

DESIGN AND TECHNOLOGY

Paper 9705/11

Written 1

General comments

In general, the performance of candidates was similar to last year. While some excellent answers were seen in all sections of the paper, responses were very mixed.

The better responses were from those candidates who had looked at the number of marks available for each part of a question and produced answers which contained enough detail 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 that did not fully address what the question had asked for. Some of the responses were too short while 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 their answers are focused on the requirements of the question being asked and produce responses which 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, more candidates than in previous years found time management a problem, particularly in **Section B** and **Section C**.

Some repetition was evident in answers to questions in all sections of the paper. Some candidates 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 or information than the first drawing. A common error by candidates in written responses was to repeat the same information two or more times using slightly different words.

It is suggested that Centres make the content of this report available to future candidates in order to help them avoid making similar errors and omissions.

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 required, their correct use must be shown and described. The quality of sketching was generally good but candidates need to understand that the use of lots of continuous text should be avoided when answering questions in this section of the paper.

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 specific questions

Question 1

Correct answers to part **(a)** of the question needed to explain that batch production involved the manufacture of a set number of identical products. Only a very limited number of fully correct responses were seen. A significant number of candidates incorrectly described drilling a hole in part **(a)**.

Responses to part **(b)** were very mixed. While the majority of candidates gained at least some marks, very few fully correct answers were seen. In a limited number of cases, candidates incorrectly gave details about how the chair could be made.

The majority of candidates who answered part **(c)(i)** were able to display at least some knowledge and understanding about how three pieces of plywood could be laminated to make part **A**. The better responses used notes and sketches to describe how the pieces of plywood could be glued together, bent around a former and held in place until the glue dried. A good number of the weaker answers frequently showed little more than three pieces of plywood being glued together to make a thicker piece of flat plywood.

The better responses to part **(c)(ii)** described how a hole could be drilled in the end of part **B** and a thread cut in the hole using a tap and tap wrench.

Question 2

In part **(a)(i)**, the majority of candidates gained some marks by correctly describing at least some of the stages involved in closing the top of the box. Only a limited number of fully correct answers were seen with a good number of candidates not providing sufficient details about how the locking tab and slot functioned.

The better responses to part **(a)(ii)** clearly described how the four flaps folded over and the two longer flaps locked together to secure the bottom of the box without the need to use glue. The majority of candidates generally did not go any further than to describe how the two smaller flaps folded over.

Part **(a)(iii)** was not answered well. The development required to make the template was frequently incomplete and very few candidates took into account how the template could be used to mark out the fold lines. Descriptions of how the template could be cut out and used generally lacked the level of detail required to gain high marks. Some candidates related their answers to making the box rather than making the template.

In part **(b)**, few candidates were able to give two appropriate reasons why thin plastic had been chosen for making the template rather than card. Appropriate reasons included the fact that it would last longer and it would be easier to draw around because it is more rigid than card. This part of the question again highlighted the need to read questions carefully, as a high number of candidates incorrectly related their answers to making the box rather than the template.

Question 3

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

Part **(a)(i)** required candidates to describe how one side of the laptop support could be cut out and the edges of the MDF rounded. A significant number of candidates spent far too long describing how the required shape could be marked out on the MDF. This was not a major requirement of the question. Most candidates were able to explain at least some of the processes required to achieve the required outcome. Some candidates focused their responses on just the outer shape and did not give any details as to how the inner shape could be achieved. Very few candidates described how the edges of the MDF could be rounded. The majority of candidates included at least some details about tools and safety precautions. It is important that these details are included in the body of the question and not simply listed at the end.

Responses to part **(a)(ii)** were very mixed.

The better answers described how impact adhesive (for example) could be used to attach the melamine sheet to the top surface and tools such as a smoothing plane used to angle the edges of the top at 15 degrees.

Inappropriate methods such as the use of screws or nails were much in evidence. The majority of answers did not include details about how the edges of the top could be angled. A good number of answers incorrectly suggested that additional pieces would need to be added to achieve the required angle and to join the top to the sides. Once again this highlighted the need for candidates to read the question carefully and study the given information before starting their response.

