

DESIGN AND TECHNOLOGY

Paper 9705/11
AS Level Written Paper

There were too few candidates for a meaningful report to be produced.

DESIGN AND TECHNOLOGY

Paper 9705/12 AS Level Written Paper

Key messages

Candidates responded well to the new style of question paper and many excellent responses were seen.

Candidates should develop knowledge and understanding of all twelve topics of the syllabus content. Some candidates answered parts of questions to an excellent standard, such as **3(d)** *Identify and justify a suitable finish for the oak base*, but other parts, such as **5(c)(ii)** *Use sketches and notes to show an example of standardised components*, they were less sure about.

Candidates should be encouraged to read the questions carefully and to take note of command words and instructions. For example, in **Question 4(c)(i)** and **4(c)(ii)** it clearly stated: *In your response, you should give details of any tools, equipment and processes involved and the safety precautions undertaken*, and in **Question 7** it clearly stated: *discuss the impact of emerging technologies on the wider issues in design and technology (including cultural, economic, environmental and social factors)*. In some cases, candidates may have scored higher marks if they had correctly followed all the instructions.

General comments

Candidates appeared to have sufficient time to attempt all the questions in the examination paper.

Almost all candidates answered within the given response area, with only a small number of candidates using additional pages. Where additional pages were used, it was usually for **Question 7**.

Questions that required candidates to use sketches and notes to describe making processes, for example **3(b)(i)** and **3(b)(ii)**, were usually completed to a very high standard. The sketches were often of an excellent standard, and the supporting annotations demonstrated a good understanding of the tools and equipment required.

Some candidates may have benefitted from using a more structured approach in longer written responses, such as the use of numbered points or bullet points.

For **Question 6**, the design modification proposals were often very impressive, but the analysis of how the modification would meet the needs of people with limited hand movement was sometimes rather superficial.

For **Question 7**, some candidates demonstrated only limited understanding of emerging technologies, such as computer-controlled devices or artificial intelligence (AI).

Comments on specific questions

Question 1

- (a) (i) Most candidates were able to name a thermoplastic that could be used to make the hopper of the wheelbarrow. Commonly seen responses included polypropylene, polyvinyl chloride, high density polyethylene or nylon. Incorrect responses often named a thermosetting plastic, such as polyester resin.
- (ii) Most candidates were able to name a ferrous metal that could be used to make the frame of the wheelbarrow. Commonly seen responses included mild steel, steel, iron or cast iron. Incorrect responses often named a non-ferrous metal, such as aluminium.

- (iii) Most candidates were able to explain why a silicon moulding has been added to the frame of the wheelbarrow. Commonly seen responses suggested the silicon moulding would provide good grip, the silicon moulding would be comfortable, or the silicon moulding would prevent the ferrous metal frame from rusting. For the award of both marks a clear explanation was required, for example, the silicone moulding would make the handle more comfortable by adding a softer surface that is ergonomically shaped.
- (b) (i) Most candidates were able to describe a method of attaching the wheelbarrow wheel to the frame. Commonly seen responses referred to an axle or rod running through the centre of the wheel and being held in place by nuts, split pins or welding. A small number of candidates described methods that would not allow the wheel to rotate, for example a rod that was welded to the frame and welded to the centre of the wheel.
- (ii) Most candidates were able to express some knowledge of an elastomer. Commonly seen responses referred to an elastomer being flexible, so that it would absorb shocks as the wheelbarrow wheel moved over rough terrain.

Question 2

- (a) (i) Most candidates were able to identify the given presentation technique as a two-point perspective drawing.
- (ii) A wide range of alternative presentation techniques were named. These included one point perspective, isometric drawing, exploded views or sectional views. The explanation of why the presentation technique would be used by a designer usually included accurate knowledge of the technique. For example, candidates who named an exploded view usually described how this technique would show the parts of a product in their relative positions.

Commonly seen incorrect responses were often based upon naming and then explaining a type of drawing that was not a presentation technique, for example an orthographic drawing. It is important that all candidates are aware of how the communication methods are classified in the syllabus.

- (b) Many excellent responses were seen to this question. Commonly seen advantages for designers of using tone and colour to show a design proposal to a client included; they can realistically show the materials that the product will be made from so the client can easily understand the product, they can show different colour options so the client can select the best option, or colour enhances the clients experience when they are viewing a design by making it more aesthetically pleasing.

Some candidates repeated the same advantage, for example more aesthetically pleasing and would look nicer. It is important that candidates are advised that when two advantages are required, they should be distinctly different rather than a rewording of the same advantage.

Question 3

- (a) Candidates were asked to explain two reasons why the use of softwood for the point-of-sale display would be considered more sustainable than acrylic or oak.

Commonly seen responses often referred to softwood as sustainable because it grows much quicker than oak, softwood is biodegradable as it will naturally decompose or softwood can be recycled and used for a different purpose, such as making chipboard.

A small number of candidates gave reasons why softwood would be used for the point-of-sale display that were not linked to sustainability, such as it is less expensive, lighter or easier to work.

- (b) (i) Many excellent responses were seen to this question. Most candidates were able to show a method of folding the acrylic sheet at a right angle that involved marking out, heating the fold line and then holding the material in position around a block of wood whilst it cooled. Whilst the heat source was often a line bender, some candidates used an oven, a blow torch or a heated bar to soften the acrylic. The quality of sketches and notes was usually of a high standard and sufficient to fully communicate the folding method.

A small number of candidates incorrectly showed a method of folding the acrylic sheet by scoring and using force to fold it into shape.

- (ii) Many excellent responses were seen to this question. Most candidates were able to show a temporary method of attaching the acrylic sheet to the oak base. The most common responses included the use of screws, magnets or Velcro. The quality of sketches and notes was usually of a high standard and sufficient to fully communicate the temporary method of attachment.

A small number of candidates incorrectly showed a permanent method of attaching the acrylic sheet to the oak base, such as an adhesive.

- (c) Most candidates were able to describe two safe working practices that should be followed when cutting the oak base to size and preparing for a finish. Commonly seen responses included wearing eye protection when cutting the oak with a circular saw to avoid wood particles getting in your eyes or wearing a face mask when sanding the oak to prevent dust entering your mouth.

Some candidates only partly answered the question in that they named Personal Protective Equipment (PPE), such as eye protection or steel toed shoes, but it was unclear what manufacturing process was being undertaken or why the PPE was being worn. The use of gloves was commonly proposed, but it was not always appropriate to the task.

