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Mark Scheme (Results)

June 2012

GCSE Engineering/Manufacturing
(5EM03) Paper 3B

Food & Drink, Biological & Chemical

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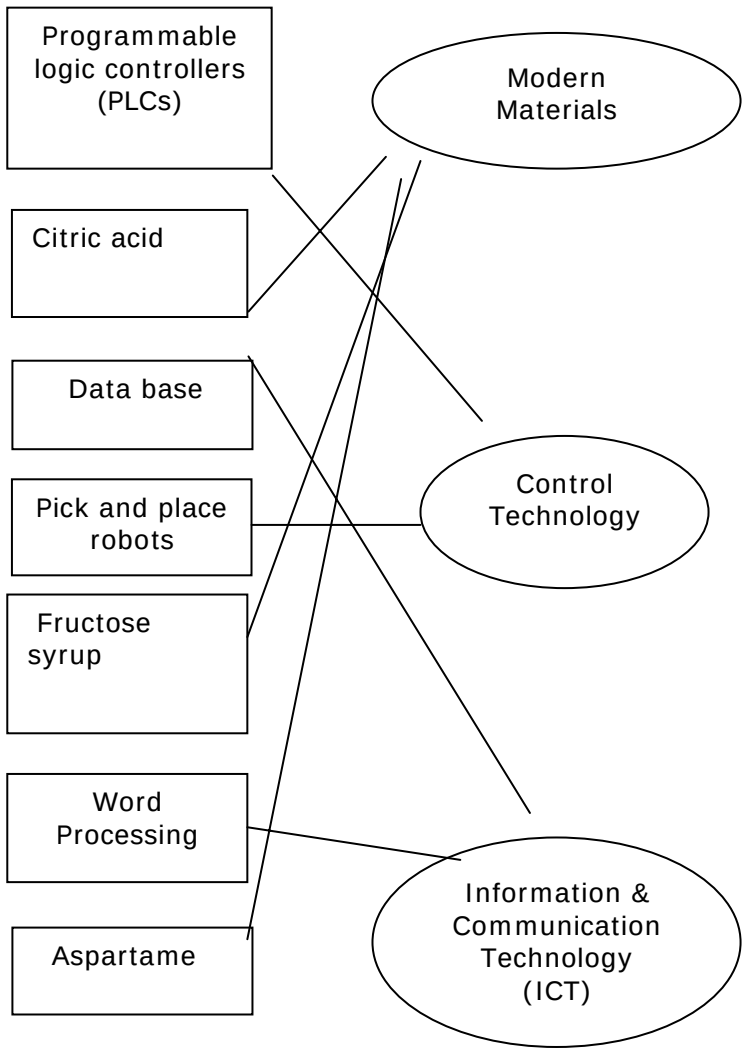
June 2012
Publications Code UG032063

Question	Answer	Mark
1(a)	• Fruit smoothie • Marmalade *If 3 boxes or more crossed - no marks.* (2 x 1)	**(2)**
1(b)	• Shampoo • Indigestion tablets *If 3 boxes or more crossed – no marks.* *(2 x1)*	**(2)**
(Total 4 marks)		

Question	Answer	Mark
2(a)	Accept any of the following answers: • Bacon slicer • Meat slicer • Slicer • Food slicer • Gravity slicer • Slicing machine *Accept any recognisable spelling (phonetic) of the answers above.* (1 x 1)	
	Accept any of the following answers: • Dish washer • Utensil washer • Tray washer *Accept any recognisable spelling (phonetic) of the answers above.* *Do not accept washing machine* (1 x 1)	**(2)**
2(b)	An answer that makes reference to TWO of the following points: • Warns that the contents of the package are poisonous/harmful • Warns that the contents can cause sickness • Warns it can make you ill if consumed /swallowed • A sign on a container which denotes the contents are highly hazardous • warns that extreme caution should be used when handling /using the material • Alerts the user about the potential dangers of the substance • Informs the user that appropriate precautions should be taken • Alerts the user that there is a potential danger when using the contents Accept any other reasonable response. e.g. warns that the contents of the package are poisonous (1) and can cause sickness (1) Do not allow toxic on its own without an explanation (2 x 1)	**(4)**

