

Mark Scheme (Results) Summer 2008

GCSE

GCSE Engineering & Manufacturing (5318) Paper 1

Unit 5318/01 Printing and Publishing, Paper and Board

Section A

Question Number	Answer	Mark
1(a)	<ul style="list-style-type: none"> • Theatre ticket (1) • Christmas card (1) <p>If 3 boxes ticked max marks = 1 mark. If 4 boxes or more ticked no marks.</p> <p style="text-align: right;">(2x1)</p>	(2)
1(b)	<ul style="list-style-type: none"> • Library book (1) • Cereal box (1) <p>If 3 boxes ticked max marks = 1 mark. If 4 boxes or more ticked no marks.</p> <p style="text-align: right;">(2x1)</p>	(2)
2(a)	<ul style="list-style-type: none"> • Möbius loop / Recycling flow / Recycling logo / Recycling / Recycle (1) <hr/> <ul style="list-style-type: none"> • Green dot / German scheme for recycling (1) <p style="text-align: right;">(2x1)</p>	(2)
2(b)	<p>An answer that makes reference to TWO of the following points:</p> <ul style="list-style-type: none"> • Used to remind users that the product is recyclable (2) <p><i>An appropriate response depicting this</i></p> <p>For additional mark - to encourage consumers to recycle either in bottle banks or kerbside collections (2x1)</p> <hr/> <ul style="list-style-type: none"> • To clearly show that the content is steel that can be recycled (2) <p><i>An appropriate response depicting this</i></p> <p>For additional mark - Found mainly on packages containing steel items (2x1)</p>	(4)
Total mark		10

Question Number	Answer	Mark														
3	<p>Key terms linked to a key area</p> <table border="0"> <thead> <tr> <th>Term</th> <th>Key Area</th> </tr> </thead> <tbody> <tr> <td> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Assembly Robots</div> </td> <td> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Information & Communications Technology (ICT)</div> </td> </tr> <tr> <td> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Thermochromic inks</div> </td> <td> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Control technology</div> </td> </tr> <tr> <td> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Spreadsheets</div> </td> <td> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Modern materials</div> </td> </tr> <tr> <td> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Acrylic</div> </td> <td> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Information & Communications Technology (ICT)</div> </td> </tr> <tr> <td> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Programmable Logic Controllers (PLCs)</div> </td> <td> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Control technology</div> </td> </tr> <tr> <td> <div style="border: 1px solid black; padding: 5px; width: fit-content;">Word processing</div> </td> <td> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Information & Communications Technology (ICT)</div> </td> </tr> </tbody> </table> <p>No mark for any term linked to more than one area.</p> <p style="text-align: right;">(6x1)</p>	Term	Key Area	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Assembly Robots</div>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Information & Communications Technology (ICT)</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Thermochromic inks</div>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Control technology</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Spreadsheets</div>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Modern materials</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Acrylic</div>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Information & Communications Technology (ICT)</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Programmable Logic Controllers (PLCs)</div>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Control technology</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Word processing</div>	<div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">Information & Communications Technology (ICT)</div>	(6)
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Total mark		6														

Question Number	Answer	Mark
4(a)(i)	<p>Appropriate product such as e.g.</p> <ul style="list-style-type: none"> • Backing board (1) • Blister packaging (1) • Tickets (1) • CD / DVD booklet (1) • Food and drink packaging (1) • Forehead thermometer (1) • Greeting card (1) • Business card (1) • Calendar (1) • Paperback book (1) • Point of sale display (1) • Board game (1) • Tetrapak (1) • A brand name of a specific product (1) <p><i>This list is not exhaustive; accept any product associated with the printing and publishing paper and board sector.</i></p> <p><i>Do not accept 'Card'</i></p> <p style="text-align: right;">(1x1)</p>	(1)
4(a)(ii)	<p>Appropriate explanation of what the product does, may include reference to features and function</p> <p>Examples:</p> <ul style="list-style-type: none"> • CD / DVD booklet: it provides information (1) and advertises the product (1) and / or makes the product look aesthetically pleasing (1) • Greeting card: to send to people (1) on an occasion (1) • Point of sale display: to advertise (1) to provide information (1) <p><i>If product given in 4a(i) is not from this sector but is from one of the other engineering manufacturing sectors then allow follow through, up to one mark.</i></p> <p><i>No answer to 4(a)(i) no mark for 4(a)(ii)</i></p> <p style="text-align: right;">(2x1)</p>	(2)

