

GCSE

**Design and Technology:  
Product Design**

45551

Mark scheme

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4555

June 2013

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Version/Stage: Final

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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**Question 1**

| Question   | Part   | Sub Part | Marking Guidance   | Mark   | Comments    |         |  |         |  |         |  |        |  |   |           |
|--|--|----------|--|--|-------------|---------|--|---------|--|---------|--|--------|--|---|-----------|
| 1  | a  |          | <table border="1"> <thead> <tr> <th>Function</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>Contain</td> <td>The packaging will contain 5 items. It will need to keep the items together and prevent any falling out.</td> </tr> <tr> <td>Protect</td> <td>The packaging should protect the contents from being damaged e.g. the fruit from becoming bruised.</td> </tr> <tr> <td>Display</td> <td>The packaging should tell the customer what is inside and encourage the customer to buy the product. Attract / eye-catching.</td> </tr> <tr> <td>Inform</td> <td>Packaging should display nutritional information, ingredients to prevent allergies, consume by date etc.</td> </tr> </tbody> </table> | Function   | Explanation | Contain | The packaging will contain 5 items. It will need to keep the items together and prevent any falling out. | Protect | The packaging should protect the contents from being damaged e.g. the fruit from becoming bruised. | Display | The packaging should tell the customer what is inside and encourage the customer to buy the product. Attract / eye-catching. | Inform | Packaging should display nutritional information, ingredients to prevent allergies, consume by date etc. | 6 | 3x2 marks |
|  |  |          | Function   | Explanation  |             |         |  |         |  |         |  |        |  |   |           |
|  |  |          | Contain  | The packaging will contain 5 items. It will need to keep the items together and prevent any falling out.                     |             |         |  |         |  |         |  |        |  |   |           |
|  |  |          | Protect  | The packaging should protect the contents from being damaged e.g. the fruit from becoming bruised.                           |             |         |  |         |  |         |  |        |  |   |           |
|  |  |          | Display  | The packaging should tell the customer what is inside and encourage the customer to buy the product. Attract / eye-catching. |             |         |  |         |  |         |  |        |  |   |           |
| Inform   | Packaging should display nutritional information, ingredients to prevent allergies, consume by date etc. |          |  |  |             |         |  |         |  |         |  |        |  |   |           |
| No marks for function.   |  |          |  |  |             |         |  |         |  |         |  |        |  |   |           |
| No marks for rewording of example.   |  |          |  |  |             |         |  |         |  |         |  |        |  |   |           |
| Explanation shows good understanding of the function relative to the packed lunch packaging. 2 marks             |  |          |  |  |             |         |  |         |  |         |  |        |  |   |           |
| Explanation is vague and lacking in understanding of the function relative to the packed lunch packaging. 1 mark |  |          |  |  |             |         |  |         |  |         |  |        |  |   |           |
| 1  | b  |          | <p><b>Sustainable</b> - Reference to recycling, recyclable materials, packaging could be reused for another purpose, washed etc., durability, use of renewable materials. Sound response which makes reference to two of the ideas above in brief or one idea in detail. 2 marks</p> <p>Brief / single word answer with reference to one idea only. 1 mark</p>   | 6  | 3x2 marks   |         |  |         |  |         |  |        |  |   |           |
|  |  |          | Max 1 mark for generic response not linked to specific design feature.   |  |             |         |  |         |  |         |  |        |  |   |           |
|  |  |          | <p><b>Educational</b> - Reference to designing products for children, inclusion of educational device such as game, discovery activity, colouring etc. Sound response which makes reference to two of the ideas above in brief or one idea in detail. 2 marks</p> <p>Brief / single word answer with reference to one idea only. 1 mark</p>  |  |             |         |  |         |  |         |  |        |  |   |           |