A small number of candidates described safe working practices that would be followed when applying a finish, rather than when cutting the oak to size and preparing for a finish.

- (d) Many excellent responses were seen to this question. Most candidates were able to identify a suitable finish for the oak and justify their choice. The justifications were usually well reasoned and based upon accurate knowledge of the material and the proposed finish.

The most seen finish was varnish, with the justification centred around; it enhances the appearance of the oak, will provide a durable and long-lasting finish and can easily be applied with a brush. Other finishes that were proposed included oil, wax and paint.

Question 4

- (a) Almost all candidates gave two reasons why melamine-faced chipboard had been chosen for the shelf. Commonly seen responses included melamine provides a surface that is durable and resistant to scratches, melamine is available in a wide range of colours or there is no need to apply a finish to melamine.

A small number of candidates gave reasons why chipboard had been chosen for the inner part of the shelf, such as it is sustainable because it is made from recycled timber.

- (b) Most candidates were able to explain one reason why the wall shelf is sold with an instruction leaflet. Commonly seen responses included the instruction leaflet can provide information in different languages so the product can be sold worldwide, the instruction leaflet provides assembly instructions to ensure the customer can easily assemble the product, or the instruction leaflet allows the user to correctly attach the shelf to the wall, reducing the risk of it falling and injuring someone.

- (c) (i) Many excellent responses were seen to this question. Commonly seen methods of making the wall bracket included marking out the parts, cutting the parts to size, welding the parts together and then applying a finish to the parts. In stronger responses, the correct names of tools and equipment were used in a detailed description of each stage in the process. In weaker responses, the sketches and notes only showed limited details of the method of making.

A small number of candidates did not show a method of making the metal wall bracket, as shown in Figure 4.1, but described how to make the entire shelf.

Most candidates included details of safety precautions to be undertaken during the making of the wall bracket. Some candidates only named Personal Protective Equipment (PPE) that would be required, rather than linking the use to a specific stage in the making process.

- (ii) Many excellent responses were seen to this question. Commonly seen methods of attaching the wall bracket included the use of screws and Rawl plugs, and various fixings that involved the use of nuts and bolts. The material for the wall was not stated in the question and so candidates usually interpreted this as being constructed from brickwork or wooden studwork. In stronger responses,

the correct names of tools and equipment were used in a detailed description of each stage in the process. In weaker responses, the sketches and notes only showed limited details of the method of attachment. Almost all attachment methods could easily be removed from the wall if required.

A small number of candidates did not show a method of attaching the metal wall bracket to a wall, as shown in Figure 4.1, but described how to attach the shelf to a wall.

Most candidates included details of safety precautions to be undertaken during the making of the wall bracket. Some candidates only named Personal Protective Equipment (PPE) that would be required, rather than linking the use to a specific stage in the making process.

Question 5

- (a) (i) Candidates were asked to explain why the food ordering terminal attracts customers to purchase food. Commonly seen responses included colour photographs of the food are used so that customers will see exactly what their food will look like before they order, or the food terminal is easy to use as the customer can just click on the images.
- (ii) Candidates were asked to explain how the food ordering terminal impacts on employees. Commonly seen responses included employees will have less interaction with customers as the customers will just use the terminal to order their food, or workers will have less work to do as they only need to serve food, not take orders.
- (iii) Candidates were asked to explain how the food ordering terminal monitors the sales of food. Commonly seen responses included; the food ordering terminal records the number of each food item that is sold in a day and produces a report for the manager, the food ordering terminal can analyse the food sold during a particular week and order food for the next week, or the food ordering terminal keeps track of customer's orders and can be used for targeted promotions.
- (b) (i) Candidates were asked to explain one advantage of using symbols to show the payment options. Commonly seen responses referred to the symbols remove language barriers as they can easily be understood by people from different countries, or symbols speed up transactions as there is no need to spend time reading detailed instructions.
- (ii) Candidates were asked to explain why many restaurant owners prefer customers to pay by debit card or credit card. Commonly seen responses included; card payments mean that less money is kept on the premises and reduces the risk of theft, card payments reduce the need to give change to customers who do not have the exact amount of money in notes or coins, or using a card machine means cash does not need checking and totalling up before taking to the bank.
- (c) (i) Candidates were asked to use sketches and notes to show how the designer had considered ergonomics in the design of the child's play area. Stronger responses clearly made a link between a child and a feature of the play area. For example, the diameter of the tunnel is of a size that would allow a child to crawl through it, or the slide is wide enough for a child to fit on it and comfortably slide down. Weaker responses often showed some understanding of the term ergonomics but did not relate this to the child's play area. The quality of sketches and notes produced in response to this question were usually of a very good standard.
- (ii) Candidates were asked to use sketches and notes to show how the designer had considered standardised components in the design of the child's play area. Stronger responses clearly made a link between a feature of the play area, such as the balls, and explained how these would be purchased in quantity from a specialist supplier to reduce costs. Many candidates also mentioned that if a standardised component, such as a rail, was broken, a replacement part would be readily available. Weaker responses often showed little understanding of why standardised components are used in the production of products. The quality of sketches and notes produced in response to this question were usually of a very good standard.
- (d) Candidates were asked to describe two ways the designer had considered safety when selecting materials for the child's play area. Commonly seen responses referred to the rails would be covered in foam to prevent a child injuring themselves when they bumped into it, or the slide would have a smooth surface so that a child would not suffer from friction burns when sliding down it. Some candidates did not fully appreciate that the question referred to considering safety when

selecting materials for the child's play area and described general safety features, such as nets are provided to prevent a child from falling.

Question 6

Candidates were asked to use sketches and notes to show how the design of one other product could be modified to be more inclusive, allowing a person with limited hand movement to be able to use the product. Commonly seen modifications included remote controls, door handles, steering wheels, seating, devices for opening cans or bottles and a range of hand tools. The quality of sketches and notes were usually of a very high standard and nearly always sufficient to communicate the modification.

A small number of candidates did not show how the design of another product could be modified for use by people with limited hand movement and simply redrew the example given in the question.

Many candidates demonstrated a good understanding of the specific needs of a person with limited hand movement, such as reduced grip or difficulties with fine motor skills.

For many candidates the strength of their response was in showing how they intended to modify a specific product, rather than analysing how the modification that they had proposed would meet the needs of people with limited hand movements.