Question Number	Answer	Mark
4(b)(i)	<ul style="list-style-type: none"> • production planning (1) materials - supply and control (1) processing / production (1) assembly / finishing (1) packaging / dispatch (1) <p><i>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.</i></p> <p><i>No answer to 4(a)(i) no marks for 4(b)(i)</i></p> <p><i>Accept a process that is within any of the stages e.g. Vacuum forming / shearing or cutting / folding / automatic packaging / printing etc.; must be appropriate to the product stated in 4(a)(i)</i></p> <p style="text-align: right;">(1x1)</p>	(1)

Question Number	Answer	Mark
4(b)(ii)	<p>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</p> <p>Production planning</p> <ul style="list-style-type: none"> • speed (1) - faster than human application (1) <p>materials - supply and control</p> <ul style="list-style-type: none"> • cost control (1) - by less waste / faulty parts (1) • waste control (1) - by monitoring processes and quality control of processes (1) <p>processing / production</p> <ul style="list-style-type: none"> • energy conservation (1) - by control of energy into process (1) • waste control (1) - by monitoring processes and quality control of processes (1) • competitiveness (1) - faster rates of production (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) <p>assembly / finishing</p> <ul style="list-style-type: none"> • energy conservation (1) - by control of energy into process (1) • waste control (1) - by monitoring processes and quality control of processes (1) • product consistency (1) - by control of processes (1) • cost control (1) - by less waste / faulty parts (1) • efficiency (1) - by less waste / faulty parts (1) • speed (1) - faster than human application (1) <p>packaging / dispatch</p> <ul style="list-style-type: none"> • 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) <p><i>Low response (1) or two low responses (2) or detailed response (2). If the answer in part (i) is a Manufacturing stage allow follow through up to 2 marks. No answer to 4(b)(i) no marks for 4(b)(ii)</i></p>	(2)

Question Number	Answer	Mark
4(c)(i)	<ul style="list-style-type: none"> • Thermochromic inks / phosphorescent pigments (1) • Polymorph (1) • Laminate (1) • Holographic card / packaging laminates (1) • Coated card (1) • Bleed proof card (1) • Various thermoplastics (PP, HDPE, PVC etc) (1) • Other appropriate materials / a material currently used for the given application <p><i>accept 'card', 'cardboard' or 'thermoplastic'</i></p> <p><i>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.</i></p> <p><i>No answer to 4(a)(i) no marks for 4(c)(i)</i></p> <p style="text-align: right;">(1x1)</p>	(1)
4(c)(ii)	<p>One mark for identifying improvement One mark for how</p> <ul style="list-style-type: none"> • Functional characteristics (1) - weight / size / shelf life / protection / rigidity (1) • Mechanical characteristics (1) - strength / durability (1) • Aesthetic characteristics (1) - surface finish / texture / colour / appearance (1) • Intended markets (1) - appeal to target audience (1) • Quality standards (1) - consistency / reliability (1) • Reduced weight (1) - better strength to weight ratio (1) • Reduced cost (1) - quicker / quicker to assemble (1) • Any other appropriate functional / mechanical / aesthetic characteristic relating to the improvement (1) <p><i>If answer in part 4(ai) is inappropriate but the material given in 4(ci) is appropriate allow follow through up to 2 marks. If no answer is given in part 4(ai) but the answer to part 4(cii) relates to the material stated in part 4(ci) allow follow through up to 1 mark. If no answer or incorrect answer given in part 4(ci) no marks awarded for 4(c)(ii)</i></p> <p style="text-align: right;">(2x1)</p>	(2)
Total mark		9