|   |   |  |    |  |
|---|---|--|----|--|
|   |   | <p>Max 1 mark for response not linked to children as intended user</p> <p><b>Ergonomic</b> – reference to size, weight for children to be able to carry comfortably, open and close easily. Reference to anthropometric data used to design suitable for user.<br/>                 Sound response which makes reference to two of the ideas above in brief or one idea in detail. 2 marks<br/>                 Brief / single word answer with reference to one idea only. 1 mark</p> <p>Max 1 mark for generic response not linked to specific design feature.</p>   |    |  |
| 1 | c | <p><b>12-15 marks</b> Response is fully compatible with packaging for the lunch items, is drawn in proportion and would be fully effective. Solution has <b>innovative</b> or <b>commercially recognised</b> features which enhance the product's saleability.</p> <p>Sketch is accurate and detailed and may be a 2D net development of the packaging solution, in proportion with glue tabs correctly positioned and dimensions appropriately labelled and / or a detailed 3D drawing of the packaging solution, in proportion, closure and joins correctly positioned.<br/>                 Application of colour has been used to provide detail of surface decoration; applied to 2D net development and/or 3D drawing, appropriate to the lunch items including e.g. logos and conventions such as bar code, contents, food packaging symbols, image of product etc.</p> <p><b>8 - 11 marks</b> A mostly effective solution for packaging the lunch items but may not be fully drawn or has missing components which result in solution not being entirely appropriate for product. Design may be a standard solution which may not detail innovative or commercial design features but is an appropriate solution and commercially viable.<br/>                 Response includes a sound 2D net development of the packaging solution, in proportion with most glue tabs correctly positioned and dimensions appropriately labelled and / or a sound 3D drawing of the packaging solution, in proportion, closure and/or most joins correctly positioned.<br/>                 Reasonable application of colour to give some detail of the surface decoration; applied to 2D net development and/or 3D drawing, appropriate to the lunch</p> | 15 |  |

|   |   |  |   |  |
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|   |   | <p>items. May not have included e.g. logos and conventions such as bar code, contents, safety symbols, image of product etc. or may be simplistic and lack detail.</p> <p><b>4-7 marks</b> Part of response may be effective as packaging for the lunch items but may not be fully drawn or has missing components which result in solution not being entirely appropriate for product. Design may be a simple solution which may not detail innovative or commercial design features and therefore may not enhance the product.<br/>Response may include a 2D net development of the packaging solution, but may not be in proportion or may not have glue tabs correctly positioned, dimensions may not be given and / or a 3D drawing of the packaging solution, but may not be in proportion or may not have closure and joins correctly positioned.<br/>Basic application of colour to give simplistic detail of surface decoration; may be applied to 2D net or 3D drawing; may not have given detail of logos or packaging conventions.</p> <p><b>0-3 marks</b> Limited response which lacks significant detail as an effective or creative packaging solution.<br/>Basic 2D net development of the packaging solution not in proportion, glue tabs missing or incorrectly positioned and / or a basic 3D drawing of the packaging solution not in proportion, closure/joins missing or incorrectly positioned.<br/>Little or no application of colour, colour / surface decoration applied crudely and does not enhance appearance of product.</p> |   |  |
| 1 | d | <p>Evaluative comments and possible future developments can be rewarded. All three areas do not need to be covered.</p> <p>Concise and detailed evaluation with well-reasoned points clearly linking the packaging functions to specific design features. 7 – 8 marks</p> <p>Some well-reasoned points linked to original design criteria although response may be lacking in some detail or reference to further development opportunities. 5-6 marks</p>   | 8 |  |

|  |  |   |  |  |
|--|--|---|--|--|
|  |  | <p>At least two reasoned points linked to original design criteria although response may be simplistic and lacking in detail or reference to further development opportunities. 3-4 marks</p> <p>One point fairly well reasoned or some vague points which might not be linked to original design criteria. Little or no reference to further development opportunities. 1 – 2 marks</p> <p>No relevant evaluation presented. 0 marks</p> |  |  |
|--|--|---|--|--|

