

DESIGN AND TECHNOLOGY

<p>Paper 9705/02 Project 1</p>
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Key messages

- Candidates are advised not to spend unnecessary time researching materials, construction methods, fittings and finishes as part of the analysis of and research into the design brief as this cannot be awarded marks in this section of the assessment scheme. Data collected should relate to the design problem not any anticipated product outcome.
- It is important that candidates consider all aspects of their design specification, when responding to the generation and appraisal of design ideas, as part of the ongoing consideration of their possible ideas.

General comments

The school based assessment for this syllabus can be offered either as two discrete components, Project 1 and Project 2 or as one larger piece of work combining the two projects in a holistic way. This report identifies each of the components separately but also acknowledges the overall design process where the two are combined.

Centres introduce this important part of the Design and Technology course to their candidates in slightly different ways but it is important that evidence produced matches the requirements of the assessment scheme. Some Centres set a common theme or topic which candidates responded to in their own way while others encouraged their candidates to identify their own design problem which may be related to hobbies, interests or life at home and in the community. In any event outcomes resulted from a wide variety of design problems and it was obvious that many candidates had developed a keen interest in the area studied. In addition to the usual range of household items or architectural models, interesting outcomes of either modelling or final products included: aircraft seating, child care Centre, chess table, handle for disposable cups, cable organiser, watch storage, tree house, key storage, alarm clock, guitar stand, lifting device, outdoor lounge, automatic curtain opener, chair from recycled materials, dog kennel, battery storage unit, art light box, motorcycle stand, iPod backpack, writing pen, art equipment storage, insect repeller, camping water heater, rubbish compressing unit, cosmetics packaging, water filter, ceramics packaging, solar lamp, low cost irrigation system, plant propagator, child's table and chair, tent, garden light, bicycle repair stand, model garage, outdoor bench, vehicle loading ramp, gas cylinder transporter and over-bed table.

Centres had encouraged generally their candidates to present design folders neatly and in such a way that the design process could be followed easily.

Comments on individual assessment criteria

1. Identification of a need or opportunity leading to a design brief

The majority of candidates made it very clear how their chosen design problem linked to both the user and the situation. This was then supported by a precise design brief leaving the reader in no doubt as to the design route being followed.

2. Analysis of and research into the design brief which results in a specification

It is essential that there is a thorough analysis of the actual design problem being undertaken so as to give direction to the identification and collection of relevant data. This is a very important part of a design process as it provides information from which an accurate and meaningful specification can be formulated.

Most candidates considered a wide range of existing products and commented on these in relation to their own design brief.

Centres are reminded that the inclusion of historical records and general information on an area or topic being considered cannot be awarded marks as these do not form part of a design process.

Specifications were generally well formulated and included many specific requirements of the product being designed.

3. Generation and appraisal of design ideas

Many candidates showed a high degree of flair in the creation of ideas. Unfortunately, a few candidates presented a range of drawings not linked to the specification or even commented upon regarding their possible suitability for the problem being considered. In these cases limited credit could be awarded.

The importance of presenting a wide range of different ideas, however practical they may appear at the time, cannot be understated and these should then be considered individually with some form of written appraisal. Where ideas have touched on aspects of the Specification then these should be commented on or highlighted in some way.

There was a wide range and high standard of communication techniques used in the presentation of design proposals. Where care is taken in this respect then it is easy to see how a candidate's thought process has developed.

4. Modelling of ideas

Modelling is one stage of the consideration, testing and evaluation of design ideas ensuring that a final design can be presented and subsequently developed. Many candidates produced high quality and meaningful models that formed part of this process whereas others simply produced a mock up of the chosen design idea and it was sometimes difficult to identify how it made a contribution to the design process.

More candidates are modelling different aspects of their design ideas and using these to test for suitability and practicality in the production of a complete solution to their design problem. In this way the modelling stage plays a more meaningful part in designing.

DESIGN AND TECHNOLOGY

Paper 9705/04
Project 2

Key messages

- Candidates are advised not to spend unnecessary time researching materials, construction methods, fittings and finishes as part of the analysis of and research into the design brief as this cannot be awarded marks in this section of the assessment scheme. Data collected should relate to the design problem not any anticipated product outcome.
- It is important that candidates consider all aspects of their design specification, when responding to the generation and appraisal of design ideas, as part of the ongoing consideration of their possible ideas.

General comments

The school based assessment for this syllabus can be offered either as two discrete components, Project 1 and Project 2 or as one larger piece of work combining the two projects in a holistic way. This report identifies each of the components separately but also acknowledges the overall design process where the two are combined.

Centres introduce this important part of the Design and Technology course to their candidates in slightly different ways but it is important that evidence produced matches the requirements of the assessment scheme. Some Centres set a common theme or topic which candidates responded to in their own way while others encouraged their candidates to identify their own design problem which may be related to hobbies, interests or life at home and in the community. In any event outcomes resulted from a wide variety of design problems and it was obvious that many candidates had developed a keen interest in the area studied. In addition to the usual range of household items or architectural models, interesting outcomes of either modelling or final products included: aircraft seating, child care Centre, chess table, handle for disposable cups, cable organiser, watch storage, tree house, key storage, alarm clock, guitar stand, lifting device, outdoor lounge, automatic curtain opener, chair from recycled materials, dog kennel, battery storage unit, art light box, motorcycle stand, iPod backpack, writing pen, art equipment storage, insect repeller, camping water heater, rubbish compressing unit, cosmetics packaging, water filter, ceramics packaging, solar lamp, low cost irrigation system, plant propagator, child's table and chair, tent, garden light, bicycle repair stand, model garage, outdoor bench, vehicle loading ramp, gas cylinder transporter and over-bed table.

Centres had encouraged generally their candidates to present design folders neatly and in such a way that the design process could be followed easily.

Comments on individual assessment criteria

5. Product development

Successful candidates took the final design idea(s) from Project 1 and then considered all aspects of form, materials, components, constructions, finish and production methods in detail. All information was linked to the chosen idea and where alternatives had been considered, and choices made and reasons for these were given.

This section of the assessment also requires candidates to carry out some form of testing. This can be of materials, constructions, form, etc. but it should be obvious how this links to the design idea being developed. Candidates need to include written or photographic evidence that this has been carried out.

In some projects, it was not always clear why selections of materials, components, constructions, finishes and production methods had been made and there was often a big gap between the chosen design idea and the final product. Once these decisions had been made, the final part of the development should have included details of the final solution, mainly in the form of drawings, from which a skilled person could make the product.

6. Product planning

Most candidates set out the sequence for the main stages of production, often produced in flow chart or tabular form linked to some form of time plan. There is no requirement for candidates to show how basic techniques will be carried out but many candidates included details of the more complex methods of manufacture.

Candidates are not required to include lengthy photographic evidence of all stages of manufacture although some photographs can be helpful when highlighting certain aspects of the manufacturing process.

7. Product realisation

Many candidates produced high quality products that could clearly be put to their intended use. Candidates demonstrated care and enthusiasm in the making of their design outcomes in terms of construction methods and finishing techniques and there were many well-developed practical skills applied.

Centres are reminded of the need to include clear and detailed photographic evidence of made products in line with the guidance set out in the syllabus document.

8. Testing and evaluation

There continues to be an improvement in the number of candidates carrying out meaningful testing and evaluation. This can only be achieved if the product is shown being used as intended and the results compared to the original design brief and specification. It is always helpful when candidates include photographs of the product being used and tested in this way. The completion of questionnaires and the recording of views of others are only relevant where the results can be compared to the intended use of the product and some form of qualified judgement is made and recorded.

