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GCSE

GCSE Engineering & Manufacturing (5318/02)

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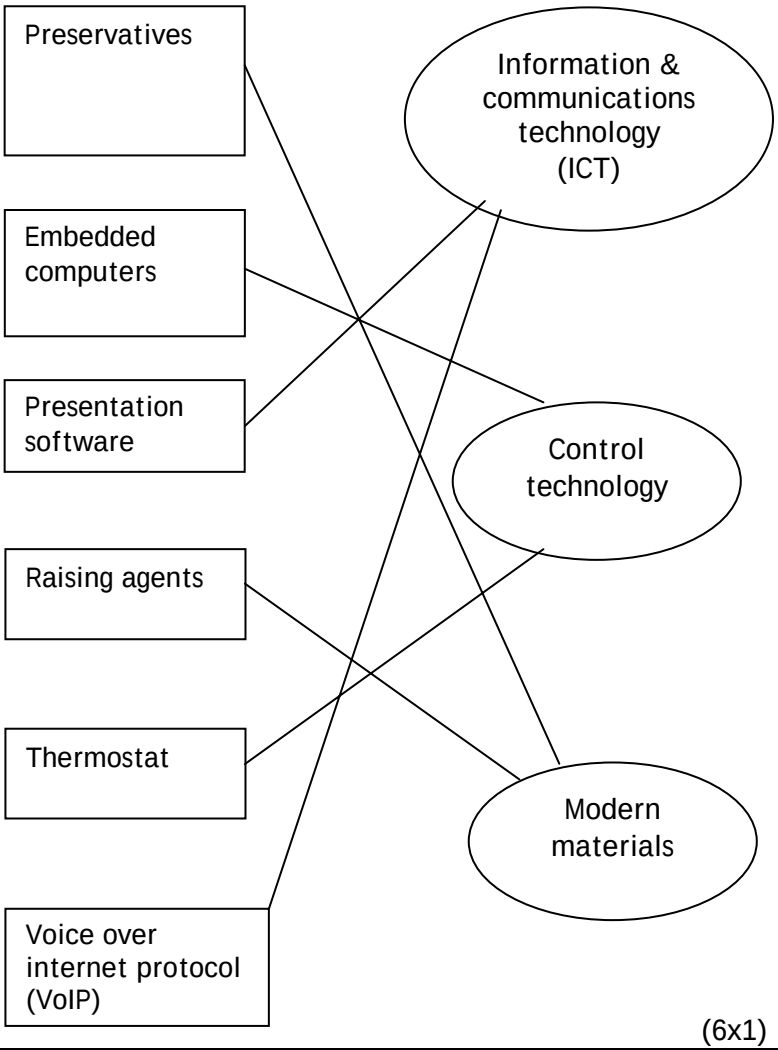
Section A

Question Number	Answer	Mark
1(a)	• Pasta sauce (1) • Ginger beer (1) *If three boxes ticked max marks = 1 mark.* *If 4 boxes or more ticked no marks.* (1x1) (1x1)	(2)

Question Number	Answer	Mark
1(b)	• Toilet bleach (1) • Insect spray (1) *If three boxes ticked max marks = 1 mark.* *If 4 boxes or more ticked no marks.* (1x1) (1x1)	(2)

Question Number	Answer	Mark
2(a)	• Sieve (1) • Hand sieve (1) • Sifter (1) • Strainer (1) Accept any answer that makes reference to sieving, sifting or straining e.g. Flour sieve or sifter Sugar sieve or sifter Strainer for soup, lumpy gravy, sauces etc *Accept any recognisable spelling (phonetic) of the answer above e.g. siv, sive, civ, seev, seaver* *Do not accept 'colander', 'drainer, filter* (1x1)	(2)
	• Vegetable peeler (1) • Fruit peeler (1) • Peeler (1) • Peeling tool (1) Accept any answer that makes reference to peeling e.g. • Apple peeler • Parsnip peeler • Potato peeler • Hand peeler • Skin peeler *Accept any recognisable spelling (phonetic) of the answers above e.g. peiler, pealer,* **Do not** accept 'knife', 'slicer', 'vegetable knife', 'cutter', 'chopper'. (1x1)	

