

Mark Scheme

Summer 2013 (Results)

GCSE Engineering and Manufacturing  
5EM03 3A  
(Paper 3A: Printing and Publishing,  
Paper and Board)

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Question	Answer	Mark
<b>1(a)</b>	<ul style="list-style-type: none"> <li>• Instruction manual</li> <li>• Birthday card</li> </ul> <p><i>If 3 boxes or more are crossed - no marks.</i></p> <p style="text-align: right;">(2 x 1)</p>	<b>(2)</b>
<b>1(b)</b>	<ul style="list-style-type: none"> <li>• Toilet roll</li> <li>• Recycled envelopes</li> </ul> <p><i>If 3 boxes or more are crossed - no marks.</i></p> <p style="text-align: right;">(2 x 1)</p>	<b>(2)</b>
<b>(Total 4 marks)</b>		

Question	Answer	Mark
<b>2(a) 1</b>	<ul style="list-style-type: none"> <li>• Craft knife</li> <li>• Cutting blade</li> <li>• Stanley knife</li> <li>• Knife</li> <li>• Scalpel</li> </ul> <p><i>Accept any recognisable spelling (phonetic) of the answers above.</i></p> <p style="text-align: right;">(1 x 1)</p>	
<b>2(a) 2</b>	<ul style="list-style-type: none"> <li>• Template</li> <li>• Stencil</li> </ul> <p>Accept any answer that makes reference to a specific template or stencil, e.g. Circle template Stencil for creating circles</p> <p><i>Accept any recognisable spelling (phonetic) of the answers above.</i></p> <p style="text-align: right;">(1 x 1)</p>	<b>(2)</b>
<b>2(b) 1</b>	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Drawing circles (1)</li> <li>• Drawing arcs/curves (1)</li> <li>• Measuring distances (1)</li> <li>• Used with a pencil (1)</li> <li>• Accurate drawing / drawing to correct diameter or radius (1)</li> </ul> <p>e.g. Used to draw a circle (1) to an accurate diameter (1).</p> <p style="text-align: right;">(2 x 1)</p>	
<b>2(b) 2</b>	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• To establish a horizontal reference (1)</li> <li>• To draw horizontal lines (1)</li> <li>• To draw lines at 90 degrees (1)</li> <li>• To support a set square (1)</li> <li>• To support a rule (1)</li> <li>• To measure accurate horizontal lengths (1)</li> <li>• Used with a pencil/other writing implement (1)</li> </ul> <p>e.g. To draw horizontal lines (1) accurately (1)</p> <p style="text-align: right;">(2 x 1)</p>	<b>(4)</b>
<b>(Total 6 marks)</b>		

Question	Answer	Mark
<p><b>3</b></p>	<p>Award 1 mark for each key term correctly linked to a key area</p> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> <div style="text-align: center;"> <p><b>Key Term</b></p> <div style="border: 1px solid black; padding: 5px; width: 150px; margin-bottom: 5px;">Computer-aided design</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin-bottom: 5px;">Automated conveyors</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin-bottom: 5px;">Hydrochromic ink</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin-bottom: 5px;">Embedded computers</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin-bottom: 5px;">3D prototyping</div> <div style="border: 1px solid black; padding: 5px; width: 150px; margin-bottom: 5px;">Duplex board</div> <div style="border: 1px solid black; padding: 5px; width: 150px;">Polyvinyl acetate (PVA)</div> </div> <div style="text-align: center;"> <p><b>Key Area</b></p> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 150px; margin-bottom: 10px; text-align: center;">Information and communications technology (ICT)</div> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 150px; margin-bottom: 10px; text-align: center;">Control technology</div> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; width: 150px; text-align: center;">Modern materials</div> </div> </div> <p><i>No mark awarded where 2 or more lines are drawn from a term. Lines do not have to be straight but term and key area must be clearly linked.</i></p>	<p>(7)</p>

**(Total 7 marks)**

Question	Answer	Mark
<p><b>4(a)</b></p>	<p>Appropriate two <b>products</b> such as e.g.</p> <ul style="list-style-type: none"> <li>• Point of sale display</li> <li>• Shoe box</li> <li>• Paperback book</li> <li>• Cereal packaging</li> <li>• Fast food packaging</li> <li>• Backing board</li> <li>• Blister packaging</li> </ul>	