DESIGN AND TECHNOLOGY

Paper 9705/11
Written 1

General comments

There was a range of performance from candidates. The better responses were from those candidates who had looked at the number of marks available for each part of a question and then produced responses which contained sufficient detail and information to give them full access to all of the marks available. In some cases, candidates had not read questions carefully or fully enough before starting their answers. This frequently resulted in responses which did not fully address the question asked. Some of the responses were too short, and others were too long. It was evident that in some cases candidates displayed only a limited knowledge and understanding of the subject matter required to correctly respond to the questions they had chosen to answer.

Candidates can improve by making sure that their answers are focused on the question being asked and that their responses are concise and display appropriate subject specific knowledge and understanding.

While the majority of candidates responded to all parts of the three questions they had chosen to answer time management proved a problem for some.

Some repetition was evident in candidates' answers to questions in all sections of the paper. Some drew the same thing more than once. A common error in written responses was for candidates to repeat the same point two or more times using slightly different words.

When a question asks for notes and sketches, it can be more difficult and time consuming to attempt the question without the use of sketches. Sketches with notes are a very straightforward way to show information.

The paper regularly asks for details of tools, equipment and processes as well as any safety precautions, without these being considered it is difficult to access full marks for a respective question.

Section A

General comments

Many students attempted this section with success, clearly showing that they had been well prepared for the three questions that were available.

Technical knowledge and most particularly technical terms are crucial if full marks are to be gained when a process is being explained. It is clear that many candidates do understand a process; brazing is an obvious example, but then subsequently did not have the technical vocabulary to name tools and equipment in a detailed way.

Comments on Specific Questions

Section A

Question 1

- (a) A nut was often drawn without a thread. A thread should be shown.
- (b)(i) Many candidates showed a jig, pressure and a means of bending the mild steel section.
 - (ii) Most students understood the die and die stock, but they disregarded the preparation of the round bar and the reduction from 6 mm diameter to 4 mm diameter before introducing the die. Use of lubricant was good.
 - (iii) Brazing was often mistaken for arc welding, which has some similar preparation processes, but is ultimately a different process.

Question 2

- (a)(i) and (ii) Height and length were often incorrectly calculated.
- (b) Many students showed a three-dimensional representation that was either correct or very well completed.
- (c)(i) Most candidates understood the process for marking and cutting out. Occasionally, the actual net shape was not shown.
 - (ii) Students found the shape of the curved net challenging, and although the marking and cutting was well explained, the actual net was more challenging.

Question 3

- (a) This part was answered well, with usually with two feasible precautions of small parts and toxic finishes being dangerous to younger children given.
- (b)(i) Many students showed a template, clear marking out, roughing out the shape as well as various finishing techniques. Occasionally, they did not complete the task and left drilling or a similar process out of their answer completely.
 - (ii) Most responses understood the need for marking out accurately as well as the fact that the components lined up for drilling of the funnel hole, but some were lacking detail on finishing techniques or did not complete the entirety of each shape.
 - (iii) Rounding sharp corners was a constant favourite, with the removal of the mast being a popular answer. Explanations of why this should happen were occasionally superficial.

Section B

General comments

Many students attempted this section with success. Whilst sub-sections (a), (b) and (c) were all managed well by the majority, it was noticeable that section (d) did on occasion cause some difficulties. Three individual relevant issues is a crucial step setting the scene for a successful answer. On occasion, these were repetitive which is counterproductive. Crucially, in many instances, candidates did not offer examples or indeed any evidence to support their conclusions.

Comments on Specific Questions

Question 4

- (a) Parting powder for those who chose this question appeared to be a well-known product.

- (b) The missing riser was often identified with air holes being identified.
- (c) Students who identified a problem in virtually all cases answered this extension very well with clear diagrams showing a riser and air holes.
- (d) As mentioned above in the general section of **Section B**, examples and evidence of the conclusions being drawn were often unrelated or indeed not offered at all.

Question 5

- (a) Explanation of the rounded corner flap was well understood and attempted.
- (b) Better responses offered the vase not being able to be removed without ripping the packaging and occasionally students commented on the fold in flaps.
- (c) Students who identified a problem in virtually all cases answered this extension very well with clear diagrams showing a better way for the vase to be removed.
- (d) As mentioned above in the general section of **Section B**, examples and evidence of the conclusions being drawn were often unrelated or indeed not offered at all.

Question 6

- (a) Fittings understood well throughout the responses.
- (b) Stay lacked a folding mechanism and was also fixed in the wrong place was mostly understood and communicated.
- (c) Students who reacted to the improvement required in the stay were very good at offering a two-part solution, thus allowing the door to move. Occasionally, candidate's response was for the whole door to be replaced which is not what the question asked.
- (d) As mentioned above in the general section of **Section B**, examples and evidence of the conclusions being drawn were often unrelated or indeed not offered at all.

Section C

General comments

Responses were very wide ranging with some exceptionally thoughtful ideas being displayed. A key word in the stem of this question is **range**, which was usually fine; however, one idea is not a range. The second key term is **develop a design**, which many students either attempted superficially or simply avoided in all three sub-sections. This dramatically reduces the score on each part. Evaluative comments also lacked detail in places and some lacked insight.

A tried and tested route is to show a range of ideas that are then analysed with evaluative comments to support developments of the favoured idea towards a final outcome. Three-dimensional responses offer a better route for presenting thoughts and ideas.

The development and development of a range of ideas which are analysed with one solution presented. The clarity/quality of notes/sketches as well as evaluative comments are the three major elements expected within parts (a), (b) and (c).

Comments on Specific Questions

Question 7

- (a) Good responses covered several different ways of keeping the table top securely closed. This was a key component of the question. Weaker responses simply looked at hinging.

- (b) Good responses offered several different routes that would have been workable outcomes for the legs both in terms of folding and fixing open. Weaker responses did not cover both elements of the question.
- (c) **'Both hands free'** was a crucial steer within the question. Candidates who understood this, offered a more thorough and realistic response.
- (d) There were many impressive pictorial views with a great deal of detail. Occasionally, colour or rendering was missing, but otherwise well attempted three dimensional outcomes that displayed the final solution clearly and in enough detail to be understood.

Question 8

- (a) Good responses covered several different designs for the display board with a noticeable three-dimensional element.
- (b) Good responses offered several different routes that would have been workable outcomes for the DVD holder. Some outstanding responses detailed some innovative attachment ideas without the use of glue.
- (c) The question asks for lettering to reflect the title, which was generally well attempted. The use of rockets and related shapes was a welcome addition to enhance the design.
- (d) There were many impressive pictorial views, with a great deal of detail. Occasionally, colour or rendering was missing, but otherwise well attempted three dimensional outcomes that displayed the final solution clearly and in enough detail to be understood.

Question 9

- (a) This was a very popular question. In many cases, the responses began well, with innovative as well as realistic seating outcomes. Technical details and sensible developments all added to a well attempted question.
- (b) Good responses offered several different routes that would have been workable but in a significant number of outcomes, either the frame, or the hanging method was not present.
- (c) Two parts; a canopy and adjustment, where most responses covered both the outcomes. Technical detail and structural commentary was generally very good.
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DESIGN AND TECHNOLOGY

Paper 9705/12
Written 1

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There was a range of performance from candidates. The better responses were from those candidates who had looked at the number of marks available for each part of a question and then produced responses which contained sufficient detail and information to give them full access to all of the marks available. In some cases, candidates had not read questions carefully or fully enough before starting their answers. This frequently resulted in responses which did not fully address the question asked. Some of the responses were too short, and others were too long. It was evident that in some cases candidates displayed only a limited knowledge and understanding of the subject matter required to correctly respond to the questions they had chosen to answer.