**Question 2**

| Question       | Part  | Sub Part   | Marking Guidance   | Mark | Comments  |   |  |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|----------------|---|--|--|------|-----------|---|--|------------------|------------|-----------|----------------|-------------|---|---|--------|---|------------------------------|-----|-------------------------|--|--------|--|-------------|-------------|--|-------------------------------|----------------|--|--|--------------|---|---------------|
| 2              | a   | i  | Best three responses in each column.   | 6    | 3x2 marks |   |  |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | <table border="1"> <thead> <tr> <th>Product</th> <th>Material/ingredient</th> <th>Finish technique</th> </tr> </thead> <tbody> <tr> <td>Drinks can</td> <td>Aluminium</td> <td>Screen printed</td> </tr> <tr> <td>Cottage Pie</td> <td>Potato / minced meat/specific meat e.g. beef, lamb, pork or quorn, lentils or other vegetarian substitute</td> <td>Potato browned using high temperature / piped</td> </tr> <tr> <td>Helmet</td> <td>HDPE / ABS / Polycarbonate / carbon fibre reinforced polymer (climbing)</td> <td>Self-finish applied in mould</td> </tr> <tr> <td>Tie</td> <td>Silk / polyester / wool</td> <td>Hand painted / screen printed / stain resistance coating</td> </tr> <tr> <td>Screws</td> <td>(Mild) steel, stainless steel (medical and marine applications), brass</td> <td>Zinc plated</td> </tr> <tr> <td>Soup carton</td> <td>Card, cardboard, waxed card / foil lined card (composites)</td> <td>Wax coating / screen printing</td> </tr> <tr> <td>Cup and saucer</td> <td>Porcelain / earthenware clay / China clay / glass / melamine</td> <td>Transfer image / hand painted / embossed / glazed / self finished in mould</td> </tr> <tr> <td>Garden bench</td> <td>Teak / elm / mahogany / iroko / oak (hard woods) / recycled plastic? / Polypropylene (PP)</td> <td>Oiled / waxed</td> </tr> </tbody> </table> |      |           | Product   | Material/ingredient                                      | Finish technique | Drinks can | Aluminium | Screen printed | Cottage Pie | Potato / minced meat/specific meat e.g. beef, lamb, pork or quorn, lentils or other vegetarian substitute | Potato browned using high temperature / piped | Helmet | HDPE / ABS / Polycarbonate / carbon fibre reinforced polymer (climbing) | Self-finish applied in mould | Tie | Silk / polyester / wool | Hand painted / screen printed / stain resistance coating | Screws | (Mild) steel, stainless steel (medical and marine applications), brass | Zinc plated | Soup carton | Card, cardboard, waxed card / foil lined card (composites) | Wax coating / screen printing | Cup and saucer | Porcelain / earthenware clay / China clay / glass / melamine | Transfer image / hand painted / embossed / glazed / self finished in mould | Garden bench | Teak / elm / mahogany / iroko / oak (hard woods) / recycled plastic? / Polypropylene (PP) | Oiled / waxed |
|                |   |  | Product  |      |           | Material/ingredient   | Finish technique   |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | Drinks can   |      |           | Aluminium   | Screen printed   |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | Cottage Pie  |      |           | Potato / minced meat/specific meat e.g. beef, lamb, pork or quorn, lentils or other vegetarian substitute | Potato browned using high temperature / piped            |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | Helmet   |      |           | HDPE / ABS / Polycarbonate / carbon fibre reinforced polymer (climbing)                                   | Self-finish applied in mould                             |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | Tie  |      |           | Silk / polyester / wool   | Hand painted / screen printed / stain resistance coating |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | Screws   |      |           | (Mild) steel, stainless steel (medical and marine applications), brass                                    | Zinc plated  |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
|                |   |  | Soup carton  |      |           | Card, cardboard, waxed card / foil lined card (composites)  | Wax coating / screen printing                            |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
| Cup and saucer | Porcelain / earthenware clay / China clay / glass / melamine                              | Transfer image / hand painted / embossed / glazed / self finished in mould |  |      |           |   |  |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |
| Garden bench   | Teak / elm / mahogany / iroko / oak (hard woods) / recycled plastic? / Polypropylene (PP) | Oiled / waxed  |  |      |           |   |  |                  |            |           |                |             |   |   |        |   |                              |     |                         |  |        |  |             |             |  |                               |                |  |  |              |   |               |