Some very good answers were seen to part (a)(iii).

The majority of candidates were able to demonstrate that they had a good knowledge and understanding of hinges and how they could be used in the given situation. A number of answers did not contain sufficient detail about the stages and equipment required to carry out the required process.

In part (b), the majority of candidates were able to give at least one appropriate reason why melamine plastic had been attached to the top. Acceptable reasons included the fact that it would improve the appearance and that it would make the top surface easier to clean.

Section B

General comments

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 disposal of products.

Parts (a), (b) and (c) of the questions in this section of the paper were generally reasonably well answered by the majority of candidates. While the number of candidates making use of the structure and mark allocation given in part (d) continues to increase the major weakness in many answers still relates to insufficient levels of ‘discussion’ that takes place in candidates’ responses.

Future candidates would be well 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.

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.

In a limited number of cases, candidates did not attempt to complete part (d) of the question that they had chosen to answer in this section of the paper.

Comments on specific questions

Question 4

This was the most popular question in this section of the paper, but it was not very well answered by many candidates.

In part (a), only a minority of the candidates gave a full explanation of the function of the slot and groove. The majority gained one mark for explaining that the blade went into the slot but far fewer went on to explain that the peg on the blade fitted into the groove.

In part (b), a reasonable number of candidates correctly identified at least one appropriate problem with the design of the jig. The major problems with the design were that there was nothing to hold the metal bar in place while making the first bend and that it was not possible to bend the metal bar around some of the fixed pegs because they were too close together.

To gain both marks for each problem, candidates need to identify the problem and go on to describe why it is a problem.

A significant number of candidates incorrectly tried to identify problems with the design of the junior hacksaw rather than the jig.

The better answers to part **(c)** used notes and sketches to good effect to explain how the design would need to be changed. Appropriate changes included adding an additional peg, or other method, of securing the end of the rod while the first bend was made and making at least two of the pegs removable so that the rod could be bent and the pegs replaced to allow further bends to take place. Only a limited number of candidates scored more than half marks for this part of the question. A number of candidates totally re-designed the jig. This type of response should be avoided.

The responses to part **(d)** were very mixed, with a good number of candidates focusing their answer on the design of the hacksaw rather than discussing 'how heat treatments can change the properties of metals'. The better responses discussed how heat treatment such as annealing, normalising, hardening, tempering and case hardening could be used to modify metals and enhance their function.

A weakness in many answers was not to provide appropriate conclusions, supported by specific examples/evidence. A degree of repetition was seen in almost all responses.

Question 5

In part **(a)**, the majority of candidates correctly explained that the function of the sticker was to hold the packaging together and improve the security of the product when displayed for sale.

The better responses to part **(b)** clearly identified at least one appropriate problem with the design of the development (net) for the lid. The two major problems with the design were that it was too small and would not fit over the insert and that there was no top on the lid which meant that it would slide down too far.

To gain both marks for each problem, candidates need to identify the problem and go on to describe why it is a problem.

Many of the answers to part **(c)** used notes and sketches to good effect, to explain how the design would need to be changed. Appropriate changes involved increasing the length and width of the development and adding a top including glue tabs. A significant number of candidates scored more than half marks for this part of the question.

A number of candidates totally re-designed the packaging. This type of response should be avoided.

In general part **(d)** was not answered well. The majority of candidates focused their responses on the design of the packaging, in particular the logo, rather than discussing how surface treatments and finishes can improve the sales of a product. The better responses discussed issues such as how surface treatments and finishes could be used to improve the appearance of a product making it more appealing to potential customers.

A weakness in many answers was not to provide appropriate conclusions supported by specific examples/evidence. A degree of repetition was seen in almost all responses.

Question 6

This question was answered by only a limited number of candidates.

In part **(a)**, very few candidates correctly explained that the purpose of the pipes was to heat the die which would make forming the plastic easier.

In part **(b)**, two main problems with the design of the die were that there was not anyway that air and/or parison (plastic) could enter the die and that the design was not complete because it did not include a screw thread. The majority of candidates identified at least one appropriate problem which generally related to the lack of a screw thread.

