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Mark Scheme (Results)

June 2011

GCSE Engineering/Manufacturing
(5EM03) Paper 3B

Food & Drink, Biological & Chemical

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June 2011
Publications Code UG027759

General Marking Guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Learners must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the learner's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate learner's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the learner has replaced it with an alternative response.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

  i) Ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear

  ii) Select and use a form and style of writing appropriate to purpose and to complex subject matter

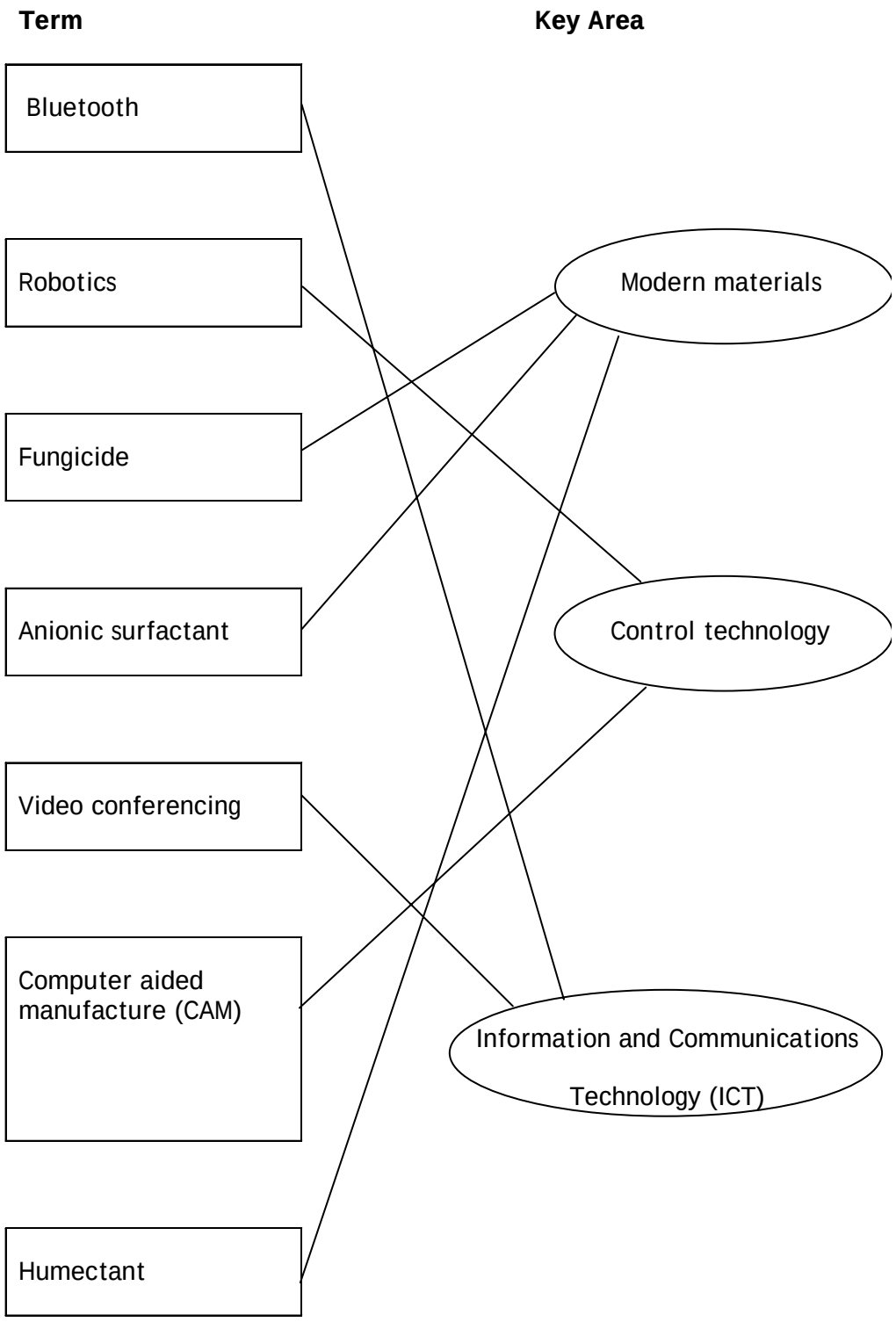
  iii) Organise information clearly and coherently, using specialist vocabulary when appropriate.