Question 7

Candidates were asked to discuss how emerging technologies have impacted on the designing and making of products. Many responses demonstrated an excellent understanding of emerging technologies by referring to robotics, artificial intelligence (AI), computer-aided manufacture, improvements in materials technology, quality assurance methods or sustainable production methods. Weaker responses often only referred to the two examples of cars given in the question.

For many candidates the strength of their response was in demonstrating their knowledge of the topic, rather than discussing the impact of emerging technologies on the wider issues in design and technology. Candidates who successfully discussed how emerging technologies have impacted on the wider issues in design and technology usually gave good examples of social, economic and environmental factors, such as a smaller workforce would be required, a more skilled workforce would be required or modern production methods produce less pollution. Cultural factors were usually less well discussed.

Excellent responses to this question were usually appropriately structured, based on accurate information, contained numerous relevant examples and included a concisely written conclusion. Weaker responses often appeared to be a collection of thoughts, rather than a balanced discussion.

DESIGN AND TECHNOLOGY

Paper 9705/13 AS Level Written Paper

Key messages

Candidates responded well to the new style of question paper and many excellent responses were seen.

Knowledge and understanding of making processes were real strengths for many candidates.

Candidates should develop knowledge and understanding of all twelve topics of the syllabus content. Some candidates answered parts of questions to an excellent standard, such as **3(c)** *Identify and justify a suitable finish for the pine frame*, but other parts, such as **5(c)(i)** *Use sketches and notes to show how the designer of the watering can had considered rigidity*, they were less sure about.

Candidates should be encouraged to read the questions carefully and to take note of command words and instructions. For example, in **Question 4(c)(i)** and **4(c)(ii)** it clearly stated: *In your response, you should give details of any tools, equipment and processes involved and the safety precautions undertaken* and in **Question 6** it clearly stated: *include an analysis of how the modification meets the needs of young children*.

Some candidates may have scored higher marks if they had correctly followed all the instructions.

General comments

Candidates appeared to have sufficient time to attempt all the questions in the examination paper.

Almost all candidates answered within the given response area, with only a small number of candidates using additional pages. Where additional pages were used, it was usually for **Question 7**.

Questions that required candidates to use sketches and notes to describe making processes, for example **4(c)(i)** and **4(c)(ii)**, were usually completed to a very high standard.

Some longer written responses may have benefitted from the use of a more structured approach, such as the use of numbered points or bullet points.

For **Question 6**, the design modification proposals were often impressive, but the analysis of how the modification would be more inclusive, allowing the product to be used by young children, was sometimes rather superficial.

For **Question 7**, some candidates demonstrated only limited understanding of how the scale of production impacts on the selection of production processes.

Comments on specific questions

Question 1

- (a) (i) Most candidates were able to name a ferrous metal that could be used to make the frame for the wall unit. Commonly seen responses included steel, iron and stainless steel. Incorrect responses often named a non-ferrous metal, such as aluminium.

- (ii) Most candidates were able to name a method of permanently joining the ferrous metal parts to make the frame of the wall unit. Commonly seen responses included welding, brazing and soldering. Incorrect responses often named a temporary joining method, such as screws, as the method of joining the parts.
- (iii) Most candidates were able to describe a property of medium density fibreboard (MDF) that made it suitable for the shelf of the wall unit. Commonly seen responses referred to; MDF has a smooth surface that can be painted, MDF is a stable material that is strong enough to support the weight of objects placed on the shelf or MDF is cheaper to purchase than hardwood. For the award of both marks a clear description of the property was required, for example MDF has a smooth surface that can be painted to match the decoration of a room.
- (b)(i) Most candidates were able to explain one reason for providing packaging for the wall unit. Commonly seen responses included the packaging keeps all the parts together so they are not lost, the packaging can be used to promote the product, or the packaging protects the product from being damaged during transportation.
- (ii) Most candidates were able to explain one way of making the packaging sustainable. Many candidates focused on the material to be used in the packaging, usually corrugated cardboard or cardboard, and how this could be recycled once the package was no longer required. Some candidates referred to using biodegradable materials, clearly printing recycling instructions on the package or ways of reducing the materials used in the packaging.

Question 2

- (a)(i) Most candidates were able identify the given presentation technique as an isometric drawing. Some candidates incorrectly stated that the given drawing was a three-dimensional drawing or perspective drawing.
- (ii) A wide range of other presentation techniques were named. These included one-point perspective, two-point perspective, exploded views or sectional views. The explanation of why the presentation technique would be used by a designer usually included accurate knowledge of the technique. For example, candidates who chose an exploded view usually described how this technique would show the parts of a product in their relative positions.

Commonly seen incorrect responses were often based upon naming and then explaining a type of drawing that was not a presentation technique, for example an orthographic drawing. It is important that all candidates are aware of how the communication methods are classified in the syllabus.

- (b) Most candidates were able to name at least one advantage of using symbols and conventions on orthographic drawings that are given to a manufacturer. Commonly seen responses included symbols are a common language that is universally understood, a projection symbol clearly indicates the different views, conventions are often shorter and take up less space on a drawing, or dimensions are set out in a standard way that means they should not be misinterpreted.

It is important that candidates are advised that when two advantages are required, they should be distinctly different rather than a rewording of the same advantage.

Question 3

- (a) Candidates were asked to explain two reasons why clear acrylic has been chosen for the picture cover rather than glass. Commonly seen responses included; acrylic is lighter than glass so the picture frame will be easy to move around, acrylic will not shatter if dropped so the picture frame will be safer for the user, acrylic is less expensive than glass so the picture frame will be more affordable, or acrylic can be cut more easily than glass so the picture frame will be easier to make.
- (b)(i) Most candidates were able to show an appropriate method of joining the corner of the pine picture frame and many excellent responses were seen. The most common response was a mitre joint that was secured with a suitable adhesive, although other joints such as a mortice and tenon joint or a dowel joint, were also seen. The quality of sketches and notes was often of a very high standard and always sufficient to communicate the joining method.

- (ii) Most candidates were able to show a method of fixing the clear acrylic picture cover in the pine frame. Commonly seen responses involved the use of a groove or rebate on the inside of the frame, although a slot in the top of the picture frame, that the acrylic sheet slid into, was also seen. The quality of sketches and notes was usually of a very high standard and sufficient to communicate the fixing method.

A small number of candidates showed the acrylic glued to the front of the picture frame.

- (c) Most candidates were able to identify a suitable finish for the pine frame and give some appropriate reasons for their choice of finish. Stronger responses fully justified their choice of finish, with well-reasoned arguments based upon accurate knowledge of the material and the proposed finish. Weaker responses often only referred to the finish making the pine more aesthetic or more durable.