Candidates can improve by making sure that their answers are focused on the question being asked and that their responses are concise and display appropriate subject specific knowledge and understanding.

While the majority of candidates responded to all parts of the three questions they had chosen to answer time management proved a problem for some.

Some repetition was evident in candidates' answers to questions in all sections of the paper. Some drew the same thing more than once. A common error in written responses was for candidates to repeat the same point two or more times using slightly different words.

When a question asks for notes and sketches, it can be more difficult and time consuming to attempt the question without the use of sketches. Sketches with notes are a very straightforward way to show information.

The paper regularly asks for details of tools, equipment and processes as well as any safety precautions, without these being considered it is difficult to access full marks for a respective question.

Section A

General comments

Many students attempted this section with success, clearly showing that they had been well prepared for the three questions that were available.

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Comments on Specific Questions

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Section B

General comments

Many students attempted this section with success. Whilst sub-sections (a), (b) and (c) were all managed well by the majority, it was noticeable that section (d) did on occasion cause some difficulties. Three individual relevant issues is a crucial step setting the scene for a successful answer. On occasion, these were repetitive which is counterproductive. Crucially, in many instances, candidates did not offer examples or indeed any evidence to support their conclusions.

Comments on Specific Questions

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Section C

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DESIGN AND TECHNOLOGY

Paper 9705/13
Written 1

General comments

There was a range of performance from candidates. In general, the standard of responses was similar to last year.

The better answers were from those candidates who had looked at the number of marks available for each part of a question and then produced responses which contained sufficient detail and information to give them full access to all of the marks available. In some cases, candidates had not read questions carefully or fully enough before starting their answers. This frequently resulted in responses which did not fully address the question asked. Some of the responses were too short, and others were too long. It was evident that in some cases candidates displayed only a limited knowledge and understanding of the subject matter required to correctly respond to the questions they had chosen to answer.

Candidates can improve by making sure that their answers are focused on the question being asked and that their responses are concise and display appropriate subject specific knowledge and understanding.

While the majority of candidates responded to all parts of the three questions they had chosen to answer time management proved a problem for some. This particularly applied to **Section C**.

Some repetition was evident in candidates' answers to questions in all sections of the paper. Some drew the same thing more than once, for example a design would be drawn as a three dimensional view and then repeated using a two dimensional view that showed no more detail than the first drawing. A common error in written responses was for candidates to repeat the same point two or more times using slightly different words.

Section A

General comments

The better answers in this section were those that used a sequence of three or four annotated sketches to clearly describe, step by step, how the appropriate tools, equipment and processes could be safely used to achieve the required results. It is not sufficient to just draw or list the tools their use must be shown and described.

A number of candidates produced very small sketches that were not produced well. Candidates need to understand that the use of lots of continuous text should be avoided when answering questions in this section of the paper. As in previous years, the use of continuous text often accompanied by very few, if any, sketches was a problem for a fair number of candidates.

Candidates could improve their performance in this section of the paper by initially spending a few minutes planning the sequence of stages that would be required to fully carry out the particular task or process identified in the question.

Comments on individual questions

Question 1

This proved to be the least popular of the questions in this section of the paper.

In part (a) the majority of candidates gained at least one of the two marks available for naming appropriate properties of copper.

Answers to part (b) were very mixed. The better responses to part (b)(i) were those that used notes and sketches to describe all of the stages required to mark out, cut out and smooth the edges of the copper sheet. Weaker responses only described some of the required stages. It is important that health and safety issues are considered. A number of responses were let down by the low quality of sketches (or the lack of them) and the use of too much continuous text.

Many of the responses to part (b)(ii) lacked the level of detail required to gain high marks. While almost all candidates attempted to describe how Part A could be formed into the required shape, fewer were able to give appropriate details about how the copper could be annealed beyond the fact that it needed to be heated. A number of responses were let down by the low quality sketches (or the lack of them) and the use of too much continuous text.

In part (b)(iii), a reasonable number of candidates were able to demonstrate at least some knowledge and understanding about soldering. However, the majority suggested that a soldering iron could be used which would not have been the most suitable method in the given situation. As with earlier parts of the question, many responses lacked the level of detail required to gain high marks. A number of responses were let down by the low quality sketches (or the lack of them) and the use of too much continuous text.

Question 2

In general, part (a) was generally well answered. The majority of candidates were able to demonstrate at least some knowledge and understanding about the fact that the symbol indicated that the drawing was produced in third angle orthographic projection.

Responses to part (b) were in the main good. Most candidates produced a pictorial drawing that had been viewed in the correct direction. The majority of the required features were included in almost all of the candidates' drawings.

The two sections of part (c) all required similar processes to be carried out. In general, the strengths and weaknesses in responses to each of the three parts were similar. Very few fully correct developments for either of two parts, A and B were seen. The majority of the shapes that were marked out would not have produced the required outcomes. Very few candidates used a stage by stage approach to describe the drawing, cutting out, assembling and joining together of the two parts. A number of responses were let down by low quality sketches (or the lack of them) and the use of too much continuous text.

The use of CAD/CAM to draw and cut out the card shapes was suggested by some candidates. This was appropriate in this situation but candidates need to make sure that the setting up and safe use of the CAD/CAM equipment is fully described.

Question 3

This was the most popular question in this section of the paper.

Part (a) was generally well answered. A significant number of correct answers seen that explained plywood was constructed from an odd number of layers than ran at right angles to each other.

The better responses to part (b)(i) were those that considered all three of the required processes: the marking out, cutting out and smoothing the edges of the plywood. The majority of candidates gained half marks or better in this part of the question. A number of responses were let down by low quality sketches (or the lack of them) and the use of too much continuous text. In part (b)(ii), the better responses were those where candidates described, in detail, how holes could be drilled and countersunk and the screws inserted using a screwdriver. Most candidates scored half marks or better in this part of the question.

A number of responses were let down by low quality sketches (or the lack of them) and the use of too much continuous text.

In general, part **(b)(iii)** was not very well answered. The better responses described how the bracket could be cut out using an appropriate tool such as a hacksaw, and how the holes could be drilled and countersunk. Weaker responses did not describe all of the required stages and often suggested the unsafe use of inappropriate equipment such as a grinder to cut the mild steel sheet.

Section B

The questions in this section of the paper require candidates to analyse situations and products, identify and resolve problems and discuss issues related to the design, manufacture, use and disposals of products.

Parts **(a)**, **(b)** and **(c)** of the questions in this section of the paper were reasonably well answered by most candidates. The number of candidates making use of the structure and mark allocation given in part **(d)** continues to increase, but the major weakness in some answers still relates to the low levels of **discussion** that takes place in candidates' responses.

Candidates are advised to base their answers to part **(d)** around the instructions and mark allocation given in the question.

In Part **(d)**, candidates need to clearly identify relevant issues, discuss why they are important and be able to support their arguments and reasoning using appropriate examples and evidence. It is important that these issues are specific to the given situations and requirements of the question. In some cases, candidates are doing little more than 'stating' issues and why they consider them to be relevant.

Repetition was seen in some candidates' answers particularly in part **(d)** of the questions, where a frequent error was to give the same information using slightly different words. Candidates could improve their performance in part **(d)** by spending a few minutes planning the contents of their response. This could, perhaps, help them avoid problems relating to repetition.

In a number of cases, candidates did not attempt to complete all parts of the question that they had chosen to answer in this section of the paper.