Question Number	Answer	Mark
2(b)	An answer that makes reference to two of the following points: • To drain water from vegetables after cooking / boiling prior to further processing • To wash / clean / drain salad ingredients such as lettuce • To wash / clean / drain fruits such as strawberries • To wash / clean / drain vegetables prior to cooking such as cabbage • To wash / clean rice prior to cooking • To drain water from rice, pasta or similar after boiling / cooking • To cool vegetables, rice, pasta etc, prior to further processing • To steam vegetables e.g. (i) Used to drain the water from cooked pasta (1) and allowed to cool before being made into pasta salad (1) (ii) Used to wash (1) and drain salad ingredients (1) (iii) To drain potatoes after boiling (1) before mashing (1) (1x1) (1x1)	
	An answer that makes reference to two of the following points: • To remove steam generated from cooking ingredients such as vegetables, pasta, rice • To extract cooking smells e.g. from fish • To remove smoke from cooking process e.g. frying, smoking • To reduce risk of activating smoke/ fire alarms • To keep the air in the cooking area clean • To protect workers from inhaling potentially harmful fumes (health and safety) • To help reduce condensation build up in work / processing areas • To help keep cooking area cool • To provide lighting when cooking e.g. (i) To get rid of the steam from boiling potatoes (1) and reduce condensation building up in production area which cause dampness and mould (1) (ii)To remove cooking smells such as from fish (1) keeping the air clean to breath (1) (iii) If something burns it will help remove smoke from the work area (1) and the staff will not have to inhale harmful fumes (1) (1x1) (1x1)	(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.* **Term** **Key Area**  (6x1)	(6)

Question Number	Answer	Mark
4(a)(i)	Appropriate **product** such as e.g. • Bread rolls (1) • Sponge cakes (1) • Ice cream (1) • Yoghurt (1) • Biscuits (1) • Sausages (1) • Carbonated drinks (1) • Gravy mixes (1) • Packet soups (1) • Chilled ready prepared meals (1) • Frozen pizza (1) • Quiche (1) • Cake mixes (1) • Bread mixes (1) *Accept brand name of a specific product.* *This list is not exhaustive; accept any product associated with the food and drink sector.* *Do not accept ' ingredients' eg flour sugar, milk, butter, salt, emulsifier unless as part of pre– mix etc* (1x1)	(1)

Question Number	Answer	Mark
4(a)(ii)	Appropriate explanation of what the product does, may include reference to features and function Examples: • Bread rolls; used by large scale sandwich manufacturers(1) which can be eaten by consumers as a quick lunch snack(1) • Sponge cakes; used in trifles (1) by large scale manufacturers which can frozen and packaged for sale in supermarkets as an ready prepared dessert (1) • Ice cream; eaten by consumers to cool down (1) and as addition to a dessert such as apple pie (1) *If product given in 4(a)(i) is not from this sector but is from one of the other engineering / manufacturing sectors then allow follow through, up to one mark.* *No answer to 4(a)(i) no mark for 4(a)(ii)* (1x1) (1x1)	(2)

Question Number	Answer	Mark
4(b)(i)	• design (1) marketing (1) production planning (1) materials – supply and control (1) processing / production (1) assembly / finishing (1) packaging / dispatch (1) *If product given in 4(a) (i) is not from this sector but is from one of the other engineering / manufacturing sectors then allow follow through.* *No answer to 4(a)(i) no marks for 4(b)(i)* *Accept a process as long as it has an inferred link to computer – integrated that is within any of the stages e.g. weighing, mixing, blending, depositing cooking, baking, cooling, creaming, enrobing, chilling, freezing, etc.; must be appropriate to the product stated in 4(a)(i)* (1x1)	(1)