Question Number	Answer	Mark
5(a)(i)	<ul style="list-style-type: none"> • materials supply (supplier details / raising orders) (1) • materials control (materials location) (1) • stages in manufacturing (list of processes / standard times) (1) • process control (statistics / references to standards) (1) • storage (location / description) (1) • distribution (customer location / packaging requirements / routing information) (1) • Stock control (location / type of stock / critical re-order levels / stock taking / EPOS) (1) • Marketing and mailshots (customer listing / customer orders) (1) • Queries and searches (product / customer / cost / supplier) (1) <p><i>Do not accept software names</i></p> <p style="text-align: right;">(1x1)</p>	(1)
5(a)(ii)	<p>One mark for identifying the benefit, one mark for how. Two low responses - only one mark</p> <p>Must relate to example given. No answer in (i) no marks, otherwise, allow follow through to one mark.</p> <ul style="list-style-type: none"> • reduced ordering times (1) - supplier identified automatically (1) • maintaining quality (1) - consistency (1) • reduced wastage (1) - correct process used (1) • improved efficiency (1) - faster access to knowing material location (1) • better process control (1) - easier access to quality standards (1) • reduced labour / costs (1) - less time spent searching for data (1) • reduced storage space (1) - less paper work (1) • efficient marketing (1) - mail merge / mailshots (1) <p><i>If answer in part 5(ai) is inappropriate allow follow through up to 2 marks. If no answer given in part 5(ai) allow follow though up to 1 mark.</i></p> <p><i>Do not accept 'easier' without explanation</i></p> <p style="text-align: right;">(2x1)</p>	(2)

Question Number	Answer	Mark
5(b)(i)	<p><i>One mark per relevant example</i></p> <ul style="list-style-type: none"> • 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) <p><i>Do not accept: TV, CAD, Radio, database, computer, laptop, spreadsheets</i></p> <p style="text-align: right;">(1x1)</p>	(1)
5(b)(ii)	<p>Must relate to example given. No answer in (i) no marks, otherwise, allow follow through to one mark.</p> <ul style="list-style-type: none"> • Fax (1) - hard copy record (1) • Mobile phone (1) - flexibility / roaming location (1) • Email (1) - immediate permanent record (1) • Internet (1)- immediate vast access to information (1) • Video conferencing (1) - no travel expenses / less time wasted in travelling (1) • Electronic point of sale (EPOS) (1) - faster / more accurate (1) • EDI (1) - immediate transfer of information / no hard copies needed / less storage space (1) • ISDN (1) - more data transferred in parallel (1) • Texting (1) - stored record of transaction (1) • Phone (1)- immediate two way conversation (1) • Walkie Talkie (1) - flexibility / roaming location / cost (1) <p>Other benefits may be seen in the light of:</p> <p><i>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</i></p> <p><i>Benefits must relate to the manufacturer</i> <i>2 low responses 1 mark only.</i></p> <p style="text-align: right;">(2x1)</p>	(2)

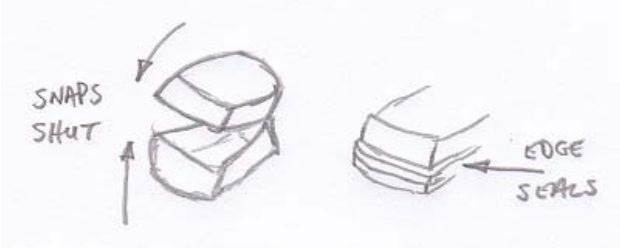
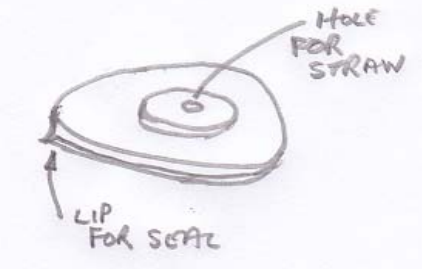
Question Number	Answer	Mark
5(c)	<ul style="list-style-type: none"> • Less returns (1) - more consistent products (1) • Lower purchase price (1) - increase sales (1) • Shorter order times (1) - greater use of appropriate software / automated orders (1) • Increase sales (1) - more profit (1) • Better reputation / customer satisfaction (1) - more reliability (1) • Increased profits (1) - fewer waste products / faster throughput (1) • Better quality products (1) - systems reject faulty products or stop them being produced (1) • Better communication with manufacturer (1) - fewer problems with products / orders (1) <p><i>Benefit must relate to the retailer</i> <i>One mark for identifying the benefit, one mark for how. If two low responses given - one mark e.g. cheaper and quicker - only one mark</i> <i>Any combination of the answers above as long as appropriately linked e.g. better quality products (1) therefore more profit (1)</i></p> <p style="text-align: right;">(2x1)</p>	(2)
Total mark		8