Question	Answer	Mark
	An answer that makes reference to TWO of the following points: • Warns that water is poisonous • Warns that the water is unsafe to drink/consume • Indicates that water is dangerous for humans • Warns it may contain contaminates e.g such as minerals/bacteria or other infective agents • Warns that the water will make you sick /ill if consumed • Warns that the water should not be used in the manufacture of food/drink/consumable biological/ consumable chemical products Accept any other appropriate answer e.g. warns that the water is poisonous (1) because it may contain bacteria (1) (2 x 1)	
(Total 6 marks)		

Question	Answer	Mark
3	Award 1 mark for each key term correctly linked to a key area. **Key Term** **Key Area**  *No mark awarded where 2 or more lines are drawn from a key term. Lines do not have to be straight but key term and key area must be clearly linked.*	**7**
(Total 7 marks)		

Question	Answer	Mark
4(a) (i)	Appropriate **products** such as e.g. • Bread • Cakes • Soft drinks • Ham/bacon • Dried fruit • Cheese • Accept any branded name with appropriate product e.g. Hovis bread *This list is not exhaustive, accept any products associated with the food and drink sector that contains a preservative.* (2 x 1)	**(2)**
4(a)(ii)	Accept any appropriate preservative suitable for the product named in Product 1. Examples: • Bread – acetic acid / E260 • Cakes – sorbic acid / E200 • Soft drinks – benzoic acid / E210 • Ham/bacon – sodium nitrite / E250 • Dried fruit – sulphur dioxide / E220 • Cheese – potassium sorbate / E202. Do not accept potassium, sodium, sulphur on its own. (1 x 1)	**(1)**
4(a)(iii)	One mark for identifying each reason One mark for each explanation • Makes the product last longer (1) and increases the saleable life (1) • Slows or stops microbiological spoilage (1) and stops the product going bad (1) • The product can be distributed over greater distances (1) as it does not go mouldy (1) • Prolongs the shelf life of the product (1) by protecting it against deterioration (1) • Changes the Ph / acidity of the product (1) making to difficult for micro organisms to multiply (1) • Allows the product to be stored for longer (1) before it becomes inedible (1)	

Question	Answer	Mark
	Accept any other appropriate response e.g. makes the product last longer (1) and stops it going bad (1) If the answer 4(a)(ii) is a preservative but not found in the product, allow follow through up to 4 marks. If answer in 4 (a) (ii) is incorrect allow follow through up to 1 mark for each of the two answers for a suitable explanation. If there is no answer or the answer is a product in 4(a)(ii), no marks for 4(a)(iii). (2 x 1) (2 x 1)	**(4)**
4(b)(i)	• production planning (1) • materials – supply and control (1) • processing/production (1) • assembly/finishing (1) • packaging/dispatch (1) (1 x 1)	**(1)**
4(b)(ii)	One mark for identifying advantage One mark for why Appropriate advantage to the manufacturer e.g. **production planning, materials supply and control, processing / production, assembly / finishing, packaging / dispatch** **production planning** • speed (1) – faster than human application (1) • accuracy (1) – reliability of data (1) • integrates with other software systems • (1) giving more accurate plan (1) **materials supply and control** • buy best available materials (1) – use of internet (1) • waste control (1) – by monitoring processes and quality control of processes (1) **processing / production** Answer could relate to the application of CAM and control technology such as:- • energy conservation (1) – by control of energy into	

Question	Answer	Mark
	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 products (1) • efficiency (1) - by less waste/faulty products (1) • speed (1) – faster than human application (1) **assembly / finishing** Answer could relate to the application of CAM and control technology such as:- • 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 products (1) • efficiency (1) - by less waste/faulty products (1) speed (1) – faster than human application (1) **packaging / dispatch** Answer could relate to the application of CAM and control technology such as:- • packaging consistency (1) – by control of processes (1) • cost control (1) – by less waste/faulty products (1) • efficiency (1) - by less waste/faulty products (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) *Low response (1) or two low responses (2) or detailed response (2)* (2 x 1)	**(2)**