|   |   |    |   |   |  |   |          |
|---|---|----|---|---|--|---|----------|
|   |   |    | <b>Wedding invitation</b>   | Card or other appropriate named papers and boards, cartridge paper (insert) | Embossed / screen printed / glazed / wax coating applied |   |          |
| 2 | a | ii | <p>to visually enhance the material e.g. gloss/silk/matt /metallic /hammered finish;<br/>to protect from deterioration, corrosion;<br/>to make more durable / waterproof</p> <p>Sound response which makes reference to two of the ideas above in brief or one idea in detail.<br/>2 marks</p> <p>Brief / single word answer with reference to one idea only.<br/>1 mark</p>  |   |  | 2 |          |
| 2 | b | i  | <p>Any combination of material/component and two appropriate standard forms.<br/>Material does not need to match product i.e. might be incorrect; Standard form must match material or component selected.</p> <p>e.g.           <b>paper and board:</b> A3, thickness, weight and colour;<br/>                  <b>food:</b> Fresh, frozen, dehydrated, liquid and canned;<br/>                  <b>metal:</b> Sheet, rod, bar and tube;<br/>                  <b>ceramics:</b> Slip, body, pigment and oxides;<br/>                  <b>textiles:</b> Roll width, linear metre, weight and ply;<br/>                  <b>wood:</b> Rough sawn, PSE, sheet size and mouldings;<br/>                  <b>plastics:</b> Granules, sheet, rod, powder and foam.</p> <p>No mark for material/component, 1 mark for each standard form.</p> |   |  | 2 | 2x1 mark |



|   |   |    |   |   |  |
|---|---|----|---|---|--|
| 2 | b | ii | <p>Materials processed into standard sizes to enable costing, transportation, manageable, ready for manufacture, wastage, standard forms driven by consumer demand etc.</p> <p>A concise and detailed response showing a good understanding of factors relating to a primary processing and specifying materials. Reference made to two or more ideas in detail.</p> <p>Sound response which makes reference to two of the ideas above in brief or one idea in detail.</p> <p>Brief / single word answer with reference to one idea only.</p> | 4 |  |
|---|---|----|---|---|--|

3-4 marks  
2 marks  
1 mark

**Question 3**

| Question | Part | Sub Part | Marking Guidance  | Mark | Comments |
|----------|------|----------|---|------|----------|
| 3        | a    | i        | Inspiration for new products often comes from the needs of society, market research improves products, brand loyalty, have to have one psychology. An innovation based upon market pull has been developed by the R&D function in response to an identified market need, fashion or trend.  | 2    |          |
| 3        | a    | ii       | How advances in technology are used to produce new products. Inspiration for new products comes from research and development labs. An innovation based upon a new invention and a perceived market need.   | 2    |          |
| 3        | a    | iii      | <p>No longer working or useful. How consumer demand leads to produce new products. Manufacturer deliberately minimised the 'life' of a product to maintain sales of future products – built in / planned obsolescence</p> <p>Sound response which makes reference to two of the ideas above in brief or one idea in detail.</p> <p style="text-align: right;">2 marks</p> <p>Brief / single word answer with reference to one idea only.</p> <p style="text-align: right;">1 mark</p> | 2    |          |