Question Number	Answer	Mark
4(b)(ii)	One mark for identifying advantage One mark for why Appropriate advantage to the manufacturer e.g. **Design, marketing, production planning, materials – supply and control, processing/production, assembly/finishing, packaging/dispatch** **design** • better designs (1) – can link other information into the process (1), or best designs can be maximised 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) **marketing** • accurate information (1) – less mistakes made in capturing data (1) • better / accessible knowledge base (1) – easy data entry / data analysed easy (1) • increased sales (1) through advertising (1) **production planning** • speed (1) – faster than human application (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 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 (1) • efficiency (1) – by less waste / faulty parts (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 parts (1) • efficiency (1) – by less waste / faulty parts (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 parts (1) • efficiency (1) – by less waste / faulty parts (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)* *If the answer in part 4(b)(i) is not a manufacturing stage allow follow through up to 2 marks.* *No answer to 4(b)(i) no marks for 4(b)(ii)* (1x1) (1x1)	(2)

Question Number	Answer	Mark
4(c)(i)	• Modified starches (1) • Preservatives(1) • Emulsifiers (1) • Antioxidants(1) • Gums (1) e.g. Guar, Locust bean • Enzymes(1) • Stabilizers (1) • Mould Inhibitors (1) • Chemical Aerators (1) • Flavour enhancers (1) • Additives (1) • Other appropriate materials / material currently used for the given application *Accept brand name of a specific material* *If product given in 4(a)(i) is not from this sector but is from one of the other engineering / manufacturing sectors then allow follow through.* *No answer to 4(a)(i) no marks for 4(c)(i)* (1x1)	(1)

Question Number	Answer	Mark
4(c)(ii)	One mark for identifying an improved characteristic One mark for how • Functional characteristics – weight (1) / size (1) / shelf life (1) / protection (1) / eating quality eg taste, smoothness, softness, chewy, crunchy etc. (1) • Aesthetic characteristics – texture (1) / colour (1) / appearance (1) / finish(1) / shape (1) • Reduced weight (1) – to size ratio (1) eg same size product but weighs less than original (1) • Reduced cost (1) – quicker to manufacture / assemble (1) / finish (1) • Better appearance (1) – brighter (1) / attractive finish (1) • Any other appropriate functional / aesthetic characteristic relating to the improvement (1) *If answer in part 4(a)(i) is inappropriate but the material given in 4(c)(i) is appropriate allow follow through up to 2 marks. If no answer is given in part 4(a)(i) but the answer to part 4(c)(ii) relates to the material stated in part 4(c)(i) allow follow through up to 1 mark. If no answer or incorrect answer given in part 4(c)(i) no marks awarded for 4(c)(ii)* (1x1) (1x1)	(2)

Question Number	Answer	Mark
5(a)(i)	*One mark per relevant example* • to create virtual products (1) • to produce design drawings (1) • to create 2 or 3D designs (1) • for modelling (1) • to show ideas (1) • to show new product concepts (1) • to modify existing products (1) • to prepare an initial product specification (1) • to animate designs (1) • to simulate products (1) • to create packaging designs (1) • to create virtual packaging (1) *Do not accept software names on their own; do not accept 'software' without explanation e.g. 2D design software / package; do not accept 'design' or 'designing' on its own.* (1x1) (1x1)	(2)

Question Number	Answer	Mark
5(a)(ii)	One mark for identifying benefit One mark for how • accurately drawn (1) entry of accurate data on sizes (co–ordinates) (1) • quicker development time (1) – through simulation (1) • easier to communicate (1) – 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) • easy storage of data / information and retrieval (1) – interaction with databases (1) • conversion from 2D to 3D (1) for modelling (1) • respond to customer requests(1) to design new ideas quickly (1) • to estimate manufacturing costs (1) and calculate product prices (1) *Low response (1) or two low responses (1) e.g. its quicker and more accurate (1) or detailed response (2)* *Must relate to one of the examples given and to the manufacturer. If answer in part 5(a)(i) is inappropriate allow follow through up to 2 marks. If no answer given in part 5(a)(i) allow follow though up to 1 mark.* *Do not accept 'easier' without explanation* (1x1) (1x1)	(2)