The most seen finish was varnish, with the justification based on; it enhances the appearance of the pine, will provide a durable and long-lasting finish, and can easily be applied with a brush. Other finishes that were proposed included stain, wax and paint.

- (d) Most candidates were able to describe two safe working practices that should be followed when casting the aluminium stands. Commonly seen responses included wearing leather gloves, a leather and a face mask when pouring the molten metal to prevent inhaling fumes. Most responses showed a good understanding of the metal casting process.

Some candidates only partly answered the question; they named Personal Protective Equipment (PPE), such as eye protection or steel toed shoes, but it was unclear what manufacturing process was being undertaken or why the PPE was being worn.

Question 4

- (a) Almost all candidates gave two reasons why the display stand was designed to be assembled by the customer. Commonly seen responses included more convenient for the customer to take home as the package will be smaller, allows the customer to make changes to the product when they assemble it and saves on manufacturing costs as workers do not have to assemble the product.

- (b) Candidates were asked to explain one reason why the manufacturer has used standardised components for the display stand. The most successful responses often referred to; the manufacturer could purchase the standardised components very cheaply from a specialist manufacturer, outsourcing production would avoid the manufacturer having to purchase specialist equipment, or replacement parts could be easily and quickly obtained by the manufacturer or customer.

- (c) (i) Many excellent responses were seen to this question, with the quality of sketches often being outstanding. Commonly seen descriptions of a method of making one hardwood tray for the display stand included wood turning and fabricating the tray from two pieces of hardwood. In stronger responses, the correct names of tools and equipment were used in a detailed description of each stage in the making process. In weaker responses, the sketches and notes only showed limited details of the method of making.

Most candidates included details of safety precautions to be undertaken during the making of the hardwood tray. Some candidates only named Personal Protective Equipment (PPE) that would be required, rather than linking the use to a specific stage in the making process.

- (ii) Many excellent responses were seen to this question, with the quality of sketches often being outstanding. Commonly seen descriptions of a method of making one polymer end cap for a leg of the display stand included fabricating the cap from two pieces of polymer and vacuum forming. In stronger responses, the correct names of tools and equipment were used in a detailed description of each stage in the making process. In weaker responses the sketches and notes only showed limited details of the method of making.

Some candidates proposed methods of making the end cap, such as injection moulding, that was inappropriate for making one end cap.

Most candidates included details of safety precautions to be undertaken during the making of the polymer end cap. Some candidates only named Personal Protective Equipment (PPE) that would be required, rather than linking the use to a specific stage in the making process.

Question 5

- (a) (i) Candidates were asked to explain why the lawnmower might have parts that are different colours. Commonly seen responses included so that the user can easily identify parts of the lawnmower such as the handle for raising and lowering the height of the cut, so that the lawnmower looks more attractive to potential purchasers or colour can be used to warn users of hot or moving parts of the lawnmower.
- (ii) Candidates were asked to explain why the lawnmower has a collection basket that is made of plastic rather than metal. Commonly seen responses included a plastic basket will be lighter for the user to detach and empty, it will be less likely to corrode when in contact with wet grass and a metal basket would get warmer than a plastic basket and could burn the user's hand.
- (iii) Candidates were asked to explain why the lawnmower has a handle that folds down. Commonly seen responses included the handle folds to make the lawnmower more compact for storage or the handle folds to make the lawnmower smaller when transporting it in a car boot. A small number of candidates gave answers that related to the handle being able to be folded down so that it was comfortable for people of different heights to use.
- (b) (i) Candidates were asked to explain one disadvantage of using a lawnmower that is powered by a rechargeable battery. Commonly seen responses included; if the battery is flat you will need to wait for it to recharge before starting to cut the grass, you might be unable to charge the battery because you cannot find the battery charger or you will not be able to use the lawnmower in remote places as you will always need an electricity supply to recharge the battery.
- (ii) Candidates were asked to name one other method of powering a lawnmower and give a reason for their choice. Commonly seen alternative methods of powering a lawnmower included mains electricity (sometimes referred to as a power socket), petrol, diesel or solar energy. The reasons for choosing the alternative method of powering a lawnmower usually referred to it being more convenient for the user, for example it is quicker and easier to fill up a petrol tank than charge a battery, but some responses also referred to lower costs or power output.
- (c) (i) Candidates were asked to use sketches and notes to show how the designer of the watering can had considered 'rigidity'. Stronger responses identified a feature on the watering can, such as the ridges on the sides, the double wall thickness around the filling hole or the triangulation around the spout and used this in their explanation. Weaker responses often showed some understanding of how a thin plastic shell structure could be made more rigid but did not always relate this to a feature on the watering can. The quality of sketches and notes produced in response to this question were usually of a very good standard.
- (ii) Candidates were asked to use sketches and notes to show how the designer of the watering can had considered 'recycling of materials'. Stronger responses referred to the polymer symbol that was moulded into the side of the watering can, explaining that this indicated that the watering can was made from polypropylene. Weaker responses often showed little understanding of the recycling of materials beyond stating that a polymer could be recycled. The quality of sketches and notes produced in response to this question were usually of a very good standard.
- (d) Candidates were asked to describe two advantages of using a system that automatically waters a garden. Commonly seen responses included; an automatic watering system would mean less work for the gardener as they would not have to keep filling a watering can, it would be more accurate as it would always provide the correct amount of water, or it could be operated by a timer so that plants could be watered at an appropriate time of the day.

Question 6

Candidates were asked to use sketches and notes to show how the design of one other product could be modified to be more inclusive, allowing it to be used by young children. Commonly seen modifications included a water bottle, seating, clothing, luggage and a toothbrush. The quality of sketches and notes were usually of a very high standard and nearly always sufficient to communicate the modification.

A small number of candidates did not show how the design of another product could be modified for use by young children and simply redrew the product given in the question.

Some candidates demonstrated a good understanding of the specific needs of young children, such as reduced reach or difficulty in understanding complex written instructions.

For many candidates, the strength of their response was in showing how they intended to modify a specific product, rather than analysing how the modification that they had proposed would meet the needs of young children.

Question 7

Candidates were asked to discuss how the scale of production impacts on the selection of production processes. Many responses demonstrated an excellent understanding of the scales of production, such as one-off, batch and mass production, and production processes such as injection moulding, blow moulding and press forming. Weaker responses often only referred to the three products given in the question.