Question	Answer	Mark
	<ul style="list-style-type: none"> <li>• Tickets</li> <li>• CD/DVD booklet</li> <li>• Forehead thermometer</li> <li>• Greeting card</li> <li>• Business card</li> <li>• Board game</li> <li>• Tetrapak</li> <li>• Photographic prints</li> </ul> <p>A brand name of a specific product is acceptable</p> <p><i>Do not accept 'card'</i>  <i>This list is not exhaustive; accept any product associated with the printing and publishing paper and board sector.</i></p> <p style="text-align: right;">(2 x 1)</p>	<b>(2)</b>
<b>4(b)(i)</b>	<ul style="list-style-type: none"> <li>• Design</li> <li>• Marketing</li> <li>• Production planning</li> <li>• Materials supply and control</li> <li>• Processing/production</li> <li>• Assembly/finishing</li> <li>• Packaging/dispatch</li> </ul> <p style="text-align: right;">(1 x 1)</p>	<b>(1)</b>
<b>4(b)(ii)</b>	<p>One mark for identifying benefit x 2  One mark for why x 2</p> <p>Appropriate benefit to the manufacturer e.g.</p> <p><b>Design</b></p> <ul style="list-style-type: none"> <li>• better designs (1) – can link other information into the process (1), or best designs can be maximised by simulation (1)</li> <li>• faster (1) – many CAD features such as copy, array can be used (1) or if mistakes made they can be quickly rectified (1)</li> </ul> <p><b>Marketing</b></p> <ul style="list-style-type: none"> <li>• accurate information (1) – less mistakes made in capturing data (1)</li> <li>• better/accessible knowledge base (1) – easy data entry/data analysed easier (1)</li> <li>• speeds up the editing of marketing literature (1) – customers always kept up to date (1)</li> </ul> <p><b>Production planning</b></p> <ul style="list-style-type: none"> <li>• easier or quicker planning (1) – computers are faster (1)</li> <li>• spreadsheets can be adapted as Gantt Charts (1) for planning – faster than human application (1)</li> <li>• accurate reading of planning sheets (1) – professional output (1)</li> </ul> <p><b>Materials supply and control</b></p> <ul style="list-style-type: none"> <li>• buy best available materials (1) – use of internet (1)</li> <li>• waste control (1) – by monitoring processes</li> </ul>	

Question	Answer	Mark
	<p style="text-align: right;">and quality control of processes (1)</p> <p><b>Processing/production</b>            Answer could relate to the application of CAM and control technology such as: -</p> <ul style="list-style-type: none"> <li>• energy conservation (1) – by control of energy into process (1)</li> <li>• waste control (1) – by monitoring processes and quality control of processes (1)</li> <li>• competitiveness (1) – faster rates of production/application of CAM techniques (1)</li> <li>• product consistency (1) – by control of processes (1)</li> <li>• cost control (1) – by less waste/faulty parts (1)</li> <li>• efficiency (1) - by less waste/faulty parts (1)</li> <li>• speed (1) – faster than human application (1)</li> </ul> <p><b>Assembly/finishing</b>            Answer could relate to the application of CAM and control technology such as: -</p> <ul style="list-style-type: none"> <li>• energy conservation (1) – by control of energy into process (1)</li> <li>• waste control (1) – by monitoring processes and quality control of processes(1)</li> <li>• product consistency (1) – by control of processes (1)</li> <li>• cost control (1) – by less waste/faulty parts (1)</li> <li>• efficiency (1) - by less waste/faulty parts (1)</li> <li>• speed (1) – faster than human application (1)</li> </ul> <p><b>Packaging/dispatch</b>            Answer could relate to the application of CAM and control technology such as: -</p> <ul style="list-style-type: none"> <li>• packaging consistency (1) – by control of processes (1)</li> <li>• cost control (1) – by less waste/faulty parts (1)</li> <li>• efficiency (1) - by less waste/faulty parts (1)</li> <li>• speed (1) – faster than human application (1)</li> <li>• energy conservation (1) – by control of energy into process (1)</li> <li>• waste control (1) – by monitoring processes and quality control of processes (1)</li> </ul> <p><i>Low response (1) or two low responses (2) or detailed response (2)</i></p> <p><b><i>If no answer or incorrect answer in 4(b)(i) then no marks awarded for 4(b)(ii).</i></b></p> <p style="text-align: right;">(2 x 1)            (2 x 1)            (1 x 2)            (1 x 2)</p>	<b>(4)</b>