Question Number	Answer	Mark
1(a)	• Golden syrup • Orange squash *If 3 boxes or more ticked -no marks.* (2 x 1)	**(2)**

Question Number	Answer	Mark
1(b)	• Acetic acid • Spray oven cleaner *If 3 boxes or more ticked -no marks.* (2 x 1)	**(2)**

Question Number	Answer	Mark
2(a)	• Thermometer • Digital thermometer • Temperature probe/gauge/measure • Temperature food probe • Food probe • Electronic / Electric thermometer • Food thermometer *Accept any recognisable spelling (phonetic) of the answer above.* *Do not accept temperature on its own* (1 x 1) • Oven • Gas/electric/oil oven • Deck oven • Multi deck oven • Bakers / Baking oven • Industrial oven • Large scale oven • Batch production oven • Supermarket oven • Cooker *Accept any reference to fuel in the above answers e.g. electric. gas, oil* *Accept any recognisable spelling (phonetic) of the answers above* *Do not accept ' microwave oven' or 'stove' or 'fire'* (1 x 1)	**(2)**

Question Number	Answer	Mark
2(b)	An answer that makes reference to two of the following points: Corrosive; • Indicates that the contents can cause damage (1)to surfaces if spilt (1) • Indicates that contents can cause serious burns(1) if it comes into contact with the body (1) • Advises that protective clothing and equipment (1) should be worn (1) • Warns the user that the contents can cause serious harm (1) to the eyes (1) • Warns the user that the contents can cause serious harm (1) to the skin (1) • Warns that the contents should be handled with care (1) and may react with other materials (1) e.g. Warns that the chemical can cause serious burns (1) and correct protective clothing should be worn (1) (2 X 1) An answer that makes reference to two of the following points: Irritant; • Warns the user that the contents can cause harm (1) if ingested/swallowed (1) • Warns the user that the contents can cause harm (1) if it comes into contact with skin/eyes (1) • Warns the user that the contents are poisonous (1) and could cause sickness (1) • Warns the user that the contents can cause rashes /itching (1) and discomfort if it gets on the skin (1) • Warns that the contents can cause harm (1) and users should be trained how to use it(1) e.g. Provides a warning (1) to the user of the chemical product that it is harmful to them or others if consumed (1) (2 x 1)	**(4)**

Question Number	Answer	Mark
3	 *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.* (7 x 1)	**(7)**

Question Number	Answer	Mark
4(a)	Appropriate **product** such as e.g. • Window cleaner • Bread • Soft drinks • Washing up liquid • Insect spray • Ready meals • Cakes • Detergent • A brand name of a specific product *This list is not exhaustive; accept any product associated with the food and drink, biological and chemical sector.* (2 x 1)	**(2)**

Question Number	Answer	Mark
4(b)(i)	• Emulsifiers • Colours • Flavours • Humectants • Surfactants • Preservatives • Enzymes • Anti-foaming agents • Chemical aerators • Modified starch • Stabilisers • Other appropriate materials/a material currently used for the given application *If any product given in 4(a) is not from this sector but is from one of the other engineering manufacturing sectors then allow follow through.* ***No answers to 4(a) no marks for 4(b)(i)*** (1 x 1)	**(1)**

Question Number	Answer	Mark
4(b)(ii)	One mark for identifying each benefit One mark for each explanation • Better physical characteristics/size/volume /softness (1) • Improved texture/taste/flavour (1) • Improved shelf–life/functionality (1) • Easier manufacturing (1) wider distribution(1) • Improved profitability (1) lower costs (1) • Quicker to manufacture (1) with less waste/spoilage(1) • Improved aesthetic characteristics (1) finish/colour/appearance (1) • Meets requirements of intended markets (1) – appeal to target audience (1) health related markets (1) • Better quality standards (1) – consistency/reliability (1) • Reduced weight (1) – better volume to weight ratio (1) • Able to produce dietary products (1) extending the product range (1) • Better functionality (1) such as stain removal using enzymes in washing powder(1) • Any other appropriate functional/mechanical /cost/aesthetic characteristic relating to the benefit (1) e.g. improves appearance of the product (1) to increase appeal to the target audience(1) *If an answer in part 4(a) is inappropriate but the material given in 4(b)(i) is appropriate allow follow through up to 2 marks for each of the two benefits. If no answers are given in part 4(a) but the answer to part 4(b)(ii) relates to the material stated in part 4(b)(i) allow follow through up to 1 mark. If no answer or incorrect answer given in part 4(b)(i) no marks awarded for 4(b)(ii).* (2 x 1) (2 x 1)	**(4)**