For many candidates, the strength of their response was in demonstrating their knowledge of the topic, rather than discussing the impact of the scales of production and selection of production processes on the wider issues in design and technology.

Candidates who successfully discussed the wider issues in design and technology usually gave good examples of social, economic and environmental factors, such as references to the impact on the workforce, costs per unit of production and levels of pollution produced. Cultural factors were usually less well discussed.

Excellent responses to this question were usually appropriately structured, based on accurate information, contained numerous relevant examples and included a concisely written conclusion. Weaker responses often appeared to be a collection of thoughts, rather than a balanced discussion.



DESIGN AND TECHNOLOGY

Paper 9705/02 Product Analysis and Improvement Project
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Key messages

- Centres should note that this element of the course is a product improvement project rather than a comprehensive product redesign. It is essential that centres guide candidates to follow the syllabus requirements for the project.
- Candidates are required to study a commercially available product and, after thorough analysis, identify one area for improvement.

General comments

Candidates showed a good ability to design and suggest solutions to the problems they identified at Stage 1 of the assessment criteria. Candidates only need to present research material that directly relates to the identified product and area for improvement. When using questionnaires to assess user needs, it is sufficient to document the key findings and analysis rather than all the information obtained.

Candidates should be encouraged to organise their portfolios according to the six distinct project stage headings. This approach allows them to focus on the specific requirements of each section.

Centres are reminded that they need to include detailed photographic evidence of the final product that candidates have produced.

Folder presentation should ideally be in paper folio form, avoiding plastic flip folders.

Comments on individual assessment criteria

Stage 1: Identifying and analysing a product for improvement.

Successful candidates delivered a thorough analysis of an existing individual product, forming the basis for subsequent design enhancements. The evaluation also included key economic, environmental, social, and cultural aspects associated with the selected product, ensuring a well-rounded and informed approach to product analysis.

Candidates who were less successful often spent time unnecessarily analysing multiple products instead of focusing on just one. Centres should remind candidates that this project is about analysing and improving a single aspect of an existing product, not creating an entirely new design.

Stage 2: Identifying one area for improvement

Successful candidates demonstrated their ability to evaluate their selected product against a range of comparable products on the market, effectively narrowing the focus to a specific area for improvement. The specific area for improvement was clearly documented at the end of this stage of the project.

However, many candidates did not use their research to identify and justify one specific area for further development, and instead proposed changes across multiple areas as part of a complete product redesign.

Stage 3: Clarifying the design situation or need and generating ideas

Centres should ensure that candidates provide an accurate design brief that clearly describes the need they are addressing and a detailed, justified and measurable specification at the start of this section of the project. Successful candidates consistently referenced their specification during the design development and manufacturing process in their projects. This was then used as a framework for evaluating the success of the final product.

The most effective candidates demonstrated a clear ability to competently communicate their ideas through hand sketching, annotation, and in some instances, high-quality physical and computer modelling to develop concepts for their product. They identified and provided justification for their selection of the designs to take forward to the final development phase in stage 4 of the project.

Stage 4: Developing the design and planning

The most successful candidates provided comprehensive documentation outlining the progression and refinement of one of their initial concepts from stage 3 into a proposal appropriate for production. Further research, modelling and construction testing at this phase was included, offering clarity about the precise details and methodology for manufacturing the prototype.

Candidates should review their developed proposal against the original design brief and specification to ensure that it meets all the requirements for the proposed improvement they outlined in stage 3.

Comprehensive construction and timing plans must be presented so that someone with experience could build the product. These should feature scale drawings, a detailed list of necessary materials with sizes, and a timeline for producing the prototype.

Stage 5: Producing a prototype to demonstrate the improvement

Most candidates created prototypes that demonstrated their ability and skill to shape and process materials for the intended purpose. Thorough documentation of each stage of production is essential. The most successful candidates recorded the practical techniques they used clearly, and consistently tracked their project's progress during manufacturing.

Some centres implemented a teacher sign-off sheet that documented observations of candidates using safe working practices, which was useful evidence for assessing and moderating candidates' work.

Centres are reminded that providing clear and detailed photographic evidence is a requirement of the syllabus. This documentation should accurately record the step-by-step construction process, the range of techniques used at various stages of the prototype production, and close-ups of the main features of the final prototype.

Stage 6: Testing and evaluating the improvement

This was the weakest stage for some candidates and in some projects this section was minimally addressed.

More successful candidates produced a testing and evaluation plan at the start of this section that provided a way to comprehensively assess their completed prototype. Accurate and transparent comparisons with the specification, along with user and third-party evaluations, allowed candidates to assess the success of their project and identify clear areas for improvement. Photographic evidence of the product in use was helpful at this stage.

Candidates need to suggest further improvements to their prototype. This ideally needs to be in the form of sketched and annotated designs. Commercial production methods and the wider design technology issues should be addressed during this stage.

DESIGN AND TECHNOLOGY

Paper 9705/32 A Level Written Paper
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Key messages

- Candidates are advised to utilise the allotted time as efficiently as possible. Some candidates made little or no attempt to answer **Questions 5 and 6**.
- Some responses to questions with the command word 'describe' or 'explain' were often very brief, in some cases, single word responses.
The instruction 'to describe' requires the candidate to state the points of a topic, giving characteristics and main features.
The instruction 'to explain' requires the candidate to respond with some or all of the following; set out purposes or reasons, make the relationships between things clear saying why and/or how, and support answers with relevant evidence.
- Responses to questions requiring the candidate 'to discuss' were generally answered well. Most candidates included relevant issues in sufficient depth and in a structured way. Some presented responses using bullet points with brief statements, which is not appropriate.

General comments

Most candidates fully complied with the rubric and attempted all questions. A significant number did not attempt some questions or fully complete them.

The quality of annotated sketching to support answers was mostly very good. Annotation was generally clear, with supportive detail or appropriate evaluative comments. For some candidates, annotation was very limited or not used at all.

Candidates should read all questions very carefully. For some questions, key parts of the question were missed, or incorrect focus was applied. For example, for **Question 5(c)**, some candidates focussed entirely on digital technology with very limited or no reference to collaborative learning, consequently not accessing the higher mark ranges.