Question Number	Answer	Mark
6	<p>Two different examples</p> <ul style="list-style-type: none"> • process control (1) • PLCs (1) • Embedded computers (1) • Robotics (1) • CIM (1) • CAD / CAM links (1) • CAM (1) • CIE (1) • Quality control (1) • Automation (1) <p><i>Don't accept examples that are about handling data and information e.g. databases / spreadsheets , CAD, computers, CNC</i></p> <p style="text-align: right;">(1x1) (1x1)</p> <hr/> <p>Two different methods used</p> <ul style="list-style-type: none"> • 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) <p><i>Must be a feasible replacement</i></p> <p>If answer in 6(a) is not appropriate allow follow through. If no answer in 6a no mark for 6(b)</p> <p style="text-align: right;">(1x1) (1x1)</p>	

<p>6 con't</p>	<p>Explain two different benefits One mark for identifying the benefit. One mark for how</p> <p>Examples</p> <ul style="list-style-type: none"> • reduce the time (1) testing is quicker (1) • reduce the money spent (1) lower stock level / JIT techniques (1) • lower labour costs (1) reduction in staffing (1) • increased overall productivity (1) via increased throughput (1) • improve quality (1) more consistent processes (1) • continuous production (1) machines work 24/7 (1) <p><i>Benefits must relate to new methods and the manufacturer.</i></p> <p>Low response (1) or two low responses (1) or detailed response (2). Allow follow through up to one mark providing either (a) or (b) is answered for each example.</p> <p style="text-align: right;">(2x1) (2x1)</p>	<p style="text-align: center;">8</p>
<p>Total mark</p>		<p>8</p>

Question Number	Answer	Mark
7(a)	<p>One mark for identifying the benefit One mark for how</p> <ul style="list-style-type: none"> • reduced ordering times (1) - automatic monitoring (1) • improve quality / accuracy (1) - control of processes (1) • reduced wastage (1) - optimise production methods • improved efficiency (1) - faster 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) <p><i>Do not accept 'easier' without explanation</i></p> <p style="text-align: right;">(2x1)</p>	(2)
7(b)	<ul style="list-style-type: none"> • More consistent products (1) - process reliability (1) • Lower purchase price (1) - increased efficiency / productivity (1) • Shorter delivery times (1) - automated systems (1) • Customer satisfaction (1) - availability of different products (1) • Quality product (1) - fit for purpose (1) • Product guarantee (1) - ability to design / produce products to higher standards (1) • Product flexibility (1) - more variation within processes (1) <p><i>1 mark for benefit, 1 mark for how. Low response (1) or detailed statement (2) or two low responses (2)</i></p> <p>Example: <i>Readily available products of good quality (1) means fewer complaints about sub-standard products (1)</i></p> <p><i>Any combination of the answers above as long as appropriately linked e.g. more consistent product (1) fit for purpose (1)</i></p> <p style="text-align: right;">(2x1)</p>	(2)
Total mark		4
Total mark for section A		45

Section B

Question Number	Answer	Mark
8(a)	<p>An answer that makes reference to three of the following points. Diagrams and notes up to 3 marks</p> <ul style="list-style-type: none"> • Allows the food to keep warm (1) • To contain food (1) • Allows food to be carried more easily (1) / without burning hand (1)  <ul style="list-style-type: none"> • Has a tight fitting lid to keep food inside (1) / warm (1) • To provide hygienic short term storage (1) <p>Answer must contain both notes and sketches. Max two marks if only notes or sketches used.</p> <p style="text-align: right;">(3x1)</p>	(3)
8(b)	<p>An answer that makes reference to three of the following points. Diagrams and notes up to 3 marks</p> <ul style="list-style-type: none"> • To stop liquid spilling out (1) • To allow customer to insert a straw and suck the contents out (1) / stops straw moving around (1) • To keep contents at a constant temperature (1) • To provide hygienic short term storage (1)  <ul style="list-style-type: none"> • Easy to dispose once contents are consumed (1) • To provide a seal on the cup (1) <p>Answer must contain both notes and sketches. Max two marks if only notes or sketches used.</p> <p style="text-align: right;">(3x1)</p>	(3)
Total mark		6