Question Number	Answer	Mark
4(c)(i)	Must be related to the sector • Modified starches (1) • Textured vegetable protein (TVP) (1) • Modified enzymes (1) • Stabilisers (1) • Hydrocolloids (1) • Surfactant (1) • Bleaching agents (1) • Flour treatments (1) • Preservatives (1) • Dough / bread improvers (1) • Chemical aerators (1) • Humectants (1) • Or other appropriate smart material • *Accept trade names e.g Quorn, Benecol* *Do not accept sodium hydrogen carbonate, sodium bicarbonate.* *Accept references to packaging materials e.g temperature sensitive, microbiological sensitive.* (2 x 1)	**(2)**

Question Number	Answer	Mark
4(c)(ii)	One mark for a characteristic One mark for the description • Modified starch used in pizza topping which thickens in the oven to prevent the sauce running off(1) and will return to being runny after cooking and cooling slightly (1) • Textured vegetable protein (TVP)is dry and easy to transport and store when manufactured (1) when mixed with water and heated takes on the texture and appearance of meat (1) • Enzymes such as invertase can change a sugar from a disaccharide (sucrose) to monosaccharides (glucose and fructose) (1) without being changed itself (1) • Stabilisers used in whipped cream combine with water (1) and slow down or prevent the cream collapsing and the water content seeping into the base e.g. (sponge) (1) • Alginates are hydrocolloids and have the ability to form a gel (1) which when added to a quiche lorraine allows it to be frozen and then thawed without it going wet as it binds the water (1) • Surfactants will improve the cleaning power of detergents (1) by increasing their wetting power by reducing surface tension when mixed with water (1) *If at least one material given in 4(c)(i) is appropriate allow follow through up to 2 marks. If no answers or two incorrect answers given in part 4(c)(i) no marks awarded for 4(c)(ii).* (2 x 1)	**(2)**

Question Number	Answer	Mark
5(a)	One mark for reason One mark for description • 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 (1) • Ability to convert from 2D (1) to produce samples(1) *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)**

Question Number	Answer	Mark
5(b)(i)	• Reduced lead times (1) • Higher production rates/efficiency(1) • Better quality output/control (1) • Complex operations can be carried out (1) • Reduced material costs (1) • Reduced waste/recycling/rework (1) • Reduced processing costs (1) • Reduced materials costs (1) • More consistent products (1) • Ability to produce bespoke/varied products (1) • Rapid prototyping (1) • Improved customer satisfaction (1) • Less chance of human error (1) • Reduced labour (1) • Increased safety (1) • Any other appropriate response *No repeats* (1 x 1) (1 x 1)	**(2)**

Question Number	Answer	Mark
5(b)(ii)	One mark for identifying the benefit One mark for how • More consistent products (1) - fewer returns (1) • Lower purchase price (1) – increased sales (1) • Shorter ordering times (1) – improved response for customer (1) • Automated ordering (1) – in-demand products available (1) • Fewer customer complaints(1) - more repeat sales(1) • Ability to order bespoke/varied products (1) - improved customer satisfaction (1) • Better communication with manufacturer (1) – less likelihood of delivery errors (1) • Receipt and movement of goods inward improved (1) – simplified tracking procedures (1) • Increased number of customer referrals (1) resulting in a larger customer base (1) *Do not accept 'easier', or 'faster/quicker' without explanation* *Low response (1) or two low responses (2) or detailed response (2), for each of the benefits* (2 x 1) (2 x 1)	**(4)**

Question Number	Answer	Mark

6(a)	• Software/hardware (1) used to organise/monitor/control production (1)
	• Technologies used to facilitate production (1) through:
	  • Continuous operation (1)
	  • Improved reproducibility (1)
	  • Increased speed (1)
	  • Work in hazardous environments (1)
	• A computerised/automated method (1) for reducing unpredictability (1)
	• Any other appropriate response
	