Question Number	Answer	Mark
5(b)(i)	*One mark per relevant example* • Fax (1) • Mobile phone / infra –red / blue tooth (1) • Email / messaging (1) • Internet / wireless / WI–FI (1) • Video conferencing (1) • Electronic point of sale (EPOS) (1) • EDI (1) • ISDN (1) • Texting (1) • Phone (1) • Walkie Talkie (1) • Voice over internet protocol – VoIP (1) *Do not accept: TV, CAD, Radio, database, computer, laptop, spreadsheets* (1x1) (1x1)	(2)

Question Number	Answer	Mark
5(b)(ii)	One mark for identifying benefit One mark for how • Mobile phone – can talk to supplier 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 and check stock immediately / in real time (1) immediate vast access to information (1) • Video conferencing –no travel expenses / less time wasted in travelling (1) but has face to face contact (1) • Electronic point of sale (EPOS) – faster / more accurate control of stock (1) automatic reading of bar codes (1) • EDI – immediate transfer of information / 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) **Other benefits may be seen in the light of;** Speed, accuracy, JIT, information retrieval, meets consumer demands, quicker, increased sales, reduced stock levels, reduced running costs, reduced lead times, calculation of sales, stock taking quicker / easier, storage space reduced or any other appropriate response *Must relate to one of the examples given and to the manufacturer. No answer in 5(b)(i) no marks, otherwise, allow follow through to one mark. 2 low responses 1 mark only.* (1x1) (1x1)	(2)

Question Number	Answer	Mark
6(a)	• Materials that have one or more properties that can be significantly changed in a controlled fashion(1) by external stimuli, such as stress, temperature, light, moisture, pH, mixing, pressure (1) • Materials that sense environmental conditions (1) and respond to them (1) • Materials that appear to 'think' (1) or have some 'memory' (1) • Or other appropriate response *Low response (1) or two low responses (2) or up to two marks for a detailed response (2); 1 mark only for naming a smart material related to the sector, i.e. thermochromic ink, anodised aluminium, smart wire, shape memory alloys, ph sensitive polymers, polymorph, carbon fibre, phosphorescent pigments, holographic card, microfibres, laminated fabrics, intelligent garments, piezoelectric material, thermoresponsive materials etc* (1x1) (1x1)	(2)

Question Number	Answer	Mark
6(b)	One mark for identifying the benefit One mark for how • reduced ordering times (1) – automatic monitoring (1) • improve quality / accuracy (1) – 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) • safer processes (1) – less manual input (1) • collecting manufacturing data/information (1) – continuously to aid management (1) • quicker identification of faulty products (1) – reducing numbers of rejects (1) • lower risk of human error (1) – more consistent quality (1) *Do not accept 'easier' without explanation.* Do not allow repetition *Low response (1) or two low responses (2) or detailed response (2), for each of 3 benefits* (2x1) (2x1) (2x1)	(6)

Question Number	Answer	Mark
7(a)	One mark for each point made up to 2 marks such as: • 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) • X ray machines (1) to detect foreign bodies (1) • Metal detectors (1) are used to check the products are safe (1) • Automated temperature controls on freezers / refrigerators / ovens / cookers etc (1) are used to monitor / adjust the process to ensure safe temperatures are achieved (1) • Or any other appropriate response *Low response (1) or two low responses (1) or detailed response (2)* (1x1) (1x1)	(2)