Question Number	Answer	Mark
9(a)(i)	<ul style="list-style-type: none"> • Stage 1 - Design / product development (1) • Stage 4 - Material supply and control / purchasing / material supply / material control / supply of components / supply of parts (1) <p><i>Do not accept development on its own for stage 1</i> <i>Do not accept product on its own for stage 1</i> <i>Do not accept design ideas for stage 1</i> <i>Do not accept material on its own for stage 4</i></p> <p style="text-align: right;">(2x1)</p>	(2)
9(a)(ii)	<ul style="list-style-type: none"> • Marketing (1) • Stage 2 / stage two (1) • 2 / two (1) <p style="text-align: right;">(1x1)</p>	(1)
9(b)(i)	<p>Low response (1) or three low responses (3) or up to three marks for detailed response (3) Appropriate descriptions including three of the following points:</p> <p><u>Production</u></p> <ul style="list-style-type: none"> • use the available resources (1) • Materials, parts and components used (1) • Processes that are used (1) • Used of available equipment and machinery (1) • Following the sequence of production (1) • Carrying out inspection and quality control (1) • Complying with health and safety factors (1) • Where the cardboard container is cut / printed (1) • Where the polymer parts are vacuum formed (1) <p>Or similar, but must related to the manufacture of fast food packaging.</p> <p><i>Example: The machinery/equipment/materials (1) would be prepared for a production run (1) and the fast food packaging would be printed/cut/folded/vacuum formed (1). At this stage these products would also need to be checked to see that they have been made correctly (1).</i></p> <p style="text-align: right;">(3x1)</p>	(3)

Question Number	Answer	Mark
9(b)(ii)	<p>Low response (1) or three low responses (3) or up to three marks for detailed response (3)</p> <p>Appropriate descriptions including three of the following points:</p> <p><u>Packaging and Dispatch</u></p> <ul style="list-style-type: none"> • Gathering together of manufactured parts (1) • Parts boxed together (1) • Could be in flat pack condition (1) • Box items sent to retailers (1) • Bar coding applied to boxed sets of products (1) • Details sent to finance department for invoicing requirements (1) <p>Or similar, but must related to the manufacture of fast food packaging.</p> <p><i>Example: At this stage the fast food packaging would be put into bigger boxes (1) and then sent to the customer (1). The fast food packaging might be sent in flat pack form (1). The details of this would then be sent to the customer to ask for the money that they owe (1). The big boxes might have bar codes on (1).</i></p> <p><i>Do not accept answers that relate to the 'assembly of the fast food packaging'</i></p> <p style="text-align: right;">(3x1)</p>	(3)
Total mark		9

Question Number	Answer	Mark
10(a)(i)	<p>1 mark per material. Up to 1 mark</p> <ul style="list-style-type: none"> • Aluminium foil (1) • Low density polythene (LDPE) (1) • Polyethylene (PT) (1) • Polypropylene (PP) (1) • Paper (1) • Cardboard (1) <p><i>Do not accept any generic term, i.e. 'plastic' or 'card'</i></p> <p style="text-align: right;">(1x1)</p>	(1)
10(a)(ii)	<p>1 mark for improvement, 1 mark for how If no answer in 10(a)(i) then no marks. Allow follow through up to 1 mark if incorrect material is given in 10(a)(i)</p> <p>Answers that relate to:</p> <ul style="list-style-type: none"> • Size (1) - to reduce volume (1) • Weight (1) - easier to carry (1) • Ease of use (1) - for retailer / consumer (1) • Durability (1) - to last as long as necessary (1) • Move towards "one piece solution" (1) - ease of manufacture • Aesthetics (1) - to improve appearance (1) • Allows throw away packaging (1) - one trip containers (1) • Better recyclability (1) - improved reputation of retailer (1) • More hygienic (1) - to reduce possibility of food poisoning (1) • Has improved thermal characteristics (1) - to keep food warm (1) <p style="text-align: right;">(2x1)</p>	(2)

Question Number	Answer	Mark
10(b)	<p>1 mark for low response. 2 marks for detailed response. 2 marks for 2 low responses.</p> <ul style="list-style-type: none"> • Provides effective process for getting 3D shape (1) • Gives flexibility for different shapes (1) by applications of different tooling sets (1) • Can be automated easily (1) for high volume production (1) • Reliable process (1) • Tooling sets / moulds are very durable (1) and can be replaced infrequently (1) • Small amounts of waste (1) / reduction in amounts of material used (1) • Not labour intensive (1) <p><i>Do not accept 'easy' or 'cheap'</i></p>	<p>(2x1) (2)</p>