Question	Answer	Mark
<p><b>4(c)(i)</b></p>	<p>Accept any appropriate modern material suitable for Product 1, e.g.</p> <ul style="list-style-type: none"> <li>• Forehead thermometer - Thermochromic inks</li> <li>• Greetings card - Holographic card</li> <li>• Blister packaging - Laminate</li> <li>• Board game - Coated card</li> <li>• Phosphorescent pigments</li> <li>• Polymorph</li> <li>• Packaging laminates</li> <li>• Bleed proof card</li> <li>• Duplex board</li> <li>• Composites</li> <li>• Polymer / plastic [although plastic is not technically correct, accept the term 'plastic']</li> <li>• Various thermoplastics (PP, HDPE, PVC etc)</li> <li>• Other appropriate materials / a material currently used for the given product</li> </ul> <p><i>Accept 'card', 'cardboard' or 'thermoplastic'</i></p> <p><b>No answers/incorrect answer for 4(a) no marks for 4(c)(i)</b></p> <p><b>Markers need to refer to response in 4(a).</b></p> <p style="text-align: right;">(1 x 1)</p>	<p style="text-align: right;"><b>(1)</b></p>



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

Question	Answer	Mark
<p><b>5(a)(i)</b></p>	<p>An example:</p> <ul style="list-style-type: none"> <li>• materials supply</li> <li>• materials control</li> <li>• process control</li> <li>• storage</li> <li>• linking CNC machines together</li> <li>• monitoring quality</li> <li>• documentation control</li> <li>• workflow control</li> <li>• movement control</li> <li>• application within sector eg CNC printer/robotic machines to cut and crop, 3D printing, laser cutting</li> </ul> <p>Accept any appropriate response</p> <p style="text-align: right;">(1 x 1)</p>	<p><b>(1)</b></p>
<p><b>5(a)(ii)</b></p>	<p>One mark for benefit One mark for explanation</p> <ul style="list-style-type: none"> <li>• reduced machine loading times (1) – automatic monitoring (1)</li> <li>• improve quality / accuracy / consistency (1) – control of processes (1)</li> <li>• reduced wastage (1) – optimised production methods (1)</li> </ul>	

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

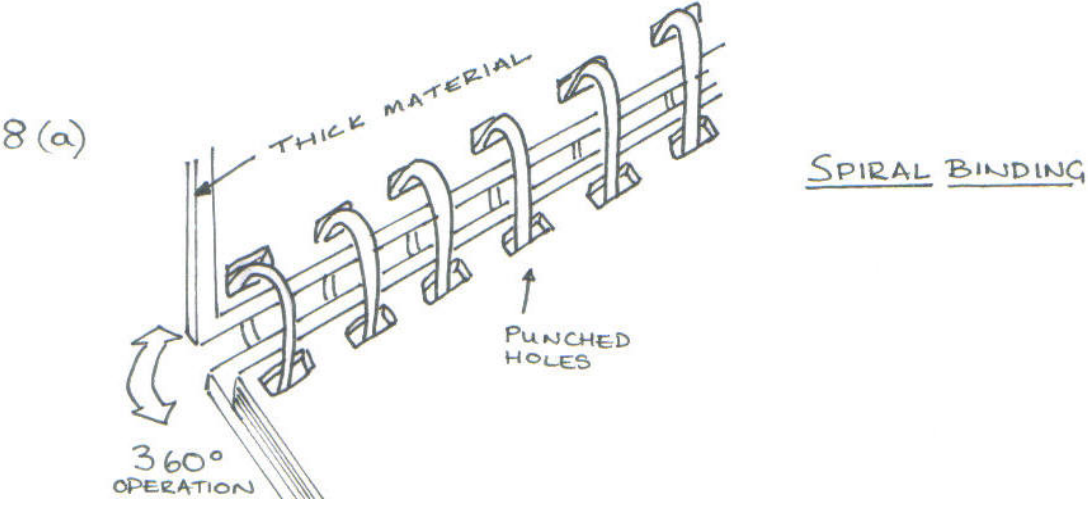
Question	Answer	Mark
<b>5(c)</b>	<p>One mark for benefit  One mark for explanation</p> <ul style="list-style-type: none"> <li>• more consistent products (1) – accurate processes (1)</li> <li>• shorter order times (1) – faster production (1)</li> <li>• better quality (1) – can produce to tighter tolerances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