Comments on Individual Question

Question 4

This proved to be the least popular of the questions in this section of the paper.

In **Part (a)**, a significant number of candidates correctly explained that the mould was made in two parts so that the product being manufactured could be easily removed.

In **Part (b)**, the majority of candidates correctly identified at least one appropriate problem with the design of the mould. Two major problems were that there was no way of getting plastic into the mould and that the method of locating the two parts of the mould was not complete because while there were holes for the locating pins shown the pins themselves were missing. A significant number of candidates correctly identified that the current mould design did not include a feature that allowed plastic to enter the mould. A minority of candidates were able to identify a suitable second problem. Many candidates confused the holes for locating pins with holes for the plastic to enter the mould. A few candidates incorrectly tried to totally redesign the mould.

Those candidates that had identified appropriate problems in part **(b)** frequently went on to produce appropriate solutions to the problems in part **(c)**. Some responses were let down by low quality sketching and/or not giving sufficient details about the changes being proposed.

In part **(d)**, a significant number of candidates focused their responses broadly on the injection moulding process rather than discussing 'why injection moulding is generally used for the **mass** production of a product rather than to produce **individual** or **very small batches** of a product.' The responses produced by a reasonable number of candidates indicated that they were familiar with the injection moulding process. Most of these candidates were able to identify relevant issues and discuss (with varying degrees of success) their importance. Very few candidates supported their conclusions by making reference to products that they were familiar with.

Examples of appropriate issues included:

- high cost of equipment
- high cost of making mould
- uneconomic to use for individual pieces and small production runs
- other production methods such as 3D modelling could well prove to be more cost effective
- high cost of final product would limit final market

Question 5

In part **(a)**, a reasonable number of candidates correctly explained that the plastic ring fitted over the top of the box and held the box together without the need to glue the fold in flaps together.

In part **(b)**, the majority of candidates correctly identified at least one appropriate problem with the development. Two major problems were that the fold in flaps were the wrong shape and would prevent the box folding to the required shape, and the surface decoration was wrong and would not produce the joined up design shown in the assembled view of the packaging.

In part **(c)**, the majority of candidates changed the shape and/or size of the fold in flaps in some way, but few achieved results that would have fully worked. Many of the changes made to the surface decoration would still not have achieved the required result. A few candidates incorrectly tried to totally redesign the box. This type of response should be avoided.

The responses produced by the majority of candidates in part **(d)** indicated that they had at least some understanding about why products are packaged. A good number supported their conclusions by making reference to products that they were familiar with.

Examples of appropriate issues included:

- protection of the product
- often made the product easier to store, transport and display
- could make the product more appealing to potential customers
- provided space to give more information about the product

Question 6

This proved to be the most popular question in this section of the paper.

In part **(a)**, only a limited number of candidates correctly identified the two types of motion using the technical terms, rotary and reciprocating motion. Many candidates incorrectly stated round and round and up and down.

In part **(b)**, the majority of candidates correctly identified at least one appropriate problem with the mechanical toy. The main problem with the quality of the design of the mechanical toy was the fact that it would not work, and when the handle was turned, the person would not move up and down because there was a problem with the circular disc. Problems with quality of the manufacture of the mechanical toy needed to relate to the splits in the wood, the pieces of wood on the left hand end did not line up and one end of the top was poorly finished.

A good number of the responses to part **(c)** explained that the problem of the toy not working could be overcome by either making the hole in the disc off centre or by changing its shape into the shape of an egg or pear. In a few cases, candidates suggested major changes to the design and/or manufacture of the mechanical toy. This type of response should be avoided.

In part (d), a number of candidates focused their responses on just mechanical toy rather than the broader factors associated with the relationship between the quality of a products design and the quality of its manufacture.

The better responses were able to identify relevant issues and discussed (with varying degrees of success) their importance. A number supported their conclusions by making reference to products that they were familiar that were well designed and/or well manufactured or were poorly designed and/or manufactured.

Examples of appropriate issues included:

- Poor design could lead to products that do not work or are unsafe.
- Good quality design and manufacture make a product more appealing.
- Poor quality design cannot always be 'covered up' by high quality manufacture and vice versa.
- It may not always be possible to manufacture products which have been poorly designed.

Section C

Some good design work and presentation drawings were seen in this section of the paper.

The better answers showed the use of quick free flowing sketches to produce around three distinctly different ideas for all or part of the product that was being designed in each part of the question. While candidates should annotate their sketches, some candidates continue to use far too much continuous text. A few candidates, spent too long to produce very neat drawings of their initial ideas.

Some of the weaker responses presented only one idea or produced several drawings that gave the same information but in a different form. For example, both a 2D view and 3D view showing exactly the same design idea.

The better evaluations were those that used concise notes to clearly identify the strengths and weaknesses of designs. They included justified choices including which design or parts of a design to carry forward to the development stage.

Candidates need to understand that ideas need to be evaluated in a meaningful way. Evaluation tables with 'star' 'tick' or 'number' ratings were in evidence. While these can be used to good effect, their value lies in the use of headings appropriate to an examination situation and an indication about what the stars or numbers mean. It must be more than 'excellent, good or poor'. Some candidates did not evaluate their ideas at all. Candidates need to be aware that there are up to 12 marks available for evaluation.

Development should be seen as more than re-drawing one of the initial ideas better. It should bring together, and possibly improve, the best parts of a candidate's earlier design thinking into a proposed solution. Candidates need to understand that they do not have to develop each one of their initial ideas. As part of the development process basic details about materials, joining methods and important sizes should be given. Candidates are not required to explain stage by stage how their chosen design would be made.

Some candidates had very little or no evidence of design development and just selected one of their ideas. A good number of candidates did not take sizes into account or give any technical detail in a visual form.

In part (d), candidates were required to produce a rendered pictorial drawing of the complete product that they had designed. Candidates can produce this drawing with the aid of drawing equipment or as a high quality freehand sketch. Candidates should understand that rendering involves more than 'colouring in'. It should use colour, tonal shading and texture to enhance the three dimensional appearance of a drawing and to represent the material from which the product is made. Some inappropriate 'colouring in' was seen.

Some candidates did not manage their time well. They had spent too long on earlier parts of the question. This then left them insufficient time to complete part (d).

Candidates need to understand that errors of the type mentioned above can severely restrict the number of marks available to them.

Comments on individual questions

Question 7

This proved to be the most popular question in this section of the paper.

Part (a) of the question required candidates to develop a design for the top section of the cart shown in Fig. 7. The better responses were those that explored different ways in which the design could provide seating for two children and prevent the children falling from the cart. A significant number of over complex, very elaborate designs were seen some of which would not have been safe to use. Very few candidates took into account the given sizes or gave any real technical details about construction or materials. Details about how the seats and sides could be attached to the main body of the cart were lacking in almost all of the responses.

The majority of the ideas produced in part (b) focused mainly on the design of the wheels. Often, only very limited details were given about how the wheels could be attached to the cart. Very few candidates took into account sizes or gave any real technical details about construction or materials.

Part (c) was not very well answered by the majority of candidates. Many responses focused only on how the cart could be pulled and gave little or no consideration to how the cart could be steered. A significant number of over complex, elaborate designs were seen, some of which were potentially dangerous. Very few candidates took into account sizes or gave any real technical details about construction or materials.

A limited number of good rendered pictorial drawings were seen in part (d), however, in some responses; the rendering was not attempted or was not done well. Not all of the responses clearly showed all of the features that had been designed in parts (a)–(c). Common omissions were not to fully show how the wheels would be attached to the cart or how the cart would be steered.