	Low response (1) or two low responses (2) or up to two marks for a detailed response (2)
	If example included as an extension then award 2nd mark
	e.g. Controlling production (1) such as pick and place robots (1)
	
	(2 x 1)
		(2)

Question Number	Answer	Mark
6(b)(i)	• Process control (1) • PLCs (1) • Embedded computers (1) • CIM (1) • CAD/CAM links (1) • CAM (1) • CIE (1) • Quality control (1) • Automation (1) • Expert systems (1) • Accept specific references e.g. temperature control, automated mixing. *Do not accept examples that are about handling data and information e.g. databases / spreadsheets , CAD, computers, CNC* (1 x 1)	**(1)**

Question Number	Answer	Mark
6(b)(ii)	• Cam timers (1) • Manual operations associated with the sector (1) • Manual placing (1) • Manual testing (1) • Manual recording (1) • Manual measurement (1) • Physical activity/employees (1) • Any other appropriate answer (1) *Must be a feasible replacement* *If answer in 6(b)(i) is not appropriate allow follow through* *If no answer in 6(b)(i) no mark for 6(b)(ii)* (1x 1)	**(1)**

Question Number	Answer	Mark
6(b)(iii)	One mark for identifying the benefit One mark for how Examples: • Improved safety (1) minimal human input (1) • Ability to operate in extreme conditions (1) offering new manufacturing possibilities (1) • Does not make mistakes (1) as it does not tire (1) • Less injuries (1) as robotic sensors can detect danger (1) • Other safety features may not be necessary (1) as robots operate in a variety of environments (1) / as robots work in a guarded environment (1) / as robots work in sealed/no atmosphere (1) • Less need to pay compensation for injuries (1) reduces risk of bad publicity (1) *Response must relate to hazardous conditions* *Low response (1) or two low responses (1) or detailed response (2) per benefit* (2 x 1) (2 x 1)	**(4)**

Question Number	Answer	Mark
7(a)	One mark for identifying implication Up to two marks for how • Accurate sales information (1) – instant feedback (1) higher sales (1) • Detailed customer information (1) – tailoring product to target market (1) matching customer requirements better (1) • Information for marketing strategies/campaigns (1) – choosing correct media (1) • Information for advertising campaigns (1) – model sales versus demand (1) importance of correct parameters (1) • Profit / loss information available (1) – meeting demand (1) can be shown in graphical form (1) • Ordering to meet sales faster (1) meeting on demand (1) more efficient (1) • Information overload (1) too much detail to process (1) can lead to inaccuracies (1) • Incorrect data (1) can lead to wrong decisions being made (1) when marketing products (1) • Increased computer capacity may be needed (1) to store all marketing information (1) • Recall products (1) so they can deal with problems (1) • Or any other appropriate response *Low response (1) or detailed statement (3)* (3 x 1)	**(3)**

Question Number	Answer	Mark
7(b)	One mark for identifying implication Up to two marks for how • Less likelihood of material shortages (1) – reduced down time (1) better utilisation (1) • Highlight threshold stock levels (1) – automatic ordering (1) ensures continuous supply (1) • Reduction in order complexity/lead time (1) –ability to use JIT (1) • Receipt and movement of goods inward improved (1) – simplified tracking procedures (1) • Easier to allocate materials to individual products (1) for traceability (1) • Better communication with materials supplier (1) – less likelihood of delivery errors (1) • Automatic ordering (1) could lead to purchase of obsolete materials (1) which would be wasted (1) • 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) • Reduced stock holding(1) – tracks trends / JIT (just in time) (1) • Inaccurate bill of materials / product data (1) could lead to incorrect ordering of materials (1) that will be wasted (1) • Or any other appropriate answer *Low response (1) or detailed statement (3)* (3 x 1)	**(3)**

Question Number	Answer	Mark
8(a)	An answer that makes reference to any of the following points: • To produce carbon dioxide gas (CO_2)(1) • To make the product lighter(1) • To make the product bigger (1) • Assists in raising the product(1) • Influences the pH of the baking powder (1) • Neutralises acid (1) • To open the texture of the product (1) • Makes the product better to eat (1) • Makes the product look better (1) • Allows for lower weight to volume ratios(1) • Allows a dry aerator to be manufactured (1) • It is easier to handle/store (1) • Or similar (3 x 1)	**(3)**