Question	Answer	Mark
(Total 10 marks)		

Question	Answer	Mark
5(a)	One mark for each identification One mark for each extension • For 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) – for 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) for modelling/samples (1) Accept reference to production and/or packaging *Low response (1) or 2 low responses (1) e.g. its quicker and more accurate – only one mark or detailed response (2)* *Do not accept 'easier' without explanation* (2 x 1) (2 x 1) (2 x 1)	**(6)**
5(b)	One mark for reason One mark for extension • reduced ordering times (1) – automatic monitoring (1) • improve quality / accuracy (1) –	

Question	Answer	Mark
	control of processes (1) • reduced wastage (1) – optimise production methods (1) • 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 (1) • faster processes (1) – less manual input (1) • Safer/cleaner (1) – more suitable for hazardous environment (1) *Do not accept 'easier' or 'faster' / 'quicker' without explanation.* *Low response (1) or two low responses (2) or detailed response (2)* (2 x 1)	**(2)**
(Total 8 marks)		

Question	Answer	Mark
6(a) (i)	• a method of exchanging digital messages (1) across the Internet (1) • a protocol (1) for sending, receiving and storing messages (1) • the exchange of computer-stored messages (1) by telecommunications (1) • A quick method (1) which allows functions such as attachments / read receipts (1) *Accept any other appropriate response* *Low response (1) or two low responses (2) or detailed response (2)* (2 x 1) (1 x 2)	**(2)**
6 (a) (ii)	1 mark for identification 1 mark for why • Messages go to Junk mail (1), issues with accessing the message (1) • Insecure (1), loss of confidential data (1) • Mail boxes can be full (1), mail not received (1) • Inefficient (1) intended recipient doesn't always receive the message (1) • Hard to translate (1) could receive incorrect meaning (1) • Restriction on size of message (1), unable to send large files (1) • Recipient doesn't always receive the message immediately (1), delay in access to computer software (1) *Do not accept any answer that is not directly related to email or lower costs.* *Low response (1) or two low responses (2) or detailed response (2)* *Do not accept repetitive responses* (2 x 1) (1 x 2)	**(2)**

Question	Answer	Mark
6(b)(i)	• Face to face / meeting (1) • Telephone (1) • Conference (1) *Accept any appropriate response* (1 x 1)	**(1)**
6(b)(ii)	One mark for each identification One mark for each extension • convenience (1) – don't have to travel to venue (1) • cost savings (1) – travel costs reduced (1) • time savings (1) – communication in real time (1) • 'work environment' (1) – all material/ information at hand (1) • access to outside experts (1) – regular meetings to compare data etc (1) • staff development (1) – encourages employees to keep up to date with modern technology (1) • Can be arranged at short notice (1) – avoids lengthy planning (1) • Can be recorded (1) – played back to remind/recall information (1) *Accept any other appropriate response* *Low response (1) or two low responses (2) or detailed response (2)* *Do not accept repetitive responses* (2 x 1) (1 x 2)	**(4)**
(Total 9 marks)		

Question	Answer	Mark
7(a)	One mark for benefit One mark for extension • Accurate information (1) – updated regularly (1) • Detailed information (1) – high storage space (1) • Fast access to data (1) – search/ sort/query (1) • Improved planning (1) – short lead times (1) • Forecasting (1) – collects volumes of data/ modelling (1) • Cost of control (1) – better scheduling (1) • Waste control (1) – process monitoring/control (1) • Reduced stock holding(1) – tracks trends/JIT • Training records (1) – skills monitoring (1) • Wage information (1) – ease of cost monitoring (1) *Accept any other appropriate response* (1 x 2)	**(2)**
7(b)	One mark for each benefit One mark for each extension • Accurate orders (1) – updated regularly (1) • Detailed stock movement information (1) – efficient storage space (1) • Fast access to data (1) – search/sort/ query (1) • Effective goods tracking (1) – barcoding /EPOS (1) • Fast distribution (1) – Fast delivery details • Improved stock control (1) – process monitoring/ control (1) • Regulating drivers' workload (1) – to meet delivery demand/schedules (1) • Improved stock security (1) – less theft (1)	**(4)**