Question 8

While this question proved to be the least popular question in this section of the paper it did result in some of the best responses seen in **Section C**.

The better responses to part (a) were from those candidates who had considered both how the phone would fit in the holder and how the holder would hook over the top of the display stand. A number of candidates explored the use of various materials, but in the main, candidates did not fully consider sizes or where the holder would be positioned. There was frequently a lack of information about how the final holder could be made.

In part (b), the majority of candidates produced designs for a leaflet holder which had the potential to work. The better responses went on to explore various ways in which the leaflet hold could be constructed from card and attached to the display stand. Weaker responses often focused on just the appearance of the leaflet holder. It is important that candidates carry forward their design work from part (a) into part (b). In some cases the design arrived at in part (b) would not have fitted in the position shown by candidates when the design produced in part (a) was hooked over the top of the display stand. A significant number of candidates had not considered sizes or given sufficient technical details about how their chosen design could be constructed.

Answers to part (c) were very mixed. The better responses were those where the candidate produced exciting and original designs which reflected the company's name '**Our phones let you speak to the world**'. These responses frequent incorporated features that suggested the world (e.g. a globe) or were associated with phones into the design of the lettering. Only a limited number of candidates explored the use of colour and/or possible positions for the letter on the box. Weaker designs frequently used little more than single line block capitals to produce the lettering.

The quality of the drawings produced in part **(d)** was very mixed but a limited number of high quality rendered drawings were seen. Some of the drawings did not show all of the features that had been designed in parts **(a)–(c)**. Before starting their responses to this part of the question candidates should select a form of pictorial drawing and a viewing position which are the most suitable for showing all of the features they have designed in **(a)–(c)**. It is important that on drawings of this type, the card is given a thickness and not drawn as a single line.

Question 9

Responses to all parts of this question were very mixed. Size should have been a major consideration when producing possible solutions to this question. The vast majority of candidates did not consider sizes at any stage of their work.

The better responses to part **(a)** were those where candidates had considered various ways in which the trays could be supported so that they could slide in and out of the unit. Few responses gave sufficient details about materials, construction or sizes. Some designs were over complex, and frequently resulted in units that either would not meet the requirements of the question, or be uncomfortable or potentially dangerous to use. Some candidates incorrectly suggested that the shape of the unit should be changed. Weaker responses often focused on little more than the shape of the unit.

A significant number of responses did little more than focus on the design of a handle for the tray. Few responses gave sufficient details about materials, construction or sizes. Some designs were over complex which resulted in some designs that would be uncomfortable to use

In general, part **(c)** was not very well answered. The better responses were those where candidates had considered both the layout of the equipment in the tray had how the equipment could be prevented from moving in the tray. Very few responses considered sizes when attempting to design a suitable layout for the inside of the tray. Very limited details about materials and construction were given.

Only a very limited number of good quality fully rendered pictorial drawings were seen in part **(d)**. A significant number of incomplete drawings were seen which frequently did not shown all of the features that had been designed in parts **(a)–(c)** of the question, and were often not rendered.

DESIGN AND TECHNOLOGY

Paper 9705/31
Written 2

General Comments

Candidates were generally well prepared for this examination and used their time effectively in both sections of the paper. The overall standard of candidate performance was good this year with an increased number of outstanding scripts achieving very high marks.

Responses to **Section A** were generally good, but a number of candidates produced very brief responses, which lacked the detail necessary to achieve middle to high mark ranges. The quality and use of appropriate sketching and annotation was again good throughout the paper.

Candidates are reminded that if a question has an instruction 'discuss', they should:

- examine critically the issues raised by the question;
- explain and interpret these issues as appropriate;
- introduce evidence wherever possible to support conclusions of arguments.

Candidates are well prepared for **Section B** and most candidates fully completed all of the requirements. There were a small number of candidates who did not use their time effectively and did not fully complete the final sections of the paper. A significant number did not fully complete an evaluation.

In **Section A**, Part **A** was the most popular. An increased number of candidates attempted questions in Part **C** and Part **B**.

In Part **A**, **Questions 1** and **3** were the most popular. There was an even spread of attempts at questions in Part **B**. **Questions 8** and **9** were the most popular in Part **C**.

In **Section B**, there was a more even spread of attempts than in previous years. **Question 10** was marginally the most popular.

This report should be read in conjunction with a question paper and mark scheme.

Comments on specific questions

Section A

Part A – Product Design

Question 1

- (a) Most candidates stated a suitable material for the clothing hook, and gave appropriate reasons for their choice. Some candidates gave generic reasons such as environmentally friendly and easily available which do not receive credit.
- (b) Candidates answered this part well, but some did not acknowledge the nature of the bends in the holder and only considered the curve for the hook part. Most important stages were included but some did not include how to achieve a high quality finish and did not access the full mark range.
- (c) The large batch size required meant that injection moulding was a processing possibility. Most candidates achieved some marks by describing the process; those who included details of the complex mould required accessed the full mark range.

Question 2

There were relatively few attempts at this question. Some were very good, where candidates selected one of the given products, discussed the key issues relating to aesthetics, unit costs and processes. Most candidates did not read the question carefully and included all three products to give a brief account of batch production methodology.

Question 3

This was a popular question with a wide range of responses. There was a fairly equal spread of attempts at each of the processes with hardening and tempering marginally the least popular.

The highest marks were awarded to candidates who produced fully detailed descriptions of the manufacturing process chosen, using clear sketching and annotation, of the two or three key stages.

- (a) The process of hardening and tempering and vacuum forming were generally well answered. Few candidates demonstrated a detailed knowledge of edging and veneering.
- (b) Most candidates were able to correctly explain why the relevant process was suitable for the production of the items.

Part B – Practical Technology

Question 4

There were very few attempts at this question. Responses were generally fully detailed and candidates demonstrated a good understanding of adhesives and solvents.

- (a) Most identified two different adhesives or solvents and gave a specific application for both.
- (b) Candidates gave a full description of the preparation, application and health and safety issues involved when using the chosen adhesives.
- (c) This part was well answered with detailed explanations.

Question 5

There were very few attempts at this question

- (a) (i) Most candidates named two alloys and the specific materials used in each alloy.
- (ii) Most candidates identified a product for each of the alloys given.
- (iii) Few gave an explanation as to why alloys are important in the design and manufacture of products.
- (b) (i) Most had a good understanding of the property of hardness and identified a material and product.
- (ii) Very few candidates were able to describe a test to measure hardness.

Question 6

There were very few attempts at this question. Some responses were outstanding, covering in detail the issues of materials, mechanisms and friction in relation to the design of a bicycle. Some were relatively brief and did not cover the main three issues.

Part C – Graphic Products

Question 7

Relatively few candidates attempted this question.

- (a) (i) Some candidates drew an outline of the elevation but did not include the line of interpenetration.
- (ii) Candidates drew the outline of the net but did not include details of the full development.
- (b) Most candidates answered this part particularly well demonstrating a good knowledge of standardized drawing conventions and their importance to the design and manufacturing industry.

Question 8

There were a range of responses to this question. Some were outstanding and achieved very high marks.

- (a) Most candidates described two advantages of CAD in the production of graphic images.
- (b) (i) Very few candidates described an appropriate process for the production of a batch of 500 programmes. Most responses were far too brief and lacking detail.
- (ii) Similarly, very few candidates described an appropriate process for the production of a batch of 8 posters. Again, most responses were far too brief and lacking detail.

Question 9

There were some excellent, fully detailed responses to this question and many achieved very high marks.

All candidates fully explained what a pictogram, bar chart and pie chart was and used sketches well to explain an appropriate example for each. Only a few candidates clearly and accurately explained an ideogram.