Question Number	Answer	Mark
8(b)	An answer that makes reference to any of the following points: • To react with the sodium bicarbonate (1) • To produce carbon dioxide at a controlled rate (1) • To produce higher levels of CO2 than sodium bicarbonate alone (1) • To control the reaction rate of the baking powder (1) • To enable single action baking powders to be produced (1) • To enable double action baking powders to be produced (1) • To make baking powders that react when mixed with a liquid (1) • To make baking powders that react when heated (1) • To allow products to remain in an unbaked condition before liberating CO2 (1) • To reduce 'aftertaste' (1) • To neutralise ingredients (1) • Reduces the risk of crumb yellowing/darkening caused by sodium bicarbonate (1) • Contributes to the quality of the product (1) • Contributes to the characteristics of the product e.g. texture, size, softness, taste (1) • Or similar (3 x 1)	**(3)**

Question Number	Answer	Mark
8(c)	An answer that makes reference to any of the following points: • To hold the baking powder (1) • To keep the baking powder dry (1) • To keep the baking powder fresh (1) • Keeps the baking powder clean (1) • To maximise usable life (1) • To protect the baking powder (1) • Easier to handle (1) • Easier to store (1) • Easier to stack (1) • Easier to display (1) • Easier to transport (1) • To promote/advertise the baking powder (1) • Provides/shows product information e.g. best before information, allergy advice, weight (1) • Reduces the risk of tampering (1) • Reduces the risk of contamination (1) • Reduce the risk of spillages (1) • Provides/shows associated information e.g. Manufacturer information (1) Recycling guidance (1) • Or similar (3 x 1)	**(3)**

Question Number	Answer	Mark
9(a)(i)	• Marketing • Materials supply and control/materials supply/materials control (*do not accept 'supply' or 'control' on its own)* *Must be in this order* (2 x 1)	**(2)**

Question Number	Answer	Mark
9(a)(ii)	• Design • Stage 1/stage one • 1/ one (1 x 1)	**(1)**

Question Number	Answer	Mark
9(b)(i)	Appropriate descriptions including three of the following points (statements must be applicable to tubs of baking powder): • Scheduling production (1) • Converting order to production (1) • Materials requirements (1) • Packaging requirements (1) • Labour requirements (1) • Deadlines (1) • Throughputs (1) • Machinery/equipment requirements (1) • Quality checks (1) • Control points (1) • Health and safety (1) • Storing (1) e.g. The stage where the manufacturer decides how the product is going to be made (1), what materials are needed (1) and what processes will be used during manufacturing (1). e.g. The stage where the specification of the baking powder is used by the planning team to set out all operations and to schedule (1) the baking powder through the production department to meet the required delivery deadlines (1). This could include ordering any special materials (ingredients) or consumables (1) and stating machinery requirements (1). *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)**

Question Number	Answer	Mark
9(b)(ii)	Appropriate descriptions including three of the following points (statements must be applicable to baking powder) : • Ensure bulk baking powder is in correct place such as a storage hoppers or bins(1) • Ensure the baking powder is the correct specification for packaging (1) • Carry out checks e.g. contamination/moisture (1) • Ensure the specified packaging materials are in the correct location (1) • Check packaging equipment is working correctly (1) • Check all item packaging is correct e.g. lid seals, bag seals, codes etc • Carry out unit weight checks (1) • Carry out product counts (1) • Transfer packaged products to correct location (1) • Placing tubs into cardboard outers (1) • Sealing outers (1) • Coding outers (1) • Storage of baking powder (1) • Application of bar codes, dispatch codes etc (1) • Stock rotation (1) • Picking customer orders (1) • Assembly of customer orders (1) • Carry out final quality checks (1) • Checking orders against products dispatched (1) • Loading vehicles (1) • Completing invoice information for finance department (1) • Filing dispatch records(electronically or manually) (1) e.g. At this stage the baking powder would be deposited into tubs (1) then the correct number of tubs placed into cardboard outers (1) ready for the order to be dispatched to retail customers (1). e.g. The outers containing the tubs of baking powder might be placed directly onto pallets (1) the outers would be bar- coded (1) and counted (1). e.g. Records of the quantity packaged would be kept on the computer (1) the details of what was sent to the customer would be recorded (1) an invoice would then be sent to the customer to ask for the money that they owe (1). *Do not accept answers relating to the use of baking powder or products containing baking powder* *Accept answers that link packaging and dispatch* *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)**