Question Number	Answer	Mark
7(b)	One mark for each point made up to 2 marks such as: • Accurate sales information (1) for instant feedback (1) • Detailed customer information (1) to tailor product to target market (1) • Information for marketing strategies / campaigns (1) to enable choice of correct media (1) • Information for advertising campaigns (1) and modelling sales versus demand (1) • Profit information available (1) and predicting demand for popular products (1) • Ordering to meet sales faster (1) for a just in time response (1) • large amounts of data available (1) • fewer errors (1) • Or any other appropriate response *Low response (1) or two low responses (1) or detailed response (2)* (1x1) (1x1)	(2)
	Total marks for section A	45

Section B

Question Number	Answer	Mark
8(a)	An answer that makes reference to three of the following points: • Protecting the product from damage (1) • Keeping the product clean (1) free from contamination (1) • Keeps the product fresher for longer (1) • Keeps the product moister for longer (1) • Increases the shelf life of the product (1) • Improves eating qualities (1) • Easier to handle (1) transport (1) store (1) pack into outer cartons (1) display at point of sale (1) • Provides consumer information about product – product name (1) Product illustration (what it looks like) (1) nutritional information (1) guideline daily amounts (GDA) i.e. calories, sugars, fats, saturated fat, salt (1) ingredients (1) heating instructions (1) recycling information (1) quality guarantee (1) manufacturer / retailer details (1) allergy advice (1) suitability for specific consumers e.g. vegetarians (1) 'best before' information • Provides retailer information – bar code for stock control (1) price (1) ISBN (1) manufacturing codes e.g. traceability (1) • Better marketing and sales (1) attracts the customer to the product (1) attracts the customer to the brand (1) makes the retailer want to stock the product (1) • Or any appropriate response (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
8(b)	An answer that makes reference to three of the following points: • Taste / flavour e.g. sweet, sour (1) • Texture e.g. moist, firm fruit, 'chunky', (1) • Smell / aroma (1), gel (1) • Source of: fibre (apples) (1), energy (sugars / starches (1), fluid (water) (1) • Appearance i.e. colour (1), pieces of apple(1) gel (1) • Nutrition / health e.g. source of fruit (1), low fat (1) low salt (1) • Satisfies hunger needs (1) • Encourages sales (1) • Compliments pastry (1) • To give bulk to the pies (1) • Or any appropriate response (1) (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
9(a)(i)	• Production Planning (accept 'Planning' on its own ; do not accept 'Production' on its own) • Materials supply and control / materials supply/control / material supply + control (accept 'Materials supply' or 'Materials control' but not 'supply' or 'control' on its own) *Must be in this order.* (1x1) (1x1)	(2)

Question Number	Answer	Mark
9(a)(ii)	• Packaging and Dispatch / P and D (1) • Dispatch (1) • Stage 7 / stage seven (1) • 7 / seven (1) *Accept any recognisable spelling (phonetic) of the answers above.* *Do not accept 'packaging' on its own* (1x1)	(1)