Section B

There were a number of outstanding responses to this section of the paper. Presentation skills were generally of a very good standard and candidates demonstrated their knowledge of appropriate materials and construction techniques. Many candidates produced very innovative and creative work. Most candidates completed their responses in the time allowed. A few candidates did not fully complete the final proposal and evaluation sections.

The analysis and specification sections continue to improve. Many candidates consider the initial thoughts and broader issues related to the given problem/situation. This provides the key points to help to develop a specification. Some candidates still produced generic charts that have no specific reference to the problem and received little credit. Some specifications included generic statements, such as environmentally friendly and easily available materials, with no reference to the problem/situation.

The majority of candidates produced a range of different design ideas, and many included the exploration of sub-problems. Reference to appropriate specific materials was also generally good. Most candidates gave appropriate justifications for their use.

Most candidates produced an on-going evaluation of design ideas, highlighting evaluative comments which help to select features for further development. Higher marks are achieved when candidates give evaluative comments on their ideas and can make a reasoned judgment on the best solution or features to take forward.

The development of ideas section continues to be very strong. A number of candidates focused solely on a plan for manufacture and did not consider the reasoning and composition of ideas that leads to a single design proposal. To achieve the higher mark range, candidates must include evidence of their decision making to show the improvements or modifications to their idea(s) leading to a final design.

The majority of proposed solutions were feasible and well presented. Most candidates included overall dimensions in their final proposal and included details of important components, additional dimensions, materials and possible finishes.

Some candidates produced excellent, valid evaluations of their proposal, describing the positive features and functional details and suggesting further modifications or improvements. Many candidates still copy out their specification points and place a tick to show whether the point has been satisfied or not. This will not access the full range of marks available.

Question 10

This was the most popular question in **Section B** and generally well answered. Some responses were exceptionally innovative and creative. The question opened up a wide range of possibilities and several valid interpretations were presented.

Acceptable specification points included:

- The product must be able to be set up and used on uneven surfaces.
- The product must be robust and be made of materials suitable for indoor and outdoor conditions.
- The product should be easy to assemble and take apart, to take up minimal storage space.
- The product should include a method of recycling water.
- The product should ensure the privacy of the user when washing in possibly windy conditions.

Many responses had excellent, flowing creative design thinking; candidates were considering a range of possibilities for each of the specification points. A wide range of washing interpretations was accepted such as personal hygiene, washing clothes and or dishes. The development section was particularly good on this question. Final proposals were generally realistic, with most including details of materials or important dimensions.

Question 11

Candidates created a range of appropriate solutions for a collection box.

Acceptable specification points included:

- The collection box should have a clear indication of the charity for whom the donation will go to.
- The collection box should be firmly and securely fixed to avoid theft.
- The collection box should enable very easy and safe insertion of coins and notes.
- The collection box must be made of materials that can withstand tampering or force to access the money.
- The collection box could give a response to the donor to thank them for their donation.

Many ideas were genuinely creative, making donating money fun. Some had excellent ideas using sensors to trigger mechanical and or electronic responses to acknowledge a donation. Some candidates ignored the requirement for an electronic or mechanical response and did not access the higher mark ranges.

Question 12

There was a wide range of responses to this question. Some candidates applied a wider interpretation of packaging and developed excellent ideas for packaging that could be used for storage.

Acceptable specification points included:

- The packaging must allow easy retrieval and replacement of the containers.
- The labels must be printed with waterproof inks and attached to the container with water proof adhesive or printed/engraved directly onto the container.
- The labels must have a similar corporate design for the hotel but each container should be easily identified.
- The packaging must be able to be positioned in a bathroom/shower environment so must not react to water or steam.

Most candidates produced effective methods of packaging the containers and developed exciting and appropriate label designs for Sunrise Hotel.

A number of candidates proposed innovative packaging/storage units. A small number of candidates attempted this question did not have adequate knowledge of graphic materials, packaging, printing or the development of nets. They demonstrated limited technical knowledge.

DESIGN AND TECHNOLOGY

Paper 9705/32
Written 2

General Comments

Candidates were well prepared for this paper. Most candidates used the time available effectively and made full attempts at all sections of the paper. A number of candidates answered only one question from **Section A**. It appears that some candidates spent too much of their allocated time on **Section B** at the expense of lack of detail in their responses in **Section A**.

A small number of candidates attempted more than two questions from **Section A**. Time would be better spent on focusing on including as much detail as possible in the candidate's strongest two questions. The marks from two questions only will be credited.

The quality and use of appropriate sketching and annotation continues to be of a good standard throughout the paper. Most candidates used sketches well to describe the stages of particular processes and support their answers to questions, where appropriate, in **Section A**.

Candidates are reminded that if a question has an instruction 'discuss', they should:

- examine critically the issues raised by the question;
- explain and interpret these issues as appropriate;
- introduce evidence wherever possible to support conclusions of arguments.

The majority of candidates fully completed all of the requirements for **Section B**. Some candidates did waste valuable time by copying out the question or rewording the situation.

It is important that candidates are able to practise this examination under timed conditions.

In **Section A**, Part **A** was the most popular. Most candidates attempted **Question 1** and **Question 2**. Very few candidates attempted questions from Part **B** of which, **Question 4** was the most popular. **Questions 8** and **9** were the most popular in Part **C**.

There was a greater spread of attempted questions in **Section B** this year **Question 10** was the most popular followed by **Question 12**.

This report should be read in conjunction with a question paper and mark scheme.

Comments on Specific Questions

Section A

Part A – Product Design

Question 1

This was the most popular question in **Section A**. There were a number of excellent, fully detailed answers to this question.

- (a) Rotational moulding and turning were the two most popular choices of processes. Few candidates attempted the process of etching with very few full description of the process. Many candidates made good use of annotated sketches to support their answer.

- (b) Candidates answered this part of the question well. Most candidates explained why the process was particularly suitable for the specific item and achieved high marks. Some candidates did not reference the process to the item and consequently did not access the full mark range.

Question 2

This was a popular question with many very good responses; some achieving the highest mark range.

- (a) A wide range of appropriate, specific materials were stated and valid reasons for choice given. A significant number of candidates stated acrylic which would not be appropriate for this application. Candidates achieved a mark by stating mild steel, if they included an appropriate finish.
- (b) Most responses were full, but a significant number produced very brief outlines with limited technical detail and did not access the full range of marks.
- (c) A description of a process with no reference to the mould or former required for the manufacture of the runner, did not access the higher mark range. Candidates must take into account the batch size when deciding upon an appropriate manufacturing method.

Question 3

Few candidates attempted this question.

- (a) Most candidates correctly identified tools from the given options and described how the tools would be used.
- (b) Most candidates did not describe the cutting action of the selected tools. Few candidates correctly referred to clearance and rake angles of lathe tools, sketched the tooth profile of hand saws and gave specific details of the cutting action of a drill.
- (c) Some candidates described the general care of the tools named but to achieve full marks, details of how to maintain a sharp cutting edge were expected.

Part B – Practical Technology

Question 4

Few candidates attempted this question. Some candidates attempted parts (a) and (b), but made no attempt at parts (c) and (d).

- (a) Most candidates correctly defined the terms toughness and elasticity.
- (b) Most candidates stated appropriate tough and elastic materials.
- (c) Some candidates gave a fully detailed description, but very few candidates correctly described a method of tensile testing materials. Some candidates did not attempt this part of the question.
- (d) Some candidates gave clear explanations of the importance of tensile testing when developing new products, most focused on safety requirements. A number of candidates made no attempt at this part of the question.