Question Number	Answer	Mark
10(a)	Specific materials used as inert filler • Rice flour • Flour • Wheat flour • Plain flour • Cornstarch • Cornflour • Starch • Any other appropriate inert filler *Accept any recognisable spelling (phonetic) of the answers above* *Do not accept generic answers, i.e. powders* (1 x 1)	**(1)**

Question Number	Answer	Mark
10(b)(i)	Any three of the following: • Preparing sodium bicarbonate e.g. Solvay ammonia process, vacuum filtration, centrifuge • Preparing acids/bases • Preparing inert filler • Collating / collecting materials • Weighing the materials/ingredients • Measuring the materials/ingredients • Transferring base materials to blender/mixer e.g. via pipe work using vacuum, conveyors • Transfer blended /mixed baking powder to hoppers e.g. via pipe work using vacuum, conveyors • Dispensing/depositing /filling into packaging • Transfer to storage / warehouse. • Other appropriate process *1 mark per response up to 3* *Accept any recognisable spelling (phonetic) of the answers above.* (3 x 1)	**(3)**

Question Number	Answer	Mark
10(b)(ii)	Appropriate explanation including three of the following points: • Faster production rates • More efficient • More consistent product • Improved quality • Fewer complaints • Creates an homogenous product • Reduces of moisture entering product • Reduces risk of foreign matter entering the product • Less waste / rejected product • More reliable product • Increased customer confidence • Lower costs • Reduced manual handling • More hygienic /cleaner • Reduced risk of dust inhalation • Safer manufacturing operations • Or similar e.g. automated blending-mixing is a more efficient (1) way of making baking powder it provides a more consistent product (1) which is very reliable (1) when used by the customer e.g. faster production rates (1) are achieved using automated blending-mixing methods costs are reduced (1),it can be safer as there is less risk of powders being inhaled (1) 1 x1 mark low response, or up to 3 marks for detailed response. (3 x 1)	**(3)**

Question Number	Answer	Mark
10(c)	An explanation that makes reference to three of the following points: • Higher quality product • Better functionality • Longer lasting / durable • More consistent product • More accurate product • More reliable product • Safer product • Lower costs • Increased efficiency • Lower purchase price • Lower selling price • Allows for product guarantee • Allows for increased range/variation of product • Ability to produces be-spoke products e.g. single stage baking powders , two stage baking powders ,slow acting baking powders • Allows production of 'free flowing' baking powders • Appropriate-sized product • Quicker delivery times • Longer shelf life • Or similar e.g. The use of modern materials has meant that a wider range (1) of more reliable (1) and more cost effective (1) products to be made *1 x 1 mark low response, or up to 3 marks for detailed response* (3 x 1)	**(3)**

Question Number	Answer	Mark
11(a)	• The use of systems (1) to control: (i) Machinery (1) (ii) Processes (1) • The use of control systems (1) to replace human operators (1) • The ability of a process (1) to operate without the need for human sensory input (1) • Mechanical devices that are operated electronically (1) and function automatically (1) • Or similar *Low response (1) or two low responses (2) or up to two marks for a detailed response (2)* *If example included as an extension then award 2nd mark* *e.g. Controlling processes (1) such as using conveyor systems (1)* (2 x 1)	**(2)**

Question Number	Answer	Mark
11(b)(i)	Must have relevant automation technology link Examples of automation: • PLCs (1) to control processes in production (1) • Automated weighing of (1) of the main ingredients (1) • Use of conveyor systems (1), vacuum pipes (1), to move the powders from one process to the next (1) • Automated filling (1) the correct weight into packaging such as small tubs (1) • Embedded computers (1) to perform dedicated functions (1) • Remotely operated vehicles (1) moving packaged baking powder to dispatch or storage (1) • Any similar *Do not accept 'CIM' or 'CNC' without links to Automation* *Must relate to the production stage* *Low response (1) or two low responses (2) or detailed response (2) per example* (2 x 1) (2 x 1)	**(4)**

