.
(Total 6 marks)		

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