Question 5

There were very few attempts at this question.

- (a) Some candidates produced excellent responses to this part; fully detailed and showing a clear understanding of mechanisms and applications.

- (b) Most candidates correctly explained the term mechanical advantage, but very few candidates correctly explained velocity ratio.

Question 6

There were few attempts to this question. Most of those candidates who attempted this question did not go on to attempt part (b).

- (a) A few candidates described how to solder onto a PCB; some did not consider the specific requirements of soldering an LED, i.e. polarity and heat protection. Very few candidates attempted to describe the die casting of the putter head. Responses were generally detailed and included details of the die/mould required.
- (b) Most candidates attempting this part did not explain the difference between welding and hard soldering in part (c). Most candidates gave a suitable application of welding and hard soldering.

Part C – Graphic Products

Question 7

Relatively few candidates attempted this question. Some of the responses were excellent; fully detailed and well structured.

Some responses were very brief and did not include appropriate evidence/examples to support the answer.

Question 8

This was the most popular question in this section. Some responses were outstanding with many achieving very high marks.

- (a) Most candidates drew an accurate full size isometric drawing of the child's toy. Some attempted to draw the toy inside a lined page answer book without the use of equipment. Candidates are advised to use additional paper when answering questions of this type.
- (b) This part was well answered, with most candidates clearly explaining the differences between planometric and perspective drawing and their use by designers/architects. Most made excellent use of sketches to support their answer.

Question 9

There were a number of very good responses to this question.

- (a) Most candidates produced an accurate, well rendered and full size pictorial drawing of the kitchen tap. Some candidates did not render the drawing and could not access the full mark range. Few candidates attempted to draw the tap inside a lined page answer book. Candidates are advised to use additional blank paper when answering questions of this type.
- (b) Most candidates clearly knew the forms of communication listed and gave examples of usage. Many did not explain the use of working drawings with only a few referring to standardised techniques or the accuracy and detail needed by manufacturers.

Section B

All candidates prepared their answers on the A3 papers as instructed.

The overall performance of candidates on this section was generally good. The majority of candidates used their time effectively and fully completed all requirements of the questions attempted. Some candidates were genuinely innovative and creative, but a significant number produced designs of already existing ideas with very limited personal interpretation or exploration, and consequently did not access the highest mark range.

A significant number of candidates copied out the question or prepared a new brief as part of their analysis which is unnecessary. Presentation skills were generally impressive with most candidates showing knowledge of appropriate materials and construction techniques. Most candidates consider the initial thoughts and broader issues related to the given problem/situation in the analysis. This provided them with key points to help to develop a specification. Some candidates produced generic charts that have no specific reference to the problem and received little credit.

Specifications should be clear, justified statements. Single word or generic statements, with no reference to the product or the specific task/requirements will not gain a mark. The majority of candidates produced a range of different design ideas. The majority included the exploration of sub-problems. A significant number of candidates focused on a single concept and as a result, did not access the middle and higher mark ranges.

Annotation was generally very good. There was a good explanation of design details relating to the specification and proposal for appropriate specific materials and construction methods. Evaluation is clearly evident from many candidates in the exploration of ideas section. Some candidates included very limited evaluative comment on their ideas and limited reasoning for selection for further development. Evaluating when designing helps when making a reasoned judgement on the best solution or features to take forward.

A number of candidates employed a tick list to evaluate their ideas and identify a chosen solution. These are not fully appropriate unless they are adequately explained.

The development of ideas section was strong for most candidates. A few focused only on a plan for manufacture and did not consider the reasoning and composition of ideas that leads to a single final design proposal.

To achieve the higher mark range, candidates must include evidence of their decision making to show the improvements or modifications to their idea(s) leading to a final design.

Most proposed solutions were feasible and well-presented, but some did not have enough detail to clearly show the workings of the product.

Most candidates included overall dimensions in their final proposal. To achieve full marks in the detail section, candidates would be expected to include dimensions, materials and possible finishes.

An increasing number of candidates produced valid evaluations of their proposal, describing the positive features, functional details and suggesting further modifications or improvements. Many candidates still copy out their specification points and place a tick to show whether the point has been satisfied or not. This will not access the full range of marks available.

Question 10

The most popular question, generally well answered with a full range of responses. A few candidates produced outstanding, creative responses; innovative solutions that were exceptionally well presented.

Acceptable specification points included:

- The product must be made from weather resistant materials or suitably protected as it will be used indoors and outdoors.
- The product must be robust to take the wear and tear of regular exercise usage.
- The product must be adjustable or be able to accommodate different users.
- The product must be easily disassembled or adjusted for ease of storage.
- The product must be stable in use on different indoor and outdoor surfaces.

Most candidates produced a range of possible solutions, selecting and justifying appropriate materials. Very few candidates attempted innovative and different proposals.

Material and constructional detail was generally detailed and appropriate. Not all candidates clearly described the workings of their products.

Final proposals were mostly suitable and described in sufficient detail. The best responses included full dimensions and details of appropriate finish.

Evaluations were generally good although a few candidates did not make specific reference to the final proposal and suggested possible improvements.

Question 11

The least popular question with some interesting and creative ideas generated. Many candidates unfortunately produced ideas that would not be suitable for a child when travelling.

Most candidates did not focus on the requirement to include an electronic or mechanical feature in the toy. Some produce computer based games with little or no evidence of the electronic technologies required. Drawings of existing games with no technical or constructional detail did not access the middle or higher mark ranges.

Acceptable specification points included:

- The toy must not include numerous parts that could get lost when travelling.
- The toy should be of a suitable size (e.g. to place on child's lap) to not be awkward or difficult to operate when travelling.
- The toy must not emit sudden loud noises so as not to distract the driver of a vehicle.
- The toy must incorporate appropriate packaging/storing to keep any parts enclosed for storage.

Question 12

There was a range of responses to this question. Whilst some candidates produced exceptionally innovative ideas for an interactive card, mostly employing a 'pop-up' mechanism, too many candidates produced plain card ideas with no additional feature.

Acceptable specification points included:

- The card should be laminated to strengthen and protect the interactive feature.
- The card should be of standard size to fit into a standard envelope.
- The card should include congratulatory text and an appropriate section for an invitation.
- The graphics/print should be of the highest quality as it is to celebrate outstanding achievement.
- The card should use text, graphics and features to highlight the subject specific skills demonstrated by the student.

The best responses focused on the use of the school logo and school colours to explore an exciting and high quality corporate image and the use of graphics/text and features to produce a memorable card celebrating success.

DESIGN AND TECHNOLOGY

Paper 9705/33
Written 2

General Comments

Candidates were generally well prepared for this examination and used their time effectively in both sections of the paper. The overall standard of candidate performance was good this year with an increased number of outstanding scripts achieving very high marks.

Responses to **Section A** were generally good, but a number of candidates produced very brief responses, which lacked the detail necessary to achieve middle to high mark ranges. The quality and use of appropriate sketching and annotation was again good throughout the paper.

Candidates are reminded that if a question has an instruction 'discuss', they should:

- examine critically the issues raised by the question;
- explain and interpret these issues as appropriate;
- introduce evidence wherever possible to support conclusions of arguments.

Candidates are well prepared for **Section B** and most candidates fully completed all of the requirements. There were a small number of candidates who did not use their time effectively and did not fully complete the final sections of the paper. A significant number did not fully complete an evaluation.

In **Section A**, Part **A** was the most popular. An increased number of candidates attempted questions in Part **C** and Part **B**.