Question Number	Answer	Mark
11(b)(ii)	Must be appropriate to those described in (b)(i) and relate to the manufacturer, e.g. • Flexible production (1) leads to meeting customer requirements better (1) • Consistent results and quality (1) achieved through accurate use of technology (1) • Reduced human intervention (1) of plant means safer operation (1) • Accurate mixing (1) better weight control(1) • Reduced labour costs (1) as less people involved (1) • Safer method (1) as humans have less exposure to dust from powders (1) • Reduced customer complaints (1) as better quality product (1) • Control of costs (1) - lower unit cost as less waste (1) • Retailer confidence (1) through less complaints (1) • Customer confidence increased (1) through more reliable systems • Reduced waste (1) as less mistakes being made (1) • Reduced energy costs (1) through increased efficiency (1) • Improved production rates (1) through reduced downtime (1) • Gives customers a variety of products in a quicker time (1) as faster production changeovers (1) *If answer in 11(b)(i) is inappropriate, allow follow through up to one mark. If no answer given in (b)(i), no mark.* *Low response (1) or two low responses (2) or detailed response (2)* (2 x 1)	**(2)**

Question Number	Answer	Mark
11(b)(iii)	Must be appropriate to those described in (b)(i) and relate to the consumer, e.g. • Consistent product (1) - controlled better (1) • Product reliability (1) - more likely to be produced to specification (1) • Reduced delivery times (1) as manufacturer can vary product to meet demand (1) • Lower retail prices (1)as manufacturer has less waste (1) • Quicker production methods(1)allow for customer discounts through promotions(1) • Better availability(1) due to faster throughput(1) • Better quality(1) through improved process control (1) • Better value(1) because production costs are reduced allowing for lower prices to be charged(1) • Product guarantee (1) as confidence in process (1) • Customer satisfaction (1) because of consistent products (1) *If answer in 11(b)(i) is inappropriate, allow follow through up to one mark. If no answer given in (b)(i), no mark.* *Low response (1) or two low responses (2) or detailed response (2)* (2 x 1)	**(2)**

Question Number	Answer	Mark
11(c)	• Mechanisation provides assistance (1) with the muscular requirements of work only (1) • The use of operator controlled machines (1) to replace manual labour (1) • The use of machines (1) which are not automated (1) • Or similar Eg. Using automation, the blending-mixing of the baking powder would be monitored by a control system (1), whereas mechanisation would only involve the use of a mechanical batch mixer (1) *Must refer to 'mechanisation' or 'machines' not just 'automation'* (2 x 1)	**(2)**

Question Number	Answer	Mark
12(a)(i)	• Mobile phone/infrared/bluetooth • Email/messaging • Internet/wireless/Wi-Fi • Video conferencing • EDI • ISDN • Texting • Phone • Walkie talkie • Fax • VoIP/Skype *1 mark per relevant type* *Do not accept: TV, CAD, radio, computer laptop/ database, EPOS* (2 x 1)	**(2)**

Question Number	Answer	Mark
12(a)(ii)	One mark for identifying the benefit One mark for how • Mobile phone – can talk to client when needed (1) flexibility/roaming location (1) • Email – can send or receive instructions that are accurate/can get or send written confirmation of instructions (1) immediate permanent record (1) • Internet – can order immediately/in real time (1) immediate vast access to information for inspiration/ideas etc (1) • Video conferencing – no travel expenses/less time wasted in travelling (1) but has face to face contact (1) • EDI – immediate transfer of information for prototyping or to suppliers/no hard copies needed/less storage space (1) by use of secure on-line facilities (1) • ISDN – more data transferred in parallel (1) faster response rate with supplier through use of technology (1) • Texting – can refer back to what message was given (1) stored record of transaction (1) • Phone – can clarify and confirm without having to re-visit the discussion later (1) immediate two way conversation (1) • Walkie talkie can clarify and confirm without having to re-visit the discussion later (1) immediate two way conversation/flexibility/roaming location/cost (1) • Fax – can refer back to what message was given (1) stored record of transaction (1) • VoIP/Skype – can see images (1) and can use other functions on computer (1) Other benefits may be seen in the light of: • Speed, accuracy, information retrieval, meeting consumer deadlines, reduced lead times, fast exchange of ideas, opinions or any other appropriate reason *Answer must relate to technology given in 12(a)(i), up to 2 marks* *If only one mark is awarded for 12(a)(i) allow follow through* *If 12(a)(i) is not answered no mark awarded for 12(a)(ii)* (2 x 1)	**(2)**