Comments on specific questions

Question 1

- (a) Most candidates stated an appropriate material for the holder and gave two appropriate reasons to justify the choice of material. Acrylic and aluminium were the most popular appropriate materials stated. Some reasons given were either too brief and lacking detail or failed to explain why the material was particularly suitable for the holder.
- (b) Most candidates made good use of clear, annotated sketches and notes to present their response. A wide range of appropriate making processes were given. The most common responses involved the development of a net shape, either thermoformed using a strip heater and former for an appropriate polymer or bent and appropriately joined for an appropriate metal. Candidates should focus on the making of the product; some candidates spent too much time describing the marking out stages and did not include important features of the manufacture of the product to access the higher mark ranges.
- (c) Many candidates made appropriate changes to simplify the design of the holder to suit the manufacturing process required to produce 1000 identical holders. Many changed the material to be used, with most candidates selecting either injection moulding or vacuum forming as the

production method. To access the higher mark ranges, candidates needed to show how multiple moulds would be used to generate the batch number required when vacuum forming. Many candidates who selected injection moulding as the manufacturing process, did not include sufficient detail of the mould to access the highest mark range.

Question 2

- (a) Most candidates correctly described one of the stages in the product life cycle. Introduction, growth and decline were the most common correct responses. Candidates were awarded credit for different terminology of stages when the description given clearly described an appropriate stage.
- (b) Relatively few candidates achieved full marks for this question. Most candidates correctly explained one correct valid reason why material testing before production is important to the manufacturer, with some achieving full marks by giving two, well explained, valid reasons.

Several candidates gave a generic material testing reason with no reference to testing before production or the importance to a manufacturer. Guaranteeing the quality of the product or component resulting in maintaining customer confidence, and the economic and environmental benefits of reducing waste from faulty products or components, were the most common valid reasons given.

- (c) Several candidates made no attempt at this question. Many candidates produced clear and easily understood sketches and notes showing the saw guide and the length limit.

Some candidates produced several sketches showing the stages of manufacture which was not required.

Question 3

- (a) Most candidates correctly identified a product that could be manufactured as a one-off.

Bespoke items of furniture, fashion and jewellery were common correct responses. Visual and dimensional checks were the most common valid quality control checks described.

- (b) Most candidates identified an external quality standard used in manufacturing industries. ISO and BSI were the most common correct responses. Relatively few candidates went on to fully explain a specific standard. Some candidates made no attempt at this question.

- (c) Some candidates produced full and detailed answers explaining two reasons why repair and maintenance is an important service sector in design and manufacturing industries. Many responses focussed on the consumers ability to get products repaired: the question referred to the repair and maintenance service sector in manufacturing industry, so candidates needed to refer to this to fully access the mark range.

The most popular correct responses were an effective maintenance and repair sector in a company maintaining the availability and quality of the product maintains its reputation, and machinery being very expensive, so repair is more cost effective than buying a new one if a machine breaks down.

A significant number of candidates produced very brief and limited explanations, lacking appropriate detail.

Question 4

- (a) Most candidates correctly explained an issue of concern relating to the extraction of raw materials. The most common accurate responses highlighted the environmental impacts of extraction, including the detrimental consequences of unauthorized deforestation on ecosystems, its negative effects on animal habitats, and the increase of global warming. Some candidates gave very brief, often single word responses. The question required an explanation of an issue.
- (b) This question was generally well answered. Many candidates gave a clear and appropriate example of how a designer would use photo manipulation software, with reference to a specific example.

- (c) There were some very well structured and appropriately detailed answers to this question. Many responses included detailed discussion of two or more appropriate issues.

The most common relevant issues referenced by candidates were that observing customers can help businesses gain valuable insights into their behaviour and preferences, enabling them to create better marketing plans and develop products that meet their needs, and customer observation can collect insights on how people use their own or competitor products.

Some candidates presented very brief and limited responses, sometimes in the form of a bullet point list of comments with no additional relevant supporting detail and consequently did not access the higher mark ranges.

Question 5

- (a) Most candidates correctly described a way in which a filler could be used to enhance the properties of a polymer. Some candidates presented very brief responses with not enough appropriate detail to warrant credit. The most common filler mentioned was carbon fibre, which is added to polymers to increase tensile strength and improve electrical conductivity. Many candidates referred to the use of minerals such as calcium carbonate, silica, clay, kaolin and carbon, which are added as fillers to polymers to add bulk and make them easier to mould or shape.
- (b) Most candidates correctly explained what is meant by CYMK with reference to printing and achieved full marks. Some candidates correctly stated that CMYK refers to the four ink colours: cyan, magenta, yellow, and key (black) but made no reference to their use in the printing process and did not access full marks.
- (c) Most candidates produced well-structured and detailed discussions of the benefits to teams of designers, of collaborative working that uses digital technology. Most discussions focussed on issues such as the environmental and cost benefits of not having to travel to meet, with the use of video conferencing software such as Teams or Skype, and the benefits to businesses to gather a wide range of designers, often from different parts of the world, to contribute. Some candidates did not access the full range of marks by focussing exclusively on digital technologies, making no reference to the benefits of collaborative working.

Question 6

- (a) (i) – (ii) Most candidates made good use of sketches and notes to produce two different ideas of a holder for a digital drawing tablet, USB connector and pen. Most of the ideas presented were functional and met the requirements of the specification. Some candidates produced very innovative and creative possibilities. A significant number of candidates did not consider the requirement for the holder to be adjustable and allow the tablet to be supported at three different angles when in use. It is important that candidates should make reference to the given design specification in their annotation to achieve the higher mark ranges.

Some candidates made no attempt at **Question 6**.

- (b) Most candidates achieved high marks for this part. The evaluation and comparisons of the two ideas were evident, including reference to the given specifications, and the selection of the final proposal was clearly justified.
- (c) Most candidates made excellent use of sketches and notes to develop their chosen idea. Responses were generally well presented and full of appropriate detail of the development and decision making relating to functions, materials, constructions and finishes. Some candidates did not access the full mark range by incorrectly focussing solely on the stages of manufacture of the chosen idea.
- (d) Most candidates produced a clear drawing of their complete design solution. Orthographic views and isometric projections were the most common methods used to draw the complete design solution. Many included important details and key dimensions. Some candidates made no attempt at this part of the question, and a few produced partly completed drawings with no or very limited detail.

- (e) Some candidates correctly wrote four or more appropriately detailed manufacturing specification points for their chosen idea to achieve high marks on this question. A significant number of candidates incorrectly generated a modified design specification of their product.

Manufacturing specification points should contain enough information to enable a third party to manufacture the design. They could give details of the materials that will be used to manufacture each part and finishes to be used. They could include precise dimensions, tolerances and other relevant detail of the production process.