Question Number	Answer	Mark
10(c)	<p>1 mark per process. Up to 2 marks</p> <ul style="list-style-type: none"> • Material shaping such as cutting (1) • Die cutting (1) • Printing (1) • Folding or bending (1) • Polymer extrusion (1) • Net Forming (1) • Moulding / Compression moulding (1) • Moulding / Injection moulding (1) • Laminating (1) • Gluing (1) <p><i>Do not accept 'moulding' twice on its own</i></p> <p style="text-align: right;">(2x1)</p>	(2)
10(d)	<p>Low response (1) or three low responses (3) or up to three marks for a detailed response (3)</p> <ul style="list-style-type: none"> • Lower cost (1) • Opportunities to advertise (1) • Improved accuracy (1) • Durability (1) • Smaller size / lighter product (1) • Functionality - thermal features (1) • Hygienic features (1) • Less component parts (1) • More varieties (1) • Better aesthetics (1) <p><i>Example: Modern materials can be processed more quickly (1) which can results in lower costs (1). Modern materials can be processed more accurately (1) so the lids will always fit (1). Modern materials are more durable (1) which means the food can stay in the packaging longer (1). Modern materials are lighter and easier to carry (1) and more able to withstand heat (1). Modern materials are better at keeping the heat in (1) which means the food will stay warm longer (1). Modern materials are more hygienic (1) as they won't absorb fluids and therefore don't leak (1). Modern materials look better (1) which will mean the customer may be attracted to buy the food (1).</i></p> <p style="text-align: right;">(3x1)</p>	(3)
Total mark		10

Question Number	Answer	Mark
11(a)	<p>Must have relevant automation technology link Low response (1) or two low responses (2) or detailed response (2)</p> <p>Example of automation</p> <ul style="list-style-type: none"> • PLC (1) to control processes in production (1) • Automated printing (1) of fast food retailer logo (1) • Robots (1) dealing with the box products (1) • Use of conveyor systems (1) to move parts of the packaging about (1) • Pick and Place (1) to fit boxes of finished products (1) • Embedded computers (1) to perform dedicated functions (1) • Remotely operated vehicles (1) moving boxed fast food packaging parts to dispatch or storage (1) <p><i>Do not accept 'CIM' or 'CNC' without links to automation</i></p> <p style="text-align: right;">(2x1) (2x1)</p>	(4)

Question Number	Answer	Mark
11(b)	<p>Benefits to manufacturer</p> <p>If answer in 11(a) is inappropriate, allow follow through up to one mark. If no answer given in part (a), no mark. 2 x 1 mark for low response or 2 x 2 marks for detailed responses. Must be appropriate to those described in (a) and relate to the manufacturer e.g.</p> <ul style="list-style-type: none"> • 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 printing (1) better registration (1) • Reduced labour costs (1) as less people involved (1) • Safer method (1) as humans have less exposure (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) by less mistakes being made (1) • Reduced energy costs (1) through increased efficiency (1) • Improved production rates (1) through reduced downtime (1) • Gives customers variation of products in a quicker time (1) faster production changeovers (1) <p style="text-align: right;">(2x1) (2x1)</p>	(4)

Question Number	Answer	Mark
11(c)	<p>Benefit to consumer</p> <p>If answer in 11(a) is inappropriate, allow follow through up to one mark. If no answer given in part (a), no mark. 2 x 1 mark for low responses. 2 x 2 marks for detailed responses</p> <p>Must be appropriate to those described in (a) and relate to the consumer e.g.</p> <ul style="list-style-type: none"> • Consistent product (1) controlled better (1) • Product reliability (1) more likely to be produced to specification (1) • Reduced time to retail / shorter delivery times (1) as manufacturer can vary product to meet demand (1) • Hygienic packaging (1) because less human contact (1) • Able to read printed instructions / adverts (1) because of sharper images (1) • Less wastage (1) as processes monitored better (1) • Lower prices (1) less waste / quicker production (1) • Better availability (1) due to faster throughput • Better quality (1) through improved process control (1) • Better value (1) because production costs are reduced (1) • Product guarantee (1) as confidence in process (1) • Customer satisfaction (1) because of consistent products <p style="text-align: right;">(2x1) (2x1)</p>	(4)
Total mark		12