The better answers to part **(c)** used notes and sketches to good effect to explain how the design would need to be changed. Appropriate changes included adding a screw thread to the top of the bottle and adding appropriate openings to allow the air and/or parison (plastic) to enter the die. Some candidates correctly

Showed that the die would need to be in two parts (i.e. a split die) in order to enable the finished bottle to be removed. The majority of candidates scored at least half marks on this part of the question.

A number of candidates totally re-designed the shape of the bottle. This type of response should be avoided.

In part (d), the majority of candidates identified appropriate issues such as blow moulding and injection moulding were quick processes that could operate around the clock (24-7). They required only limited labour to operate the machinery involved and the products produced were identical and consistently of a high standard. Most candidates went on to discuss how these factors could, for example, increase production, reduce labour costs and result in less materials being wasted.

A weakness in many answers was not to provide appropriate conclusions supported by specific examples/evidence. A degree of repetition was seen in almost all responses.

Section C

General comments

Some excellent 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. Some candidates, unnecessarily, spent a long time producing 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 must to be evaluated in a meaningful way. For example, it is questionable how ideas can be evaluated by an 'expert' in an examination situation but this was seen in a number of papers. Evaluation tables with 'star', 'tick' or 'number' ratings were much 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.

For each of the parts (a) - (c) it is important that there is clear evidence that design development has taken place. This should show how the candidate has brought the best parts of their initial ideas into a developed solution for each part of the question. This developed solution should be annotated to give details about materials, joining methods and important sizes. Candidates are not required to describe, stage by stage, how a design could be made. Marks cannot be awarded for design development where a candidate has simply chosen one of their ideas and redrawn it.

A significant number of excellent rendered pictorial drawings were seen in part (d), but in some responses, the rendering was not attempted or was done well. A number of 'multi coloured' drawings with each product in a different colour were seen. Candidates need to be aware of the difference between 'colouring in' and 'rendering'. Rendering should be used to suggest the form (shape) of the product and the material(s) that it is made from.

Comments on specific questions

Question 7

Although this was not the most popular question, it did result in some of the highest marks scored in this section of the paper.

The better responses to part **(a)** were those where candidates had considered how the bulb and shade needed to extend and produced designs for sliding and linkage mechanisms which would allow the required movement to take place. At this level, most ideas included an appropriate method of joining the mechanism to the pole. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker solutions often showed over complex designs which would not have allowed the bulb and shade to fully extend or in some cases move at all. At this level, very few ideas showed how the mechanism could be attached to the pole. Both evaluations and design development were weak and sometimes non-existent.

In part **(b)**, the better responses were those where candidates had produced good, original and workable designs for a lamp shade which included features that would allow the bulb to fit in the lamp shade and allow the lamp shade to be joined to the mechanism designed in **(a)**. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker responses often showed over-elaborate designs which frequently did not show how the bulb would be attached to the lamp shade and/or how the lamp shade would be joined to the mechanism designed in **(a)**. Both evaluations and design development were weak and sometimes non-existent.

The better responses to part **(c)** clearly showed that candidates had taken into account the stability of the base and how it could be joined to the wooden pole. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker responses often showed designs for the base which were over complex and unstable. A number of designs did not include an appropriate method for joining the base to the wooden pole. Both evaluations and design development were weak and sometimes non-existent.

A good number of excellent rendered pictorial drawings were seen in part **(d)**, but in some responses, the rendering was not attempted or was not done well. It is important that the pictorial drawing includes all of the features that have been designed in parts **(a) - (c)**.

Question 8

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

Sizes were a crucial factor in all parts of this question. Almost all candidates who attempted this question did not take sizes into account when producing their responses to this question. Very few top quality answers were seen.

In a limited number of cases candidates incorrectly suggested changing the shape of the packaging for cosmetics.

In general, part **(a)** was not very well answered. The majority of candidates did not take the size and/or shape of the four items of cosmetics into consideration when producing their designs. Very few candidates designed both the card tray and the card insert. Evaluations and design development very generally weak and sometimes not included at all.