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

Question	Answer	Mark
	<p>modern technology (1)</p> <ul style="list-style-type: none"> <li>• provides cost/supply data (1)- better stock control (1)</li> <li>• saves space (1) – keeps data secure (1)</li> </ul> <p><i>Do not accept quicker, faster, easier, simple without explanation</i></p> <p>Accept any appropriate response</p> <p><i>Answers must be relevant to the distributor.</i></p> <p style="text-align: right;">(2 x 2)</p>	<b>(4)</b>
<b>6b(iii)</b>	<p>One mark for disadvantage One mark for why</p> <ul style="list-style-type: none"> <li>• costly to install (1) – need computer skills (1)</li> <li>• costly to maintain (1) – IT maintenance staff expensive (1)</li> <li>• can lose connectivity (1) – information temporarily lost (1)</li> <li>• transfer of errors (1) – wrong data originally entered (1)</li> <li>• people may not get involved (1) – frightened of IT / lack IT skills (1)</li> <li>• IT skills replace research skills (1) – some of the knowledge base lost (1)</li> <li>• system can breakdown/fail (1)- data can be lost (1)</li> <li>• data can be 'hacked' (1)- viruses can be introduced (1)</li> </ul> <p>Accept any appropriate response</p> <p><i>Answer must be relevant to the manufacturer</i></p> <p style="text-align: right;">(1 x 2)</p>	<b>(2)</b>
<b>(Total 9 marks)</b>		

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

<b>Total Marks for Section A</b>	<b>50</b>
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Question	Answer	Mark
8(a)	<p>An answer that makes reference to any of the following points:</p> <ul style="list-style-type: none"> <li>• To bind the contents of the school diary planner (1)</li> <li>• To provide a firm binding method for durability (1)</li> <li>• Allows use of material with greater density and thickness for school diary planner content [e.g. rigid covers] (1)</li> <li>• To allow 360 degree operation of the school diary planner contents (1)</li> <li>• Offers perfect page registration of school diary planner contents (1)</li> <li>• School diary planner contents can lie flat and pages turn easily (1)</li> <li>• Permanent method to prevent the insertion of new pages (1)</li> </ul> <p>Accept any appropriate response</p> <p><i>Must have notes and sketches (notes or sketches only maximum 2 marks), e.g.</i></p>  <p>8(a)</p> <p>THICK MATERIAL</p> <p>PUNCHED HOLES</p> <p>360° OPERATION</p> <p><u>SPIRAL BINDING</u></p> <p>1 x 1 mark low response, or up to 3 marks for detailed response</p>	(3)

(3 x 1)

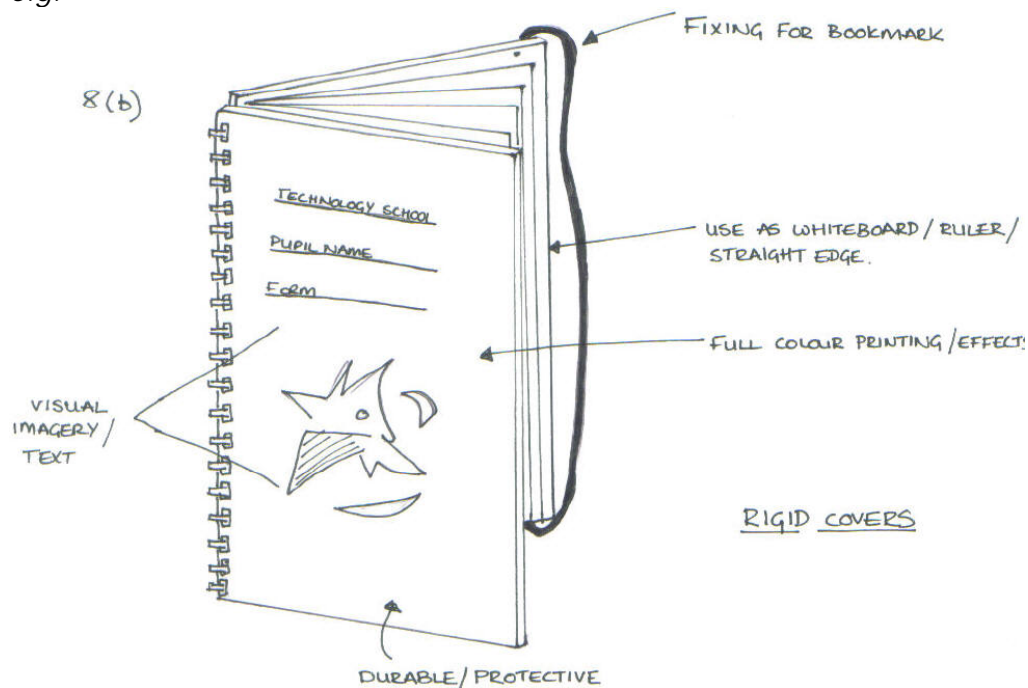
8(b)