In Part **A**, **Questions 1** and **3** were the most popular. There was an even spread of attempts at questions in Part **B**. **Questions 8** and **9** were the most popular in Part **C**.

In **Section B**, there was a more even spread of attempts than in previous years. **Question 10** was marginally the most popular.

This report should be read in conjunction with a question paper and mark scheme.

Comments on specific questions

Section A

Part A – Product Design

Question 1

- (a) Most candidates stated a suitable material for the clothing hook, and gave appropriate reasons for their choice. Some candidates gave generic reasons such as environmentally friendly and easily available which do not receive credit.
- (b) Candidates answered this part well, but some did not acknowledge the nature of the bends in the holder and only considered the curve for the hook part. Most important stages were included but some did not include how to achieve a high quality finish and did not access the full mark range.
- (c) The large batch size required meant that injection moulding was a processing possibility. Most candidates achieved some marks by describing the process; those who included details of the complex mould required accessed the full mark range.

Question 2

There were relatively few attempts at this question. Some were very good, where candidates selected one of the given products, discussed the key issues relating to aesthetics, unit costs and processes. Most candidates did not read the question carefully and included all three products to give a brief account of batch production methodology.

Question 3

This was a popular question with a wide range of responses. There was a fairly equal spread of attempts at each of the processes with hardening and tempering marginally the least popular.

The highest marks were awarded to candidates who produced fully detailed descriptions of the manufacturing process chosen, using clear sketching and annotation, of the two or three key stages.

- (a) The process of hardening and tempering and vacuum forming were generally well answered. Few candidates demonstrated a detailed knowledge of edging and veneering.
- (b) Most candidates were able to correctly explain why the relevant process was suitable for the production of the items.

Part B – Practical Technology

Question 4

There were very few attempts at this question. Responses were generally fully detailed and candidates demonstrated a good understanding of adhesives and solvents.

- (a) Most identified two different adhesives or solvents and gave a specific application for both.
- (b) Candidates gave a full description of the preparation, application and health and safety issues involved when using the chosen adhesives.
- (c) This part was well answered with detailed explanations.

Question 5

There were very few attempts at this question

- (a) (i) Most candidates named two alloys and the specific materials used in each alloy.
- (ii) Most candidates identified a product for each of the alloys given.
- (iii) Few gave an explanation as to why alloys are important in the design and manufacture of products.
- (b) (i) Most had a good understanding of the property of hardness and identified a material and product.
- (ii) Very few candidates were able to describe a test to measure hardness.

Question 6

There were very few attempts at this question. Some responses were outstanding, covering in detail the issues of materials, mechanisms and friction in relation to the design of a bicycle. Some were relatively brief and did not cover the main three issues.

Part C – Graphic Products

Question 7

Relatively few candidates attempted this question.

- (a) (i) Some candidates drew an outline of the elevation but did not include the line of interpenetration.
- (ii) Candidates drew the outline of the net but did not include details of the full development.
- (b) Most candidates answered this part particularly well demonstrating a good knowledge of standardized drawing conventions and their importance to the design and manufacturing industry.

Question 8

There were a range of responses to this question. Some were outstanding and achieved very high marks.

- (a) Most candidates described two advantages of CAD in the production of graphic images.
- (b) (i) Very few candidates described an appropriate process for the production of a batch of 500 programmes. Most responses were far too brief and lacking detail.
- (ii) Similarly, very few candidates described an appropriate process for the production of a batch of 8 posters. Again, most responses were far too brief and lacking detail.

Question 9

There were some excellent, fully detailed responses to this question and many achieved very high marks.

All candidates fully explained what a pictogram, bar chart and pie chart was and used sketches well to explain an appropriate example for each. Only a few candidates clearly and accurately explained an ideogram.

Section B

There were a number of outstanding responses to this section of the paper. Presentation skills were generally of a very good standard and candidates demonstrated their knowledge of appropriate materials and construction techniques. Many candidates produced very innovative and creative work. Most candidates completed their responses in the time allowed. A few candidates did not fully complete the final proposal and evaluation sections.

The analysis and specification sections continue to improve. Many candidates consider the initial thoughts and broader issues related to the given problem/situation. This provides the key points to help to develop a specification. Some candidates still produced generic charts that have no specific reference to the problem and received little credit. Some specifications included generic statements, such as environmentally friendly and easily available materials, with no reference to the problem/situation.

The majority of candidates produced a range of different design ideas, and many included the exploration of sub-problems. Reference to appropriate specific materials was also generally good. Most candidates gave appropriate justifications for their use.

Most candidates produced an on-going evaluation of design ideas, highlighting evaluative comments which help to select features for further development. Higher marks are achieved when candidates give evaluative comments on their ideas and can make a reasoned judgment on the best solution or features to take forward.

The development of ideas section continues to be very strong. A number of candidates focused solely on a plan for manufacture and did not consider the reasoning and composition of ideas that leads to a single design proposal. To achieve the higher mark range, candidates must include evidence of their decision making to show the improvements or modifications to their idea(s) leading to a final design.

The majority of proposed solutions were feasible and well presented. Most candidates included overall dimensions in their final proposal and included details of important components, additional dimensions, materials and possible finishes.

Some candidates produced excellent, valid evaluations of their proposal, describing the positive features and functional details and suggesting further modifications or improvements. Many candidates still copy out their specification points and place a tick to show whether the point has been satisfied or not. This will not access the full range of marks available.

Question 10

This was the most popular question in **Section B** and generally well answered. Some responses were exceptionally innovative and creative. The question opened up a wide range of possibilities and several valid interpretations were presented.

Acceptable specification points included:

- The product must be able to be set up and used on uneven surfaces.
- The product must be robust and be made of materials suitable for indoor and outdoor conditions.
- The product should be easy to assemble and take apart, to take up minimal storage space.
- The product should include a method of recycling water.
- The product should ensure the privacy of the user when washing in possibly windy conditions.

Many responses had excellent, flowing creative design thinking; candidates were considering a range of possibilities for each of the specification points. A wide range of washing interpretations was accepted such as personal hygiene, washing clothes and or dishes. The development section was particularly good on this question. Final proposals were generally realistic, with most including details of materials or important dimensions.

Question 11

Candidates created a range of appropriate solutions for a collection box.

Acceptable specification points included:

- The collection box should have a clear indication of the charity for whom the donation will go to.
- The collection box should be firmly and securely fixed to avoid theft.
- The collection box should enable very easy and safe insertion of coins and notes.
- The collection box must be made of materials that can withstand tampering or force to access the money.
- The collection box could give a response to the donor to thank them for their donation.

Many ideas were genuinely creative, making donating money fun. Some had excellent ideas using sensors to trigger mechanical and or electronic responses to acknowledge a donation. Some candidates ignored the requirement for an electronic or mechanical response and did not access the higher mark ranges.

Question 12

There was a wide range of responses to this question. Some candidates applied a wider interpretation of packaging and developed excellent ideas for packaging that could be used for storage.

Acceptable specification points included:

- The packaging must allow easy retrieval and replacement of the containers.
- The labels must be printed with waterproof inks and attached to the container with water proof adhesive or printed/engraved directly onto the container.
- The labels must have a similar corporate design for the hotel but each container should be easily identified.
- The packaging must be able to be positioned in a bathroom/shower environment so must not react to water or steam.

Most candidates produced effective methods of packaging the containers and developed exciting and appropriate label designs for Sunrise Hotel.

A number of candidates proposed innovative packaging/storage units. A small number of candidates attempted this question did not have adequate knowledge of graphic materials, packaging, printing or the development of nets. They demonstrated limited technical knowledge.