- (f) Most candidates clearly described one disadvantage of using Computer-aided-design (CAD) when designing. The most common correct responses included the cost of equipment and CAD software, and the training required to make best use of complex programmes.

Some candidates made no attempt at this question.

DESIGN AND TECHNOLOGY

Paper 9705/33 A Level Written Paper
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Key messages

- Candidates are advised to utilise the allotted time as efficiently as possible. **Questions 4(c), 5(c)** were answered well by many candidates but a significant number produced very limited responses or made no attempt to answer. Some parts of **Question 6** were not fully completed.
- Some responses to questions with the command word 'describe' or 'explain' were often very brief and in some cases, single word responses.
The instruction 'to describe' requires the candidate to state the points of a topic, giving characteristics and main features.
The instruction 'to explain' requires the candidate to respond with some or all of the following; set out purposes or reasons, make the relationships between things clear, saying why and/or how and support answers with relevant evidence.
- Responses to questions requiring the candidate 'to discuss' were generally answered well. Most candidates included relevant issues in sufficient depth and in a structured way. Some presented responses using bullet points with brief statements, which is not appropriate.

General comments

Most candidates fully complied with the rubric and attempted all questions. A significant number did not attempt some questions or fully complete them.

The quality of annotated sketching to support answers was mostly very good. Annotation was generally clear, with supportive detail and evaluative comment. For some candidates, annotation was very limited or not used at all.

Candidates should read all questions very carefully. For some questions, key parts of the question were missed, or incorrect focus was applied. For example, in **Question 6**, some candidates ignored or missed the specification point requiring the toy or puzzle to be used on a tabletop.

Comments on specific questions

Question 1

- (a) Most candidates stated an appropriate material for the money box lid and gave two appropriate reasons to justify the choice of material. Acrylic and copper were the most popular appropriate materials stated. Some reasons given were very brief and lacking detail; some candidates failed to explain why the material was particularly suitable for the money box lid.
- (b) Most candidates made good use of clear, annotated sketches and notes to present their response. A wide range of appropriate making processes were given. The most common responses involved the development of a net shape and thermoformed using a plug and yoke former. It is important that candidates focus on the making of the product; some spent too much time describing the marking out stages and did not include detail of key features of the manufacture of the product to access the higher mark ranges.

- (c) Many candidates made appropriate changes to simplify the design of the holder to suit the manufacturing process required to produce 500 identical holders. Many made changes to the material used, and most candidates selected vacuum forming as the production method. To access the higher mark ranges, candidates needed to show how multiple moulds would be used to generate the batch number required when vacuum forming. Many candidates who selected injection moulding as the manufacturing process did not include sufficient detail of the mould to access the highest mark range.

Question 2

- (a) Many candidates were not familiar with the term work hardening and did not gain credit. Some gained full marks by explaining that work hardening refers to the increase in hardness of a metal caused by processes such as hammering and rolling.
- (b) Relatively few candidates had a good understanding of how additives are used to enhance the properties of polymers. Some candidates correctly described one example, the most popular being the addition of pigments to give colour to polymers. Some also described the use of plasticisers to increase the ability of the polymer to be moulded, to achieve full marks.
- (c) Most candidates made good use of sketches and notes to show how a knock down (KD) fitting could be used on an item of furniture. Some candidates sketched dowels or nuts and bolts which are not classified as a KD fitting. Knock down fittings are specialised hardware components that join two or more pieces of wood or manufactured board securely, without the need for complex joinery techniques or permanent adhesives. They are used to enable consumers to easily assemble and disassemble furniture.

Question 3

- (a) Most candidates gave a valid explanation of why injection moulding is unsuitable for producing a one-off component or product. Most candidates focussed on the economic unsuitability, explaining that the cost of the production of the die and the set-up, material and energy required, would probably be more than the value of a one-off product.
- (b) Most candidates clearly explained a benefit for workers of a cell production manufacturing system. Many focussed on the satisfaction of working in a team, the variety of work carried out and the possible opportunity to learn new skills. Some candidates had limited understanding of cell production systems and did not present valid and focussed benefits.
- (c) Most candidates presented full and detailed explanations of two ways in which the consumer can influence the design of products. Most responses focussed on consumer feedback opportunities such as the involvement of focus groups and the review of products online. Consumers taking part in other forms of market research and the influence of trends and preferences, were also common, valid ways of influencing the design of products mentioned in candidates' responses.

Some candidates produced very brief and limited explanations to this question, lacking appropriate detail to access the middle and higher mark ranges.

Question 4

- (a) Most candidates correctly explained the term 'maturity', making appropriate reference to a product's life cycle. The most common correct responses highlighted that maturity is the stage when the product has been established and where sales remain steady; that it is the most profitable period when sales are high and other costs such as marketing decline. Broader interpretations of a product life cycle were accepted and awarded appropriate credit.
- (b) This question was well answered. Most candidates gave a clear and appropriate explanation of a benefit of using questionnaires to carry out market research. The best responses referred to issues such as the ability to focus on key areas of importance to the company carrying out the market research to quickly analyse information received, and it can be presented to the target audience in many ways including by post and on the internet. Some candidates did not access full marks by listing very short comments of two or three benefits without any supporting explanation.

- (c) Many candidates produced well-structured and appropriately detailed answers to this question. Most responses included detailed discussion of two or more appropriate issues relating to the importance of place when marketing products.

The most common relevant issues referenced by candidates were that planned strategic placement of the product such as retail outlets or online can provide companies with a competitive edge. The importance of target market demographics was also prominent in responses.

A significant number of candidates presented responses that were very brief and lacking detail, sometimes presented in the form of a bullet point list of brief comments with no additional relevant supporting detail, and consequently did not access the higher mark ranges.

Question 5

- (a) This question was answered well by most candidates. Most responses included a clear and detailed description of one factor that a car manufacturing company, looking for a site to produce its new car, would have to consider when selecting a site for production. The main factors mentioned were the availability of reliable transport connections and the proximity of an accessible workforce. Many candidates also referred to access to main utilities required for a large production plant.

Some candidates presented very brief responses with insufficient appropriate detail to warrant credit.

- (b) Most candidates correctly explained what is meant by CYMK with reference to printing and achieved full marks. Some candidates correctly stated that CMYK refers to the four ink colours: cyan, magenta, yellow, and key (black) but made no reference to their use in the printing process and did not access full marks.