|   |   |  |   |  |
|---|---|--|---|--|
| 3 | b | <p>Concise and detailed answer which shows a good understanding of how technology push / market pull have both contributed to the development of mobile phones and the market expansion. Response may include product examples or examples of specific technology / improved features. 4 marks</p> <p>Sound and fairly detailed answer which shows a good grasp of how technology push / market pull have both contributed to the development of mobile phones and the market expansion. Response may include product examples or examples of specific technology / improved features. 3 marks</p> <p>Reasonable response which may not fully understand how technology push / market pull have both contributed to the development of mobile phones and the market. 2 marks</p> <p>Limited, superficial or largely incorrect response. 1 mark</p> <p>No credit for consumable products such as disposable razors or batteries</p> | 4 |  |
|---|---|--|---|--|

|   |   |  |   |  |
|---|---|--|---|--|
| 3 | c | <p>Planned obsolescence is the conscious decision on the part of a manufacturer to produce a consumer product that will become obsolete and/or non-functional in a defined time frame. Planned obsolescence has great benefits for a producer in that it means a consumer will buy their product repeatedly, as their old one is no longer functional or desirable and not economical to repair.</p> <p>Planned obsolescence has an obvious detrimental effect on the environment as it is a planned waste of resources, particularly as typical products might use high levels of non-renewable or difficult to recycle materials. Planned obsolescence encourages use of more non-renewable materials, energy for processing raw materials and production processes, transport, pollution, packaging materials and disposal in land fill. Products could be built to last and be repairable – reference to 5 R's.</p> <p>A concise and detailed response showing a good understanding of the above factors. Examples of relevant products used to illustrate points. Response well-structured with good use of appropriate design and technology terminology and showing a good grasp of grammar, punctuation and spelling.<br/>7-8 marks</p> <p>A sound response showing a basic understanding of the above factors. At least one example of relevant products used. Response fairly well structured with some use of design and technology terminology with small number of errors in grammar, punctuation and spelling.<br/>5-6 marks</p> <p>A reasonable response although may be simplistic and lacking in detail, examples of products or understanding of planned obsolescence. Response has simple structure with limited use of design and technology terminology and some errors in grammar, punctuation and spelling.<br/>3-4 marks</p> <p>A simplistic statement which mentions one point only. Response may not</p> | 8 |  |
|---|---|--|---|--|

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|--|--|---|--|--|
|  |  | <p>include examples of relevant products or products selected may not be appropriate to argument. Response poorly structured with little or no use of design and technology terminology and with numerous errors in grammar, punctuation and spelling. 1-2 marks</p> <p>No relevant argument presented. 0 marks</p> <p>No credit for consumable products such as disposable razors or batteries</p> |  |  |
|--|--|---|--|--|

**Question 4**

| Question | Part | Sub Part | Marking Guidance  | Mark | Comments |
|----------|------|----------|---|------|----------|
| 4        | a    | i        | <p>Energy conscious:<br/>Sustainable design – recyclable materials<br/>Energy efficient – able to boil small amounts / cupful of water at a time<br/>Window / measure so can see how much water inside<br/>A rated<br/>Audible / visual alarm to show when boiled<br/>Long lasting / durable</p> <p>One design feature fully explained or two in brief, must be appropriate to user.<br/>2 marks<br/>Brief / single word answer, must be appropriate to user. 1 mark</p>                      | 2    |          |
| 4        | a    | ii       | <p>Style conscious:<br/>High quality / expensive materials<br/>Sophisticated features – e.g. water may be lit by led blue (cold) to red (hot) to show when ready<br/>Long-lasting / durable<br/>Looks good<br/>Price suggests exclusivity<br/>Aesthetics – coloured to match interior design / chrome finish etc.</p> <p>One design feature fully explained or two in brief, must be appropriate to user.<br/>2 marks<br/>Brief / single word answer, must be appropriate to user. 1 mark</p> | 2    |          |