Part **(b)** required candidates to design a hexagonal box made from a one piece development which included four windows. The tray and insert designed in **(a)** needed to fit inside the box.

The majority of candidates focused their responses on just the position of the windows.

To gain high marks, responses needed to show:

- a range of ideas for a one piece development to make the hexagonal box;
- possible locations for the four windows;
- how the tray and insert would fit inside the box.

It is important that in questions of this type features that are designed in one part of the question are carried forward to the next part. In this case, very few candidates showed that they had considered the design for the insert and tray that they had produced in **(a)** when they were designing the box.

The quality of the designs produced in part **(c)** was very variable. The better responses developed designs for lettering styles which reflected the name '**Moonbeams and Starlight**' by including features such as a moon and stars into the lettering. Only a limited number of responses gave any real consideration to colour or where the lettering would be placed on the box. It is important that candidates read all parts of a question so that they realise how parts **(a)** - **(c)** of the question link together to produce the final product that has to be illustrated in part **(d)**.

The quality of the drawings produced in part **(d)** was very mixed with only a limited number of high quality rendered drawings being seen. Some of the drawings did not show all of the features that had been designed in parts **(a)** - **(c)**. Common omissions included not showing the lettering and/or not producing an exploded view. 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 parts **(a)** - **(c)**. It is important that on drawings of this type card is given a thickness and not drawn as a single line.

Question 9

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

Part **(a)** highlighted the need for candidates to make sure that they read questions very carefully before they start their answers. This part of the question required candidates to develop a design which would allow the legs of the drawing and painting easel to be adjusted and fixed at different lengths between 1000 mm and 1500 mm. In a number of cases candidates, incorrectly produced designs which allowed the legs to be adjusted to different angles. Where this error occurred, credit was given in part **(b)**, where this feature was a requirement of the question.

The better responses were those where candidates had produced good, original and workable designs which would allow the legs to be adjusted and fixed at different lengths. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker responses often showed over complex designs which frequently would not have fully functioned and/or been dangerous to use. Both evaluations and design development were weak and sometimes non-existent. Only a limited number of candidates took sizes into account when developing their designs.

Responses to part **(b)** were very mixed. The better responses were those where candidates had considered both how the two sides of the easel could be joined together and how they could be adjusted and fixed at different angles. In these better responses, ideas had been well evaluated and developed into workable solutions. The weaker solutions often showed over complex designs which would not have fully functioned and/or would have been dangerous to use. Many of these weaker solutions did not include a method of joining the two sides together and/or a method that fixed the two sides at a particular angle. Both evaluations and design development were weak and sometimes non-existent.

In part **(c)**, the better responses had considered the design of an appropriate detachable tray, how it could be fixed to the easel and where would be the most suitable place for it to be attached. In these better responses, ideas had been well evaluated and developed into workable solutions.

The weaker solutions often showed over complex designs which would not have fully functioned.

Common omissions included:

- not showing an appropriate method of attaching the tray to the easel;
- not considering size (many trays were either too small or too big);
- not positioning the tray in an appropriate place;

Both evaluations and design development were weak and sometimes non-existent.

A number of very good rendered pictorial drawings were seen in part **(d)**. However in some responses the rendering was not attempted or was not done well. A limited number of two dimensional drawings were seen. It is important that the pictorial drawing includes all of the features that have been designed in parts **(a) - (c)**.

DESIGN AND TECHNOLOGY

Paper 9705/12

Written 1

General comments

In general, the performance of candidates was similar to last year. While some excellent answers were seen in all sections of the paper, responses were very mixed.

The better responses were from those candidates who had looked at the number of marks available for each part of a question and produced answers which contained enough detail 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 that did not fully address what the question had asked for. Some of the responses were too short while 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 their answers are focused on the requirements of the question being asked and produce responses which 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, more candidates than in previous years found time management a problem, particularly in **Section B** and **Section C**.

Some repetition was evident in answers to questions in all sections of the paper. Some candidates 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 or information than the first drawing. A common error by candidates in written responses was to repeat the same information two or more times using slightly different words.