- (c) Most candidates produced well-structured and detailed discussions of the benefits to teams of designers, of collaborative working that uses digital technology. Most discussions focussed on issues such as the environmental and cost benefits of not having to travel to meet, with the use of video conferencing software such as Teams and Skype, and the benefits to businesses to gather a wide range of designers, often from different parts of the world, to contribute. Some candidates did not access the full range of marks by focussing exclusively on digital technologies, making very limited or no reference to the benefits of collaborative working.

Question 6

- (a) (i) – (ii) Most candidates made very good use of sketches and notes to produce two different ideas for a toy or puzzle for an after-school club. Some candidates repeated ideas with very minor alterations which is not acceptable. The question states ‘produce two different innovative ideas for the toy or puzzle’.

Most ideas presented were functional, some were very imaginative and innovative. Some candidates did not apply the full design specification and missed the requirement that the toy or puzzle must be able to be used on a tabletop, generating ideas that were very large and more suitable for use on the floor.

Some candidates did not fully complete **Question 6**.

- (b) This question was well answered by most candidates. The evaluation and comparisons of the two ideas were clear and included appropriate reference to the given specifications. Most candidates gave clear justification for their choice of final proposal.
- (c) Candidates generally made very good use of sketches and notes to develop their chosen idea. Responses were full of appropriate detail of the development and decision making relating to functions, materials, constructions and finishes. A significant number of candidates incorrectly focussed solely on presenting details of the stages of manufacture for the chosen idea, with no reference to development, and consequently did not access the full mark range.

- (d) Drawings of the complete design solution were generally clear and appropriately detailed.

Orthographic views and isometric projections were the preferred methods of communicating the complete design solution. Most methods used included important details and key dimensions. Some candidates produced partly completed drawings with no or very limited detail.

- (e) Many candidates produced four or more appropriately detailed manufacturing specification points for their chosen idea and achieved high marks on this question. Some candidates re-wrote a modified design specification of their product, with no specific manufacturing specification points included, and did not gain credit.

Manufacturing specification points should contain enough information to enable a third party to manufacture the design. They could give details of the materials that will be used to manufacture each part and finishes to be used. They could include precise dimensions, tolerances and other relevant detail of the production process.

- (f) This question was very well answered. Most candidates clearly described a feature of the toy or puzzle where the safety of the children has been considered.

The most common correct responses included the removal of all sharp edges to prevent cuts or harm and making sure to use appropriate finishes to prevent possible harm.

Some candidates made no attempt or did not fully complete this question. A few candidates presented a list of several, very brief possible features with limited description and did not access full marks. The question requires the description of one feature.

DESIGN & TECHNOLOGY

Paper 9705/04 Design, Realisation and Manufacturing Project

Key messages

Candidates should not choose design proposals that are too large or complex and therefore cannot be realised in the time recommended for **Stage 4 Realising the product**.

Candidates are recommended to spend around 55 guided learning hours on their Component 4 Design, realisation and manufacturing project. Guidance on the recommended time to be spent on each stage is provided in the specification. This is only guidance and there may be variations depending on the chosen project, but candidates do not need to spend significantly more time than this on their project.

This is also relevant to the number of pages that a candidate might produce, there is no expectation that a candidate should produce 70, 80, or even 90 pages plus, to gain a good mark.

General comments

Centres are clearly encouraging candidates to identify a wide range of real-world contexts of their own choice, and we support this as a strategy as moving forward. The philosophy of choosing an area to explore that is individual and unique to each candidate is a fundamental value of this specification.

Comments on each stage

Stage 1 Identifying a situation or need to produce a design brief and design specification

6 marks

Candidates were able to identify an area to focus their design project on and generally researched it well. Some candidates completed many pages of research, often near 30 pages in stage 1 of their project, which did not ultimately benefit their learning journey. Primary research is particularly valuable in this stage but an over-reliance on secondary research can be counterproductive. Candidates chose one design situation or need to take forward, providing a justification for their choice. In stronger projects, each point of the design specification was fully justified, with references to the research.

Candidates write a design brief to meet the identified design situation or need. They then complete a design specification for a product that meets the design brief. Each point of the design specification must be fully justified, with references to their research.

Candidates are recommended to spend around **6 guided learning hours** on Stage 1.

Stage 2 Generating and appraising design ideas leading to a design proposal

8 Marks

Candidates should generate at least three ideas to meet the design brief and design specification. The ideas needed to be supported with annotated sketches and research to feed into the design ideas. Generally, this stage was well attempted by most candidates with some outstanding examples of innovative idea generation and proposals for new products. Candidates often had the confidence to explore new ideas that did not simply replicate products that already exist and then iterate them several times as they worked toward an imaginative outcome.

Candidates are recommended to spend around **9 guided learning hours** on Stage 2.

Stage 3 Developing the product and planning for making

8 Marks

Candidates generally documented their development journey clearly with a wide range of different approaches from sketch models and physical models, through to some very impressive CAD and, on occasion, CAM modelling. All of these should be documented with good quality photographs/screenshots and annotations.

Working drawings often communicated all individual parts, as well as assembly details, materials and chosen finishes. Plans to make the final solution were not always included and candidates should be encouraged to produce these.

Candidates are recommended to spend around 9 guided learning hours on Stage 3.

Stage 4 Realising the product

12 Marks

Candidates need to demonstrate proficiency in a wide range of practical skills. However, some candidates did not communicate their making journey with either clearly annotated, or high-resolution, photographs. For credit to be awarded, there must be evidence within a portfolio of this aspect. Safe working practices should also be evident.

It is expected that candidates produce a full-sized product/prototype, not a scale model.

Candidates are recommended to spend around **14 guided learning hours** on Stage 4.

Stage 5 Testing and evaluating the product

8 Marks

Stronger candidates carried out appropriate planning of, and then testing of the full-sized prototype, showing it in use in its intended environment and by the user. This allowed the candidate to draw meaningful conclusions leading to proposals for further development.

To emphasise the point made in stage 4, if a product is realised as a scale model and not a full-sized prototype it does impact on the candidate in stage 5.

Candidates are recommended to spend around **9 guided learning hours** on Stage 5.

Stage 6 Planning for manufacturing a product in quantity

8 Marks

Stage 6 should be undertaken as a distinct section after the product has been tested and evaluated.

This stage should include analysis of at least three wider issues including cultural, economic, environmental and social factors.

A plan for manufacturing the final product in quantity should also be evident. However, a small number of candidates did not include this stage in their portfolio.

Candidates are recommended to spend around **8 guided learning hours** on Stage 6.