An answer that makes reference to any of the following points:

- To protect the pages inside (1)
- To enable the school diary planner to last for a full academic year (1)
- To provide the durability that resists movement wear from the spiral binding (1)
- To enable full colour printing (1) and printing effects (1) that provide visual imagery/text (1) which will help to prevent permanent loss (1)
- Can be used as a straight edge (1)
- Can be used as a whiteboard (1) / ruler (1)
- To provide a solid fixing for the elasticated bookmark (1)
- To store a pen for completing entries (1)

Accept any appropriate response

Must have notes and sketches (notes or sketches only maximum 2 marks), e.g.



1 x 1 mark low response, or up to 3 marks for detailed response

(3 x 1)

(3)



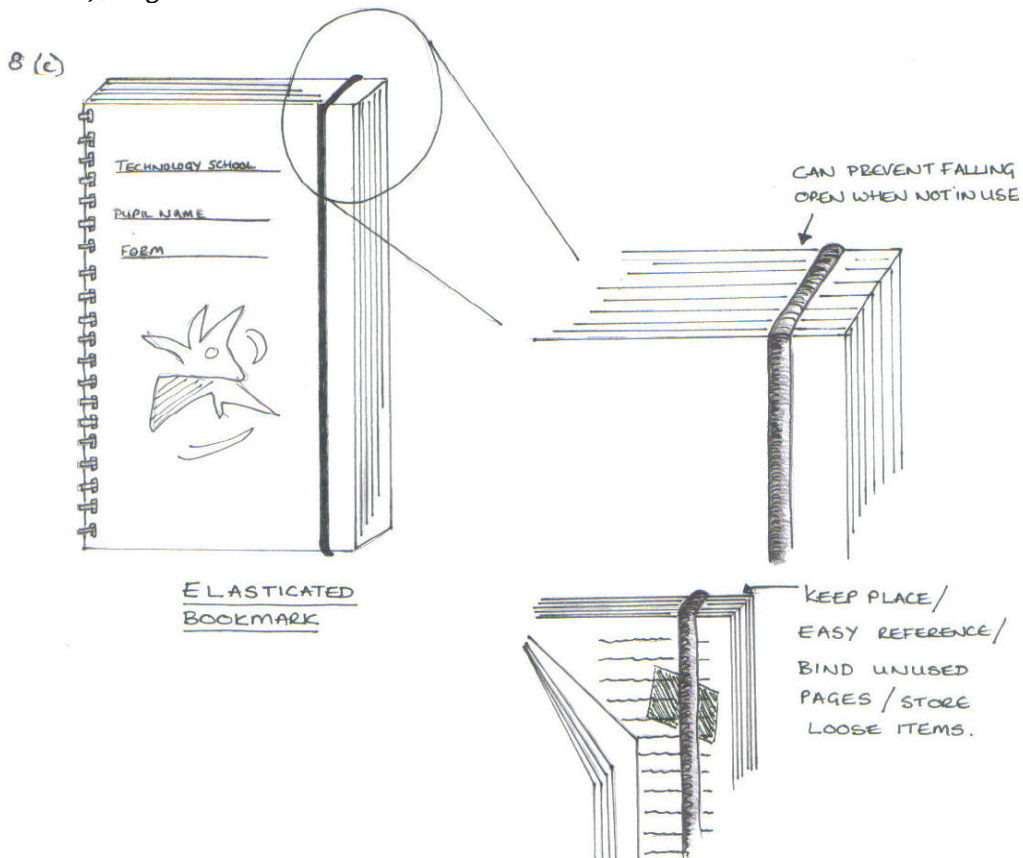
8(c)