Question	Answer	Mark
	• Less stock obsolescence (1) - efficient stock turnover (1) *Accept any other appropriate response* (1 x 2) (1 x 2)	
(Total 6 marks)		

Question	Answer	Mark
8(a)	<u>SUGAR</u> One mark for each function • Provides sweetness (1) • Helps fermentation (1) • Improves crumb/product softness (1) • Opens the crumb texture(1) • Improves moistness(1) • Darker surface colour (1) • Coats the surface (1) • Provides a 'crunchy' eat (1) • Enhances appearance • Enhances flavour/taste (1) • Contributes to shelf life (1) Accept any other appropriate response (3 x 1)	**(3)**
8(b)	<u>VEGETABLE FAT</u> One mark for each function • Provides crumb softness(1) • Improves eating qualities e.g. texture/shortness/ moistness (1) • Increases richness (1) • Increase volume/size(1) • Increases shelf-life (1) • Provides a suitable frying material (1) • Provides flavour/aroma (1) • Helps sugar to adhere to surface (1) • Improves appearance e.g. Smooth surface, sheen, colour (1) Accept any other appropriate response (3 x 1)	**(3)**
8(c)	<u>YEAST</u> One mark for each function • Produces carbon dioxide gas (Co2) (1) • Increase the size of the dough piece (through CO2) gas production (1) • Lightens/opens the texture (1)	**(3)**

Question	Answer	Mark
	• Improves eating qualities(1) • It helps matures/develop the dough (1) • Provides enzymes(invertase/maltase) for the conversion of sugars-sucrose/fructose/ maltose (disaccharides) (1) • Provides an enzyme called zymase which convert monosaccharide's (sugars) to CO2 (1) • Provides permeases (enzyme)(1) to help transport food into the yeast cell (1) • Improves flavour/aroma/appearance(1) • Contributes to softness (1) Accept any other appropriate response (3 x 1)	
(Total 9 marks)		

Question	Answer	Mark
9(a)(i) 1	• Design • Designing • Product design • Jam doughnut design • Design of jam doughnut (1x1)	
9 (a) (i) 2	• Production planning • Planning • Planning for production *Do not accept 'production' on its own* (1 x 1)	**(2)**
9(a)(ii)	• Processing and production • Production and processing • Production • Processing • Stage5 /stage five • Five/5 (1 x 1)	**(1)**
9(b)(i)	Appropriate descriptions including three of the following points (statements must be applicable to the jam doughnuts): • Gathering consumer opinion (1) • Calculating products costs (1) • Developing market plan (1) • Using market research (1) • Developing a competitive edge (1) • Advertising the jam doughnuts (1) • Promoting the jam doughnuts (1) • Carrying out questionnaires/surveys (1) • Contributes to sales activities (1) e.g. The stage where the advertising (1) of jam doughnuts is carried out following a range of market research strategies (1) to gather consumer opinion (1). e.g. The stage where the manufacturer uses a range market research strategies (1) to gather people's opinions (1) to be able to promote (1) the jam doughnuts. *Accept any other appropriate response* *Up to 3 marks* *1 x 1 mark low response, 3 x 1 mark 3 low*	**(3)**