Question Number	Answer	Mark
12(b)(i)	One application such as: • Raw material checks • Weight checks • Gassing power checks • Appearance (visual) checks e.g. colour • Functional checks • Contamination checks • Positional checks e.g. product codes, bar codes • Printing checks on packaging • Testing against specification e.g. taste, Ph, alkalinity, moisture level, microbiological, • Carry out metal detection checks • Carry out coding checks • Checking lid seals • Or similar *Must be within production stage* (1 x 1)	**(1)**

Question Number	Answer	Mark
12(b)(ii)	Description of quality check such as: • Check weights of each ingredient (1) against the product specification (1) • Carry out tests on the gassing power (1) to check the correct amount of Co2 is being liberated (1) • Check speed of gas production (1)under varying conditions e.g. hot and cold (1) • Check the colour of the baking powder(1) using colour charts or meters (1) • Check the powder is free flowing (1) and free of lumps (1) • Visually check product (1) and bar codes are readable and in the correct positions(1) • Check printed packaging is free from defects (1) and colours are correct(1) • Using appropriate apparatus such as Ph meter (1) to check the acidity/alkalinity (1) • Carry out metal detection checks(1) using test products (1) • Checking best before codes(1) visually(1) *If no answer or incorrect answer for 12(b)(i) allow follow through up to 1 mark for a correct answer to 12 (b)(ii)* *Low response (1) or two low responses (2) or detailed response (2)* (2 x 1)	**(2)**

Question Number	Answer	Mark
12(b)(iii)	An explanation that makes reference to three of the following points: • Safer product to use • Easier product to use • Confidence in product reliability • Consistent product • Helps to maintain standards • Enables product to remain in good condition • Longer usable life • Reduces rate of deterioration • Product reliability • Confidence in the company • Lower prices • Information is easier to read and understand • Any other appropriate response *Must relate to the end user* (3 x 1)	**(3)**

Question Number	Answer	Mark
13	An evaluation that makes reference to a combination of four of the following points to a maximum of four marks; **Workforce**: • Less jobs • Change in skills • Less employment for unskilled • Change in size • Retraining often required • Job insecurity • Different skills needed • Change in work patterns • Increased travel to work centralisation • Working pattern/ 24/7 operation • Less repetitive/boring work • Any other appropriate response **Working environment**: • Safer • Less dust in atmosphere • Cleaner • Quieter • Healthier • Noise pollution • Any other appropriate response *A maximum of 3 marks if only workforce/working environment considered* (4 x 1)	**(4)**

Question Number	Answer	Mark
14	**Indicative content** Discussion may address the following issues: • *Issue* ▪ Use of ICT enables a faster time to market for a wider range of baking powders • *Development* ▪ Product proliferation causes problems with using up resources and/or energy ▪ Over production causes waste in manufacture and results in waste to landfill ▪ Internet marketing encourages consumerism • *Issue* ▪ Use of modern and smart materials enabling a larger variety of baking powders • *Development* ▪ Marketing of modern/smart materials with appealing characteristics/printing effects encourages further consumerism ▪ Problems associated with recycling chemicals ▪ Irresponsible disposal of baking powder packaging causes litter and land pollution (landfill) • *Issue* ▪ Use of systems and control technology enabling more efficient production • *Development* ▪ Continuous production increases energy consumption • Or other appropriate answer/s (6 x 1)	**(6)**

Level	Mark	Descriptor
	0	No material deserving of reward
1	1-2	Learner identifies the issue(s) with no development OR identifies and develops one issue. Shows limited understanding of the issues. The learner uses everyday language and the response lacks clarity and organisation. Spelling, punctuation and the rules of grammar used with limited accuracy.
2	3-4	Learner identifies some issues with associated developments showing some understanding of the issues. The learner uses some technological/manufacturing/environmental terms and shows some focus and organisation. Spelling, punctuation and the rules of grammar used with some accuracy. Some spelling errors may still be found.
3	5-6	Learner identifies a range of issues with associated developments showing a detailed understanding of the issues, including those associated with the conflict between efficient/modern technologies and sustainability. The learner uses a range of appropriate technological/manufacturing/environmental terms and shows good focus and organisation. Spelling, punctuation and the rules of grammar used with considerable accuracy.

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