|   |   |   |   |             |
|---|---|---|---|-------------|
| 4 | b | <p>Colour psychology often used in product branding. Masculine and feminine colour combinations, primary / bright colours used for children's products, simple two colour branding for basic/ affordable range of products in supermarkets e.g. Tesco Value (blue and white), Sainsbury's Basics (Red and White). Student might be drawn to the affordable range as they recognise the two colour scheme, young professional might look for a more sophisticated use of darker colours with complex graphics to signal higher quality.</p> <p>A concise and detailed response showing a good understanding of the use of colour in branding and marketing products and which makes reference to two ideas in detail or several in brief. <span style="float: right;">3 marks</span></p> <p>Sound response which makes reference to two of the ideas above in brief or one idea in detail. <span style="float: right;">2 marks</span></p> <p>Brief / single word answer with reference to one idea only. <span style="float: right;">1 mark</span></p> | 3 |             |
| 4 | c | <p>Any two appropriate advertising methods a manufacturer might use to market their products. e.g. supermarket / retailer in store promotion, on shelf, newspapers and magazines; product placement in TV programmes; celebrity endorsement/ 'face of', Viral marketing – internet social networks, buzz words.</p> <p>A full description of the technique <span style="float: right;">2 marks</span></p> <p>A simplistic statement. <span style="float: right;">1 mark</span></p>  | 4 | 2 x 2 marks |

|   |   |   |   |  |
|---|---|---|---|--|
| 4 | d | <p>Use of Trademark, Copyright, registered designs and patents to protect their designs from being copied. Legislation provides protection so that a company can sue another company for breach of copyright etc. Products carry symbols which tell the consumer that the product originates from the original manufacturer and is therefore not a copy. Patents protect the features and processes which make products work (technology).</p> <p>A concise and detailed response showing a good understanding of copyright and trademarks and which makes reference to two ideas in detail or several in brief. <span style="float: right;">3 marks</span></p> <p>Sound response which makes reference to two of the ideas above in brief or one idea in detail. <span style="float: right;">2 marks</span></p> <p>Brief / single word answer with reference to one idea only. <span style="float: right;">1 mark</span></p> | 3 |  |
|---|---|---|---|--|



**Question 5**

| Question | Part | Sub Part | Marking Guidance  | Mark | Comments |
|----------|------|----------|---|------|----------|
| 5        | a    |          | <p>A precise drawing showing high level skills. Solution shows understanding of the term assembly and is therefore fully feasible and suitable for <b>assembly</b> in this quantity.<br/>Design is fully annotated to identify parts of product ready for assembly. 5-7 marks</p> <p>Some parts of the drawing not easy to understand. Solution might not be completely feasible or suitable for <b>assembly</b> in this quantity. Limited annotation which identifies some of the products parts ready for assembly. 2-4 marks</p> <p>Simplistic product drawn, insufficiently detailed to show separate parts for assembly or suitability for <b>assembly</b> in this quantity. No annotation. 1 mark</p> <p>Max 5 marks for notes without sketching.</p>   | 7    |          |
| 5        | b    |          | <p>A <b>production line</b> is a set of sequential operations established in a factory whereby materials are put through a refining process to produce an end-product that is suitable for onward consumption; or components are assembled to make a finished article.</p> <p>An <b>assembly line</b> is a manufacturing process (sometimes called <i>progressive assembly</i>) in which parts (usually interchangeable parts) are added to a product in a sequential manner using optimally planned logistics to create a finished product much faster than with handcrafting-type methods.<br/>Product parts are pre-manufactured and finished before being assembled. e.g. a car – many parts are manufactured in specialist facilities and brought together for assembly on a production line.</p> <p>A concise and detailed response showing a good understanding of use of an assembly line in manufacturing complex products. 3 marks</p> <p>A sound response showing a basic understanding of use of an assembly line in manufacturing complex products. 2 marks</p> <p>A simplistic statement or only partially correct response. 1 mark</p> | 3    |          |