Question	Answer	Mark
	responses or up to 3 for detailed response (3 x 1)	
9(b)(ii)	Appropriate descriptions including three of the following points (statements must be applicable to jam doughnuts materials supply and control): • Availability of suitable materials/ingredients/ packaging(1) • Purchase of suitable materials/ingredients/ packaging (1) • Sourcing of bought-in components/ingredients/ packaging (1) • Purchasing of bought-in components/ingredients/ packaging (1) • Good inwards inspection /testing(1) • Quality control checks (1) • Coding checks(1) • Storage of materials (1) e.g. The stage where the manufacturer would use a database (1) to source suitable materials/ ingredients (1) and bought-in components/ ingredients (1) for the jam doughnuts. These ingredients could then be purchased (1) and then inspected/tested (1) on arrival at the company. Accept any other appropriate response *Up to 3 marks* *1 x 1 mark low response, 3 x 1 mark 3 low responses or up to 3 for detailed response* (3 x 1)	**(3)**
(Total 9 marks)		

Question	Answer	Mark
10(a)	• Water • Egg • Milk (1 x 1)	**(1)**
10(b)(i)	Any three of the following: • Dispensing/weighing/measuring ingredients • Conditioning ingredients(temperature) • Mixing/kneading ingredients • Dividing/weighing dough into pieces • First moulding /shaping dough pieces • Intermediate proving/resting dough pieces • Final moulding/shaping dough pieces • Traying up/traying dough pieces • Frying the doughnuts • Sugaring sugar coating pieces • Cooling fried doughnuts • Jam filling/filling fried doughnuts Accept any other appropriate response *Accept any recognisable spelling (phonetic) of the answers above.* 1 mark per response up to 3	**(3)**
10(b)(ii)	An explanation that makes reference to three of the following points: • increased production rate/ output • improved process control • better control of quality • improved product consistency • fewer staff required • highly automated process • reliable process • minimal waste • less re-work • more cost effective • improved customer satisfaction/sales • more energy efficient e.g. automated final proving improves process control (1) by giving more consistent	

Question	Answer	Mark
	products (1) with minimum waste (1) Accept any other appropriate response *1 x 1 mark low response, or up to 3 marks for detailed response* (1 x 3) (3 x 1)	**(3)**
10(c)	An explanation that makes reference to three of the following points: • Improved shelf life • More combinations possible • More flavours • Different textures • Easier manufacturing • Better functionality • More variation of products • Expanding markets i.e. healthy eating, weight reduction/dieting, dairy free, gluten free, etc • Improved aesthetics • Improved eating characteristics • Enabling cost reduction • Improved consistency • Safer products e.g. modern materials have improved the shelf life of products (1) enabling the manufacturer to expand markets (1) and reduce costs (1) Accept any other appropriate response *Up to 3 x 1 mark low responses or up to 3 marks for a detailed response* (3 x 1) (1 x 3)	**(3)**
(Total 10 marks)		

Question	Answer	Mark
11(a)(i)	One mark for identifying each QC procedure One mark for each extension • Checking for physical damage on the jam doughnuts or packaging (1) – by visual inspection (1) • Packaging/product weight/size checks (1) – using scales (1) • Packaging checks (1) – by direct measurement or optical sensors (1) • Packaging security checks (1) – by optical scanning (1) • Checking quantities / batch size / product counts/stock rotation(1) – through bar coding (1) • Carry out shelf life checks (1) via sensory tests(1) • Carry out coding (1) – labelling checks (1) • Check correct packaging materials are being used (1) – product placement checks (1) • Carry out metal detection checks (1) – contamination checks (1) • Carry out environment checks (1) – such as temperature/humidity (1) *Do not accept repetitive responses* *Must be within packaging and dispatch stage* *Low response (1) or two low responses (2)* *Or Detailed response (2) per example* (1 x 2) (1 x 2) (2 x 1) (2 x 1)	**(4)**
11(a)(ii)	One mark for identifying each automation used One mark for each extension • PLCs (1) to control processes in packaging and dispatch (1) • Automated wrapping of jam doughnuts(1) • Automated labelling of jam	**(4)**