Question Number	Answer	Mark
9(b)(i)	Appropriate descriptions including three of the following points: <u>Design</u> • Development of the design brief (product and/or packaging) (1) • Design specification for the mass produced boxes of small apple pies(product and/or packaging) (1) • Listing design criteria(product and/or packaging) (1) • Listing performance requirements(product and/or packaging) (1) • Use of internet / websites to investigate existing designs (product and/or packaging) (1) • Obtaining samples of competitors products to examine(1) • Sketches are produced by hand (product and/or packaging) (1) • Initial design ideas are produced(product and/or packaging) (1) • Development of design ideas (product and/or packaging) (1) • Modelling ideas using ICT (1) • Using CAD software (1) • Prototyping / making samples before manufacture (product and/or packaging) (1) • Sourcing materials e.g. ingredients (1), packaging (1) / supplies / consumables (1) • Costing resource requirements (1) • Communicating with client / customer (1) • Able to make quick changes (1) • Or any appropriate response *Example:* *The stage where the design brief for the filling used in the mass production of boxes of small apple pies would be developed (1) and where the packaging designs would be created (1), in order to make samples / prototypes prior to manufacture (1).* *Up to 3 marks* *Low response (1) or three low responses (3) or up to three marks for a detailed response (3)* (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
9(b)(ii)	Appropriate descriptions including three of the following points: <u>Production</u> • Use of available resources (1) e.g. labour (1) • Materials (ingredients), parts and components used e.g. foils (1) • Processes that are used (1) • Use of available equipment and machinery (1) • Following the sequence of production (1) • Following the production plan (1) • Carrying out inspection (1) and quality control (1) • Complying with health and safety factors / legislation (1) • Complying with hygiene and food safety factors / legislation • Where the ingredients (for pastry and / or filling) are weighed (1) • Where the ingredients (for pastry and / or filling) are mixed (1) • Where the pastry cases are shaped (blocked / stamped) (1) • Where the filling is deposited into the pastry cases (1) • Where the pastry lids are applied / attached (1) • Where the pies are glazed or sugared (1) • Where the pies are baked (1) • Where the pies are sprinkled with sugar (1) • Where the pies are cooled (1) • Or any appropriate response but must be related to the manufacture of mass produced boxes of small apple pies. *Example:* *The pastry and filling ingredients would be weighed (1) and mixed (1), these would be quality checked (1) before being made into the pies.* *Up to 3 marks* *Low response (1) or three low responses (3) or up to three marks for detailed response (3)* (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
10(a)	Ingredient commonly used to make a gel thicken the apple pie filling. • Modified maize starch (1) • Modified starch (1) • Pre–gelatinised starch (1) • Maize starch (1) • Corn flour (1) • Corn starch (1) • Sodium alginate (1) • Alginate (1) • Arrow root (1) *Do not accept generic terms, i.e. 'starch', 'flour', 'thickener', 'gelling ingredient/ agent', 'stabiliser', 'emulsifier'* *Accept any recognisable spelling (phonetic) of the answers above.* (1x1)	(1)

Question Number	Answer	Mark
10(b)(i)	Any three of the following: • Mixing pastry (1) • Mixing / blending filling (1) • Dividing / extruding pastry (1) • Blocking / forming pastry into pie shape (1) • Depositing filling (1) • Lidding (utilising extrusion, sheeting, pinning of the pastry) (1) • Pre-bake finishing i.e. application of glaze, sugar (1) • Baking (1) • Post bake finishing i.e. application of sugar, glazes (1) • Assembly of the pies (1) • Any other appropriate response 1 mark per response up to 3 *Accept any recognisable spelling (phonetic) of the answers above.* *Do not accept 'boxing' or 'packaging'* (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
10(b)(ii)	An explanation that makes reference to two of the following points: • faster production rate • improved efficiency • improved productivity • lower unit cost • better quality • consistent products • less waste materials • fewer reject / sub–standard products • more reliable process • not labour intensive • better control of costs • better stock control of ingredients • better ordering of ingredients • control of yields • improved reconciliation • maintains products conformance / weight legislation • any other appropriate benefit *1 x 1 mark low response, or up to 3 marks for detailed response* (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
10(c)	An explanation that makes reference to three of the following points: • Aesthetics – colour, shape, crimp, embossing etc • Taste / flavour improvement / enhancement • Texture improvement • Improved eating quality • More consistent product • Longer usable life / increased shelf life • Safer to eat • Lower prices • Better availability • Heath related factors i.e. lower fats / sugars / salt, increased fibre • Environmental factors i.e. biodegradability / degradability • improved packaging materials • better printing materials • better packaging designs • better construction of packaging • Any other appropriate response *Up to 3 x 1 mark low responses or up to 3 marks for a detailed response* (1x1) (1x1) (1x1)	(3)