An answer that makes reference to any of the following points:

- To enable the user to keep his/her place in the school diary planner (1)
- To enable the user to return to the right page with ease (1)
- To enable the user to keep their place or mark particular events/pages (1)
- To prevent loss of the bookmark (1)
- To enable the user to bind unused pages (1)
- To enable the user to store loose pages with less chance of losing them (1)
- Can be used to prevent the diary planner from falling open when not in use (1)

Accept any appropriate response

Must have notes and sketches (notes or sketches only maximum 2 marks), e.g.



1 x 1 mark low response, or up to 3 marks for detailed response

(3 x 1)

(3)

(Total 9 marks)

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

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

	<p>e.g. The stage where the manufacturer of school diary planners would carry out market research (1) with consumers [schools] (1), to find out what they think of the planners (1), so a suitable product can be developed (1), meaning schools will want to buy it for their students to use (1).</p> <p><i>Up to 3 marks</i>  <i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	<b>(3)</b>
<b>(Total 9 marks)</b>		

Question	Answer	Mark
<b>10(a)(i)</b>	<ul style="list-style-type: none"> <li>• Solid white board / solid white card</li> <li>• Solid bleached board / solid bleached card</li> <li>• Cast-coated board / cast-coated card</li> <li>• Laminated board / laminated card</li> <li>• Bleed proof paper / bleed proof card</li> <li>• Polypropylene</li> <li>• Any other appropriate material, inc. finishing materials, i.e. varnish</li> </ul> <p><i>Do not accept generic answers such as 'board', 'card' or 'paper'</i></p> <p style="text-align: right;">(1 x 1)</p>	<b>(1)</b>
<b>10(a)(ii)</b>	<p>Appropriate explanation including three of the following points:</p> <ul style="list-style-type: none"> <li>• It has wear resistance (1), durability (1) and the strength to resist forces when in use (1)</li> <li>• It is ductile (1) so can be drawn into a thin, tough wire (1)</li> <li>• It is malleable (1) which allows it to be wound into a spiral shape (1)</li> <li>• It has elasticity in spiral binding form (1) so it can return to its original shape (1) if bent/ dropped etc (1)</li> <li>• It means thin gauge material can be used (1) to reduce weight (1) and cost (1)</li> <li>• It can be sprayed different colours (1) to improve presentation (1) and to differentiate year groups / houses etc (1)</li> </ul> <p>Any other appropriate response</p> <p><i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	<b>(3)</b>

<b>10(b)(i)</b>	<p>Any three of the following:</p> <ul style="list-style-type: none"><li>• Die cutting</li><li>• Guillotine cutting</li><li>• Shearing</li><li>• Scoring /creasing</li><li>• Grooving /notching</li><li>• Folding</li><li>• Cutting</li><li>• Heating</li><li>• Gluing</li><li>• Laminating</li><li>• Wire drawing</li><li>• Annealing / normalising</li><li>• Bending</li><li>• Wire forming</li><li>• Painting / powder coating</li><li>• Assembly</li><li>• Printing</li></ul> <p>Any other appropriate response, inc finishing processes</p> <p><i>One mark only for 'printing' or any variation of printing such as 'full colour printing', 'lithography' or 'flexography'.</i></p> <p><i>1 mark per response up to 3</i> <i>Accept any recognisable spelling (phonetic) of the answers above</i></p>	<p>(3 x 1) <b>(3)</b></p>
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<p><b>10(b)(ii)</b></p>	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• quick method / fast production rate</li> <li>• can be automated (CNC)</li> <li>• punch / die are durable and can be replaced infrequently</li> <li>• punch can be used on a variety of materials / thicknesses</li> <li>• able to create multiple shaped holes in a single punch</li> <li>• self-finishing</li> <li>• reliable process</li> <li>• products have consistent quality</li> <li>• unit costs are low</li> <li>• minimal waste</li> <li>• allows for simple mass production</li> </ul> <p>Accept any other appropriate response</p> <p>e.g. Reliable process (1) allowing products to be mass produced easily (1) with a consistent quality (1) and minimal waste (1).</p> <p><i>Up to 3 marks</i>  <i>Low response (1) or three low responses (3) or detailed response (3).</i></p> <p style="text-align: right;">(3 x 1) (1 x 3)</p>	<p><b>(3)</b></p>
<p><b>(Total 10 marks)</b></p>		