|   |   |   |   |  |
|---|---|---|---|--|
| 5 | c | <p>(i) All main stages of assembly listed correct and in correct order. 3 marks<br/>                 Some main stages of assembly identified but information may be insufficiently detailed and in wrong order. 2 marks<br/>                 Little or no main stages of assembly identified or information is vague and/or in wrong order. 1 mark</p> <p>(ii) Appropriate quality control measures identified and in the correct place. 2 marks<br/>                 Appropriate quality control measures identified but may not be in correct place. 1 mark<br/>                 Appropriate quality control measures may not have been identified or may be incorrect for the manufacturing process. 0 marks</p> <p>(iii) Correctly named tools and equipment for major stages of assembly and quantity of production. 2 marks<br/>                 At least one suitable item of tools or equipment identified. 1 mark</p> <p>(iv) Appropriate waste outputs and system for removal correctly identified. E.g. sprue removed from plastic components; off cuts of fabric and removal of excess threads from textiles products. 2 marks<br/>                 Appropriate waste output identified without removal system or vague waste/removal identified in brief. 1 mark</p> | 9 |  |
| 5 | d | <p>i</p> <p>Risks associated with using tools and equipment to assemble the product e.g. use of scissors, glue, clamps, general housekeeping rules such as trailing leads etc.</p> <p>Identified risk must be appropriate to product and assembly process described in 5(c).</p> <p>Appropriate H&amp;S risk identified and described in sufficient detail. 2 marks<br/>                 Appropriate H&amp;S risk identified but may not be sufficiently described. 1 mark</p>  | 2 |  |

|   |   |    |  |   |  |
|---|---|----|--|---|--|
| 5 | d | ii | Appropriate intervention or guideline identified to minimise risk e.g. stowing tools safely between uses, good ventilation when using toxic substances, safety goggles, keeping areas tidy, no trailing leads etc.                           | 2 |  |
|   |   |    | <p>Appropriate intervention described in sufficient detail. Intervention matches risk in (i).<br/>2 marks</p> <p>Appropriate intervention identified but may not be sufficiently described. Intervention matches risk in (i).<br/>1 mark</p> |   |  |

|   |   |  |  |   |  |
|---|---|--|--|---|--|
| 5 | e |  | Data Transfer e.g. Electronic Data Interchange (EDI) involves the transfer of structured data from one computer to another without human intervention e.g. to transport data between a retailer and a manufacturer; CAD remote manufacturing. Benefits are a shortened supply chain to speed up ordering and production of specific parts. Reference to barcode labelling, stock systems, Electronic Point of Sale (EPOS) readers to inform pace of manufacture. Information shared at all points of sales and manufacture to ensure sufficient stock readily available. | 4 |  |
|   |   |  | A concise and detailed response showing a good understanding of data transfer systems and appropriate to the selected product and its manufacture. 2 relevant points developed in detail or 4 in brief.<br>4 marks   |   |  |
|   |   |  | A good response showing a sound understanding of EDI systems and appropriate to the selected product and its manufacture. 1 relevant point developed in detail and 1 in brief or 3 in brief.<br>3 marks  |   |  |
|   |   |  | A sound response showing a basic understanding of EDI systems and appropriate to the selected product and its manufacture. 1 relevant point developed in detail or 2 in brief.<br>2 marks  |   |  |
|   |   |  | A simplistic statement which mentions one point only.<br>1 mark  |   |  |