Question	Answer	Mark
	doughnut packaging (1) • Automated coding of jam doughnut packaging (1) to allow automated order picking (1) • Use of conveyor systems (1) to move packaged jam doughnut packaging from one packaging and dispatch process to the next (1) • Embedded computers (1) to perform dedicated functions (1) • Remotely operated vehicles (1) moving packaged jam doughnut to next stage / storage / dispatch (1) • Pick and place robots (1) moving packed jam doughnuts to next stage / storage / dispatch (1) • Automated counting/weighing (1) carton erector (1) *Any other appropriate response* *Do not accept repetitive responses* *Do not accept 'CIM' or 'CNC' without links to automation* *Must relate to the packaging and dispatch stage* *Low response (1) or two low responses (2) or detailed response (2) per example* (1 x 2) (1 x 2) (2 x 1) (2 x 1)	
11(b)	One mark for identifying advantage to the manufacturer One mark for how • Reduced customer complaints (1) – accurate products (1) • Control of costs (1) – cheaper product / more profit (1) • Avoids further processing of faulty product (1) – early detection of rejects (1) • Increased sales (1) – consistent product / lower prices (1) • User confidence (1) – consistent product / less returns (1) • Reduced waste (1) – control of manufacturing processes (1) • Made to same quality standard (1) – increased customer satisfaction/company reputation (1)	

Question	Answer	Mark
	• Reliable product (1) – monitoring standards / testing (1) • Detection of broken machinery (1) – less damaged product (1) • Increased output/productivity (1) – increased profit (1) • Less expensive to operate (1) – fewer manual checks (1) *Any other appropriate response* *Low response (1) or two low responses (2) or detailed response (2)* (1 x 2) (2 x 1)	**(2)**
(Total 10 marks)		

Question	Answer	Mark
12(a)(i)	One mark for impact, 2 marks for extension An explanation that makes reference to three of the following points: • Smaller in size (1) • Increased competition for fewer jobs(1) • Higher level of skills (1) • Work patterns – shifts (1) • Need to retrain(1) • Better educated (1) • Higher level of development skills required (1) • Less employment for unskilled (1) • Updating and training often required (1) • Team working more important(1) • Improved promotion prospects (1) • Reduced income/standard of living (1) • Cleaner workplace (1) • Safer workplace (1) • Less physically demanding tasks (1) • Job insecurity (1) e.g. Employees would need to retrain(1) and there would be increased competition for jobs(1) and there would be less employment opportunities for unskilled people(1) *Accept any other appropriate response* *Up to three low responses (3), detailed response (3)* *(3 x 1)* *(1 x 3)*	**(3)**
12(a) (ii)	One mark for impact, 2 marks for extension An explanation that makes reference to three of the following points: Positive answers • Reduced carbon emissions (1) • Operational efficiencies – less fossil fuels (1) • Reduced waste – landfill (1) • Healthier local environment(1) • Improved quality – less waste(1)	

Question	Answer	Mark
	Negative answers • Distribution - network increased (extra fuel) (1) • Increased consumption of raw materials (1) • Over production(1) • Increased energy consumption(1) • Increased pollution (1) *Accept combinations of the above that are positive or negative.* *e.g.* *Changes in the working environment could lead to reduced waste going into landfill (1) and would create a healthier local environment (1). However over production (1) could result in increased energy consumption (1)* *Up to 3 marks* *Accept any other appropriate response* *Up to three low responses (3), detailed response (3)* *(3 x 1)* *(1 x 3)*	**(3)**
12(b)(i)	Any two of the following: • Analyse market research data in database (1) • Assists with pricing products (1) • Pricing products in spreadsheets (1) • Cost the resource requirements for jam doughnuts in spreadsheets (1) • Plan marketing campaign using DTP software (1) • Use of internet/website/social networking for marketing (1) • Use of emails for marketing purposes (1) • Video conferencing to discuss marketing + research proposals • Assists with profit analysis/ predictions (1) • Assists with 'pitching'/powerpoint presentations (1) • Provides legal information (1)	**(2)**