Question Number	Answer	Mark
12(a)(i)	<p>1 mark for change.</p> <ul style="list-style-type: none"> • Smaller in size (1) • Higher level of skills / better educated less employment for unskilled (1) • Work patterns (1) • Higher pay (1) <p style="text-align: right;">(1x1)</p>	(1)
12(a)(ii)	<p>Low response (1) or two low responses (2) or up to two marks for a more detailed response (2)</p> <ul style="list-style-type: none"> • 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) <p>Up to 2 marks each response</p> <p style="text-align: right;">(2x1) (2x1)</p>	(4)
12(b)(i)	<p>1 mark for change.</p> <p>Positive answers</p> <ul style="list-style-type: none"> • Increased efficiency (1) • Lower emissions / reduced global warming (1) • Increased productivity (1) • Less fuel used (1) • Reduced wastage in production (1) <p>Negative answers</p> <ul style="list-style-type: none"> • Greater use of machinery (1) • Higher emissions (1) • Use of finite resources to manufacture control technologies (1) • Greater overall volume of products generated (1) <p style="text-align: right;">(1x1)</p>	(1)

Question Number	Answer	Mark
12(b)(ii)	<p>Low response (1) or two low responses (2) or up to two marks for a more detailed response (2)</p> <p>Positive answers</p> <ul style="list-style-type: none"> • Increased efficiency - lower emissions: 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: 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: less materials used in production (1) resulting in less waste thrown into landfill (1) / ability to adapt process (1) to reduce rework / waste (1) <p>Negative answers</p> <ul style="list-style-type: none"> • Greater use of machinery - higher emissions: resulting in greater consumption (1) and an increase in the rate of global warming (1) / issues associated with acid rain (1) and toxic gases (1) • Use of finite resources to manufacture control technologies: increased consumption of raw materials (1) leading to increased likelihood of overuse/lack of supply (1) / issues associated with disposal of technologies (1) and use of finite resources for disassembly (1) • Greater overall volume of products generated: distribution network increased (extra fuel) (1) meaning higher CO₂ emissions (1) / higher quality products leading to greater demand (1) and reduced product lifespan (1) <p>Up to 2 marks each response</p> <p><i>If answer in 12(b)(i) is inappropriate allow follow through up to 1 mark each. If 12(b)(i) has no answer, no mark for 12(b)(ii)</i></p> <p style="text-align: right;">(2x1) (2x1)</p>	<p style="text-align: right;">(4)</p>
Total mark		10

Question Number	Answer	Mark
13(a)	<p>An explanation that makes reference to four of the following points. Low response (1) or four low responses (4) or detailed response (up to 4) The following could be either positive or negative influences.</p> <ul style="list-style-type: none"> • Climate change (1) • CO₂ emissions (1) • Land fill (1) • Environmental contamination (1) • Burning fossil fuels in manufacturing processes (1) • Renewable energy (1) • Global expansion (1) • Lifespan of product (1) • Longer shelf life (1) • Disposal of hardware e.g. computers / machinery (1) • Disposal of inks/packaging materials (1) • Volume of packaging used for modern consumer products (1) • Disassembly costs (1) • Recycling (1) • Polymer shredding (1) • Biodegradable (1) <p>Positive example The use of biodegradable materials (1) has lessened the need for landfill (1) and reduced environmental contamination (1) which could lead to the reduction of CO₂ emissions(1) because of less decomposition of the product.</p> <p>Negative / Positive Example Modern materials have meant that it is easier to produce packaging which has lead to an increase in the amount of packaging used and requiring disposal (1). However, some packaging can be made from biodegradable / degradable materials (1) that will decompose when exposed to air / sun / moisture (1) or when submitted for composting (1). Unfortunately, these materials do not readily decompose in a sealed landfill (1).</p> <p>Negative example The difficulty of the disposal of hardware / computers (1) used to manufacture fast food packaging has led to disassembly costs (1) and reduced the scope for recycling (1) because of limited lifespan of computer products (1) and increased the need for landfill (1)</p> <p>Up to 4 marks</p>	<p>(4x1)</p> <p>(4)</p>

Question Number	Answer	Mark
13(b)	<p>An explanation that makes reference to four of the following points.</p> <p>Low response (1) or four low responses (4) or detailed response (up to 4)</p> <p>The following could be either positive or negative influences.</p> <ul style="list-style-type: none"> • 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) • Manufacturing efficiencies (1) • Derivative products i.e. smaller / larger versions faster to develop (1) <p><i>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).</i></p> <p>Up to 4 marks</p>	(4)
Total mark	8	
Total Marks for section B	55	
Total marks for paper	100	