Question	Answer	Mark
<p><b>11(a)(i)</b></p>	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• Monitor</li> <li>• Adjust</li> <li>• Changing</li> <li>• Intervention</li> <li>• To keep within specification</li> <li>• Use of PLC</li> <li>• Use of embedded computers</li> <li>• Data comparison</li> <li>• Data collection</li> <li>• Closed loop/feedback</li> </ul> <p>e.g. The active changing of the process parameters (1) based on the results on process monitoring (1)  Eg Monitors the manufacturing/production process (1) so the product meets its specification (1)</p> <p style="text-align: right;">(1 x 2)</p>	<p><b>(2)</b></p>
<p><b>11(a)(ii)</b></p>	<p>One mark for identifying reason x 2  One mark for explanation x 2</p>	

Question	Answer	Mark
	<ul style="list-style-type: none"> <li>• reduced customer complaints (1) – better products (1)</li> <li>• control of costs (1) – cheaper product / more profit (1)</li> <li>• avoids faulty parts being assembled (1) – early detection (1)</li> <li>• increased sales (1) – consistent product (1)</li> <li>• user confidence (1) – less returns (1)</li> <li>• reduced waste (1) – control of manufacturing process (1)</li> <li>• reliable product (1) – monitoring standards testing / parts (1)</li> <li>• no breaking parts (1) – monitoring component / parts (1)</li> <li>• to alert the manufacturer of errors (1) – stop faulty product being made (1)</li> <li>• more efficient / faster production (1)- increased customer satisfaction (1)</li> <li>• improved product (1) and employee safety (1)</li> </ul> <p>Any other appropriate response</p>	<p>(2 x 2)</p> <p><b>(4)</b></p>
<b>11(b)</b>	<p>One mark for identifying QC used x 2</p> <p>One mark for description x 2</p> <ul style="list-style-type: none"> <li>• Visual inspection (1) - and checking against prototype/first-off/template etc. (1)</li> <li>• Size checks (1) - by direct measurement or gauging/templates/optical sensors and checking against drawing/specification/tolerances (1)</li> <li>• Functional checks (1) - opening/closing the planner and testing the bookmark (1)</li> <li>• Positional checks (1) - use of crop marks and target or registration marks (1)</li> <li>• Printing checks (1) - use of colour bar or densitometer readings (1)</li> </ul> <p>Any other appropriate answer</p>	<p>(2 x 2)</p> <p><b>(4)</b></p>
<b>(Total 10 marks)</b>		

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



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

Question	Answer	Mark
<p><b>13</b></p>	<p>An explanation that makes reference to four of the following points:  Customer satisfaction may be increased due to:</p> <ul style="list-style-type: none"> <li>• more appealing / better appearance</li> <li>• smoother / brighter finishes</li> <li>• better surface finish</li> <li>• allow enhanced functionality (whiteboard / ruler / bookmark)</li> <li>• modern materials can be cheaper / reduced cost</li> <li>• less likely to fall apart / higher quality item</li> <li>• better wear characteristics / improves wear resistance</li> <li>• extends the life-time of product</li> <li>• lower weight</li> <li>• better strength to weight ratio</li> <li>• more consistent products can be produced</li> </ul> <p>Any other appropriate answer</p> <p>Customer satisfaction may be decreased due to:</p> <ul style="list-style-type: none"> <li>• can be difficult to repair</li> <li>• not as easy to recycle at end of product life</li> </ul> <p>Any other appropriate answer</p> <p><i>Answer can be all positive or a mixture of positive and negative</i>  <i>Low response (1) or detailed response (up to 4)</i></p> <p style="text-align: right;">(4 x 1) (1 x 4)</p>	<p style="text-align: right;"><b>(4)</b></p>
<p><b>(Total 4 marks)</b></p>		