Question Number	Answer	Mark
11(a)(i)&(ii)	One mark for **identifying** each QC procedure One mark for **how** the appropriate procedures are carried out and any appropriate equipment (where it is an essential part of the QC procedure) is used. • Checking for physical damage (1) – by visual inspection (1) or checking against prototype (1) / first–off (1)/ template (1) / photograph (1) specification (1) etc at any appropriate stage in the manufacturing process. • Temperature checks at any appropriate stage in the manufacturing process – ingredients, mixes, baking, cooling (1) etc • Ingredient / pastry / filling checks (1) – Mixing times (1) temperature (1), viscosity (1), extensibility (1) pliability(1), standing / storage time (1) etc • Size check/s (1) – by direct measurement i.e. ruler (1) by gauging / templates / optical sensors (1) etc • Shape checks (1) – distortion (1) crimp (1), foil size (1) etc • Weight checks (pastry using scales– pastry / filling / product / pack (1) or any other appropriate stage. • Eating quality checks (pastry. filling, product) – flavour / taste (1), texture (1) etc • Functional / process / equipment check/s (1) – settings and operation of; pastry dividers / extruders(1), blocking dies (heaters / compressed air) (1) filling depositors (1), pastry sheeters (1), rotary moulders (1) oven settings (temperature, time / dampers / burners etc), cooler settings (1) etc • Packaging checks (1) seals (1) coding (1) print quality (1) correct packing e.g. number in carton (1) etc • Any other appropriate QC procedure; EG METAL DETECTION CHECKS (1), X RAY CHECKS(1), BACTERIOLOGICAL CHECKS(1) *Must be within production stage.* (2x1) (2x1)	(4)

Question Number	Answer	Mark
11(b)(i)&(ii)	One mark for identifying benefit to the manufacturer One mark for how / explanation; • Reduced customer / consumer complaints (1) – accurate products (1) • Control of costs (1) – cheaper product (1), more profit (1) • Avoids faulty products being packaged and sent to retailer (1) – early detection out of specification products (1) • Increased sales (1) – consistent product (1) able to charge lower prices (1) • User / consumer confidence increased (1) – consistent product / fewer returns (1),more repeat sales(1) • Reduced waste (1) – control of manufacturing processes (reduced selling prices / better profit margins) (1) • Made to same quality standard (1) • Reliable product (1) – monitoring standards / testing (1) • Detection of broken machinery (1) – less damaged product (1) • Increased output/productivity (1) increased profit (1) • Safer products are produced (1) less risk of causing illness in customers (1) • Any other appropriate response Do not accept repetitive responses *2 x 1 marks for low responses (1) or 2 x 2 marks for detailed responses* *If no answer or inappropriate answer is given in 11(a)(i) or 11(a)(ii) allow follow through up to 1 mark for each benefit.* (2x1) (2x1)	(4)

Question Number	Answer	Mark
11(c)(i)&(ii)	One mark for identifying benefit to the retailer One mark for how / explanation; • Safer product (1) **–** confidence in product reliability (1) • Consistent product (1) – assured that standards are being met (1) • Higher quality product (1) – easier to sell (1) • Fewer returns (1) – less time spent on documentation (1) • Less requirement to check goods inward (1) – lower costs (1) • Confidence in the manufacturer (1) – less requirement to source from several companies (1) • Improved reputation (1) – repeat purchases (1) • Increased sales (1) – increased profits (1) • Customer satisfaction (1) – greater market share (1), fewer complaints (1) • Consumer awareness of manufacturers reputation for quality making product easier to sell (1) • Any other appropriate response Do not accept repetitive responses *2 x 1 marks for low responses (1) or 2 x 2 marks for detailed responses* *If no answer or inappropriate answer is given in 11(a)(i) or 11(a)(ii) allow follow through up to 1 mark for each benefit.* (2x1) (2x1)	(4)

Question Number	Answer	Mark
12(a)(i)	• Smaller in size (1) • Higher level of skills / better educated less employment for unskilled (1) • Work patterns (1) • Higher pay (1) • Any other appropriate response (1x1)	(1)