**Question 6**

| Question   | Part   | Sub Part  | Marking Guidance   | Mark | Comments       |             |       |  |  |   |  |   |  |
|--|--|---|--|------|----------------|-------------|-------|--|--|---|--|---|--|
| 6  | a  |   | <table border="1"> <thead> <tr> <th>Lamp</th> <th>Novelty mirror</th> <th>Pop-up card</th> <th>Dress</th> </tr> </thead> <tbody> <tr> <td>Modelling used to check size and proportions, colour combinations, cable management, choice of materials, construction techniques, manufacturing / assembly issues, testing effect of heat from lamp over time, length of cable. Modelled first in card then in part in sample materials before full prototype. CAD 2D and 3D modelling e.g. 2D Design, Prodesktop, Solidworks, electronic circuits.</td> <td>Modelling used to check size and proportions of mirror panel and surround, colour combinations, hanging mechanism, choice of materials, construction techniques, manufacturing / assembly issues. Modelled first in card then in part in sample materials before full prototype. CAD 2D and 3D modelling e.g. 2D Design, Prodesktop, Solidworks.</td> <td>Pop-up mechanisms modelled in isolation. Card modelled in less expensive card / paper to check dimensions. Alternative card materials used to create range of prototypes to test colour, finish and suitability for mechanism, construction techniques, manufacturing / assembly issues. CAD 2D and 3D modelling e.g. 2D Design</td> <td>Toile manufactured in cheaper fabric to test size and fit against body. Decorative elements modelled in part to test dimensions, aesthetics, construction techniques, manufacturing / assembly issues, ease of manufacture. Initial paper pattern, toile then prototyped in alternative fabrics. CAD 2D and 3D modelling e.g. Speedstep.</td> </tr> </tbody> </table> <p>Concise and detailed response which makes reference to several ideas in detail. Response makes reference to specific parts of the product and shows a thorough understanding of the benefits of modelling in development of the product. 5 - 6 marks</p> | Lamp | Novelty mirror | Pop-up card | Dress | Modelling used to check size and proportions, colour combinations, cable management, choice of materials, construction techniques, manufacturing / assembly issues, testing effect of heat from lamp over time, length of cable. Modelled first in card then in part in sample materials before full prototype. CAD 2D and 3D modelling e.g. 2D Design, Prodesktop, Solidworks, electronic circuits. | Modelling used to check size and proportions of mirror panel and surround, colour combinations, hanging mechanism, choice of materials, construction techniques, manufacturing / assembly issues. Modelled first in card then in part in sample materials before full prototype. CAD 2D and 3D modelling e.g. 2D Design, Prodesktop, Solidworks. | Pop-up mechanisms modelled in isolation. Card modelled in less expensive card / paper to check dimensions. Alternative card materials used to create range of prototypes to test colour, finish and suitability for mechanism, construction techniques, manufacturing / assembly issues. CAD 2D and 3D modelling e.g. 2D Design | Toile manufactured in cheaper fabric to test size and fit against body. Decorative elements modelled in part to test dimensions, aesthetics, construction techniques, manufacturing / assembly issues, ease of manufacture. Initial paper pattern, toile then prototyped in alternative fabrics. CAD 2D and 3D modelling e.g. Speedstep. | 6 |  |
| Lamp   | Novelty mirror   | Pop-up card   | Dress  |      |                |             |       |  |  |   |  |   |  |
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|   |   |  |   |   |  |
|---|---|--|---|---|--|
|   |   |  | <p>Sound response which makes reference to the selected product as a whole and gives two or more ideas in detail. 3 – 4 marks</p> <p>Basic response which makes reference to one of the ideas in detail or two in brief but which may not make reference to the selected product. 2 marks</p> <p>Brief / single word answer with reference to one idea only. 1 mark</p>   |   |  |
| 6 | b |  | <p>CAD 3D modelling using AutoCAD/ pro desktop etc. – To show virtual product which can be machined out using a 3D prototype to test before incurring cost of setting machinery to manufacture; to help the designer visualise the product in 3D; to interface with CAM equipment (CNC). Would need to include stress analysis, destructive testing, marketing/seeking customer feedback, production planning etc. CAD 2D designing applications such as photoshop, corel draw, 2D design can be used to develop product in 2D. Drawings can be output to laser cutter / vinyl cutter / digital printer etc. Files can be edited to test different colourways, effects, sizes etc and each development saved. Files can be saved, shared with others in different locations by email, edited without needing to start again. Greater accuracy.</p> <p>Concise, detailed and well-reasoned response which makes reference to three or more of the ideas in detail. 5 – 6 marks</p> <p>Sound response which makes reference to two of the ideas in detail or several in brief. 3-4 marks</p> <p>Basic response which makes reference to one of the ideas in detail or two in brief. 2 marks</p> <p>Brief / single word answer with reference to one idea only. 1 mark</p> | 6 |  |