Question	Answer	Mark
<p><b>14</b></p> <p><b>QWC i, ii, iii</b></p>	<p><b>Indicative Content</b> Discussion to address the following:</p> <ul style="list-style-type: none"> <li>• <i>Issue</i> <ul style="list-style-type: none"> <li>▪ Use of ICT in production processes allows more flexible methods to be utilised and improves profitability meaning sales have flexibility to reduce prices if necessary or more money can be directed at marketing new opportunities to sell the school diary planners.</li> </ul> </li> <li>• <i>Development</i> <ul style="list-style-type: none"> <li>▪ Manufacturer needs to balance variation of product range with economies of scale</li> <li>▪ Could lead to extra production capacity required by extra success of marketing</li> <li>▪ Marketing and sales may need extra effort to deal with the increased efficiency of the production processes</li> <li>▪ Targeting of products into the market place would be easier</li> </ul> </li> <li>• <i>Issue</i> <ul style="list-style-type: none"> <li>▪ Use of modern and smart materials enabling a superior type of school diary planner to be made more efficiently, marketed and sold for a higher profit meaning sales have flexibility to reduce prices if necessary or more money can be directed at marketing new opportunities to sell the school diary planners.</li> </ul> </li> <li>• <i>Development</i> <ul style="list-style-type: none"> <li>▪ Improve profitability by creating a more functional / aesthetically pleasing / durable school diary planner which could be marketed as such</li> <li>▪ More efficient production processes to be used, helping profitability</li> <li>▪ Superior product may generate more sales which means the sales team would have more customers to deal with</li> <li>▪ Marketing would need to keep abreast of the better products produced using modern and smart materials and continually invest in new marketing materials.</li> </ul> </li> <li>• <i>Issue</i> <ul style="list-style-type: none"> <li>▪ Use of systems and control technology enabling more efficient production which improves profitability meaning sales have flexibility to reduce prices if necessary or more money can be directed at marketing new opportunities to sell the school diary planners.</li> </ul> </li> </ul>	

Question	Answer	Mark
	<ul style="list-style-type: none"> <li>• <i>Development</i> <ul style="list-style-type: none"> <li>▪ Only likely to affect processes and profitability when improvements in the manufacturing environment are made</li> <li>▪ Any cost reduction achieved within the processes can be passed on to the customer, generating more sales for the sales team to deal with.</li> </ul> </li> </ul> <p>Or other appropriate answer/s</p> <p>Example answer (Level 3):  Manufacturers can use ICT in the production processes, making them more efficient and therefore more profitable. The more efficient processes could lead to extra effort required to market and sell the school diary planners.  Modern or smart materials could be used to improve profitability by creating a superior diary planner which could be marketed as such with a hope that it would increase sales. The use of these materials would also enable more efficient production processes to be used, also helping raise output that would be available for selling however marketing would need to keep the market place updated about any new materials used in the school diary planner.  Manufacturers could use systems and control technology to improve the efficiency of the production processes and potential increase in profitability. This success could lead to more items being available for sale which would increase the work capacity of the sales team. Alternatively this extra profit could used to fund more targeted marketing campaigns to increase the market share of the school diary planner.</p> <p style="text-align: right;">(6 x 1)</p>	(6)
<b>(Total 6 marks)</b>		

Level	Mark	Descriptor
	<b>0</b>	No material deserving of reward
<b>1</b>	<b>1-2</b>	The learner identifies at least two effects on marketing and selling caused through improvements to production process or profitability. The learner shows some understanding of the issues. The learner uses everyday language and the response lacks clarity and organisation. Spelling, punctuation and the rules of grammar are used with limited accuracy.
<b>2</b>	<b>3-4</b>	The learner gives a brief description of at least two effects on marketing and selling, or a detailed description of one effect caused through improvements to production process or profitability. The learner uses some technological / manufacturing terms and shows some focus and organisation. Spelling, punctuation and the rules of grammar are used with some accuracy. Some spelling errors may still be found.
<b>3</b>	<b>5-6</b>	The learner gives a detailed explanation of two or more effects on marketing and selling caused through improvements to production process or profitability. The learner uses a range of appropriate technological / manufacturing terms and shows good focus and organisation. Spelling, punctuation and the rules of grammar are used with considerable accuracy.
		<b>(Total 6 marks)</b>
<b>Total Marks for Section B</b>		<b>60</b>
<b>Total Marks for the whole paper for Section A &amp; B</b>		<b>110</b>

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