Question Number	Answer	Mark
12(a)(ii)	• Smaller in size – more responsibility (1) for undertaking a variety of operations (1); different skills required (1) which are less traditional (1) • Higher level of skills / better educated / less employment for unskilled – more able people required (1) with the ability to re–train often (1); ability to cope with constant change (1) and to undertake complex work (1) but less overall cost for company (1) • Work patterns – shifts often necessary (1) resulting in better paid staff (1); often working with different people (1) hence ability to communicate vital (1) • Has made the workplace safer (1) and cleaner (1) for the workforce • Any other appropriate response *Low response (1) or two low responses (2) or up to two marks for a detailed response (2); up to 2 marks each response* *If no answer in 12(a)(i), or the answer is inappropriate allow follow through up to 1 mark each.* (2x1) (2x1)	(4)

Question Number	Answer	Mark
12(b)	• Safer (1) • Cleaner (1) • Quieter (1) • Healthier (1) • Noise pollution (1) • More space (1) • Less space (1) • More machines (1) • Less machines (1) • Dust pollution (1) • Fume pollution (1) • Temperature control (1) • Any other appropriate response (1) (1x1)	(1)

Question Number	Answer	Mark
12(c)	• Increased efficiency / lower emissions (1) resulting in less consumption (1) and a reduction in the increase in global warming (1) • Improved manufacturing control (1) meaning less waste and pollution (1) • Increased productivity / less fuel used (1) hence less use of fossil fuels (1) resulting in lower consumption and emissions (1) • Technology that is less dependant on finite resources (1) and makes efficient use of finite resources (1) or can use sustainable alternatives (1) • Reduced wastage in production (1) hence less materials used in production (1) resulting in less waste thrown into landfill (1) • Ability to adapt process (1) to reduce rework / waste (1) • Improved re-cycling properties e.g. packaging (1) • Any other appropriate response (1) *Low response (1) or two low responses (2) or up to two marks for a detailed response (2); up to 2 marks each response* (2x1) (2x1)	(4)

Question Number	Answer	Mark
13	An explanation that makes reference to four of the following points. The following could be either **positive** or **negative** influences: • Research and development time / costs (1) • Life cycle costs (1) • Sales / profits (1) • Long term savings (1) • Transferring technology into further new products (1) • Wider product range (1) • Risk evaluation (1) • Waste (1) • Shelf life (1) • Manufacturing efficiencies (1) • Derivative products Any other appropriate response i.e. smaller, larger versions faster to develop (1) • Any other appropriate response (1) Example: The application of new materials can have a high initial development cost (1) due to the time taken in researching and testing the product (1), but can result in savings in the long term (1) due to lower product costs meaning increased sales and profits (1) which could result in increased product range (1) or transference of technology into new product ranges (1). such new ranges could result in competitive advantage (1). *Low response (1) or detailed response (up to 4)* (4x1)	(4)

Question Number	Answer	Mark
14	A explanation that makes reference to four of the following points to a maximum of four marks: • Modern processes are highly automated (1) so require a lot of electricity, or other forms of energy, to operate them (1) • Modern processes are developing to replace work undertaken manually at present (1) leading to further automation (1) • Modern processes require more equipment / machinery / tooling (1) leading to higher energy consumption earlier in the supply chain (1) • Modern processes are most efficient at higher volumes (1) leading to higher production rates and therefore overall energy consumption increases (1) • Efficient modern processes may lead to a reduction in costs, meaning lower prices (1) which increases overall demand for products and leads to increased overall energy use (1) • The use of efficient modern processes may lead to economic wealth (1) which increases overall demand for products and leads to increased overall energy use (1) • The complexity of modern processes may lead to specialisation and production being concentrated in a particular area of the world (1) leading to increased energy use for transportation (1) • Or other appropriate response *Low response (1) or detailed response (up to 4)* (4x1)	(4)
	Total Marks for section B	55
	Total marks for paper	100