Question	Answer	Mark
	Accept any other appropriate response *1 mark per response up to 2* *Do not accept generic responses with* *no link to marketing or a marketing context.* (1 x 1) (1 x 1)	
12(b)(ii)	One mark for identifying the use One mark for how: • Electronic monitoring (1) by x rays/ scanners(1) • Use of sensors/x ray/scanners (1) to monitor the finishing of jam doughnuts eg sugar coating/jam filling (1) • Use of software (1) to record, log output of jam doughnuts (1) • Metal detection(1) weight/size monitoring (1) *Accept any other appropriate response* *Low response (1) or two low responses (1) or detailed response (2)* (2 x 1)	**(2)**
12(b)(iii)	One mark for identifying the benefit One mark for how • Establishes a market database (1) shared with the manufacturer (1) • Has accurate sales information (1) shared with the manufacturer (1) that can be manipulated easily (1) • Gives retailers the opportunity to match the market needs (1) with production of jam doughnuts (1) • Gives retailers sales data fast(1)possibly leading to increased sales/profits(1) • Can reduce waste product(1)through more accurate ordering (1) • Accurate sales data (1) leads to accurate pricing (1) • Advertising/selling online (1) leads to wider market (1) • Assists with stock rotation (1) leading to less waste (1) • Navigation software (1) planning routes to reduce costs (1) • Efficient tracking/monitoring (1) leads to fewer product losses (1) *Low response (1) or two low responses (1) or detailed*	**(2)**

Question	Answer	Mark
	response (2) (2 x 1)	
(Total 12 marks)		

Question	Answer	Mark
13	An explanation that makes reference to four of the following points: • Guards/sensors on machinery (1) so machinery can shut down automatically (1) • Automated machinery (1) can operate in hazardous environments (1) • Less human input at the production stage (1) reduces errors (1) and results in fewer accidents (1) • Fewer problems with fatigue (1) enables continuous processing (1) • Monitors and controls frying temperatures accurately (1) to avoid fires from fat/oil which has become too hot(1) • Cleaner environment (1) air quality improved (1) e.g. Control technology is now used to prevent machines from starting when guards are not in place (1), and to shut down machines when something goes wrong (1), which means that accidents are less likely to happen (1) and therefore people won't get hurt (1). *Accept any other appropriate response* *Up to 4 marks* *Up to 4 low responses (4) or detailed response (up to 4)* (4 x 1) (1 x 4)	**(4)**
(Total 4 marks)		

Question	Answer	Mark
14 **QWC i, ii,**	Discussion may address the following issues: • *Issue - Reduce energy consumption* ▪ The jam doughnut could be made from locally sourced materials • *Development* ▪ Less need for transportation over long distances ▪ Review of distribution networks and frequencies • *Issue - Reduce energy consumption* ▪ The jam doughnut could be manufactured using less / recycled materials and other materials that need less processing • *Development* ▪ Using recycled materials reduces the need for energy intensive primary processing ▪ The jam doughnut could be packaged using food safe recycled packaging • *Issue - Reduce energy consumption* ▪ Use of modern processes / machinery and equipment / technology enabling more energy efficient production • *Development* ▪ Minimise high temperature operations ▪ Contain heated air ▪ Use of automation and control systems ▪ Retrofit existing machinery rather than buy new • *Issue - Reduce energy consumption* ▪ Use of sustainable sources of energy and producing as little waste as possible when manufacturing the jam doughnuts • *Development* ▪ Generating own energy through solar / wind power ▪ Using combined heat and power / energy recovery systems ▪ Minimising overproduction ▪ Lean manufacturing	**(6)**
(Total 6 marks)		

Level	Mark	Descriptor
	0	No material deserving of reward
1	**1-2**	The learner identifies at least two methods for reducing energy consumption or gives a brief description of one method. 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 methods for reducing energy consumption or a detailed description of one method. The learner uses some technological / manufacturing / environmental 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 at least two methods for reducing energy consumption. The learner uses a range of appropriate technological / manufacturing / environmental terms and shows good focus and organisation. Spelling, punctuation and the rules of grammar are used with considerable accuracy.
Total Marks for Section B		**60**
Total Marks for the whole paper for Section A & B		**110**

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