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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 required, their correct use must be shown and described. The quality of sketching was generally good but candidates need to understand that the use of lots of continuous text should be avoided when answering questions in this section of the paper.

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 specific questions

Question 1

Correct answers to part **(a)** of the question needed to explain that batch production involved the manufacture of a set number of identical products. Only a very limited number of fully correct responses were seen. A significant number of candidates incorrectly described drilling a hole in part **(a)**.

Responses to part **(b)** were very mixed. While the majority of candidates gained at least some marks, very few fully correct answers were seen. In a limited number of cases, candidates incorrectly gave details about how the chair could be made.

The majority of candidates who answered part **(c)(i)** were able to display at least some knowledge and understanding about how three pieces of plywood could be laminated to make part **A**. The better responses used notes and sketches to describe how the pieces of plywood could be glued together, bent around a former and held in place until the glue dried. A good number of the weaker answers frequently showed little more than three pieces of plywood being glued together to make a thicker piece of flat plywood.

The better responses to part **(c)(ii)** described how a hole could be drilled in the end of part **B** and a thread cut in the hole using a tap and tap wrench.

Question 2

In part **(a)(i)**, the majority of candidates gained some marks by correctly describing at least some of the stages involved in closing the top of the box. Only a limited number of fully correct answers were seen with a good number of candidates not providing sufficient details about how the locking tab and slot functioned.

The better responses to part **(a)(ii)** clearly described how the four flaps folded over and the two longer flaps locked together to secure the bottom of the box without the need to use glue. The majority of candidates generally did not go any further than to describe how the two smaller flaps folded over.

Part **(a)(iii)** was not answered well. The development required to make the template was frequently incomplete and very few candidates took into account how the template could be used to mark out the fold lines. Descriptions of how the template could be cut out and used generally lacked the level of detail required to gain high marks. Some candidates related their answers to making the box rather than making the template.

In part **(b)**, few candidates were able to give two appropriate reasons why thin plastic had been chosen for making the template rather than card. Appropriate reasons included the fact that it would last longer and it would be easier to draw around because it is more rigid than card. This part of the question again highlighted the need to read questions carefully, as a high number of candidates incorrectly related their answers to making the box rather than the template.

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Section B

General comments

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This was the most popular question in this section of the paper, but it was not very well answered by many candidates.

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To gain both marks for each problem, candidates need to identify the problem and go on to describe why it is a problem.

A significant number of candidates incorrectly tried to identify problems with the design of the junior hacksaw rather than the jig.

The better answers to part **(c)** used notes and sketches to good effect to explain how the design would need to be changed. Appropriate changes included adding an additional peg, or other method, of securing the end of the rod while the first bend was made and making at least two of the pegs removable so that the rod could be bent and the pegs replaced to allow further bends to take place. Only a limited number of candidates scored more than half marks for this part of the question. A number of candidates totally re-designed the jig. This type of response should be avoided.

The responses to part **(d)** were very mixed, with a good number of candidates focusing their answer on the design of the hacksaw rather than discussing 'how heat treatments can change the properties of metals'. The better responses discussed how heat treatment such as annealing, normalising, hardening, tempering and case hardening could be used to modify metals and enhance their function.

A weakness in many answers was not to provide appropriate conclusions, supported by specific examples/evidence. A degree of repetition was seen in almost all responses.

Question 5

In part **(a)**, the majority of candidates correctly explained that the function of the sticker was to hold the packaging together and improve the security of the product when displayed for sale.

The better responses to part **(b)** clearly identified at least one appropriate problem with the design of the development (net) for the lid. The two major problems with the design were that it was too small and would not fit over the insert and that there was no top on the lid which meant that it would slide down too far.

To gain both marks for each problem, candidates need to identify the problem and go on to describe why it is a problem.

Many of the answers to part **(c)** used notes and sketches to good effect, to explain how the design would need to be changed. Appropriate changes involved increasing the length and width of the development and adding a top including glue tabs. A significant number of candidates scored more than half marks for this part of the question.

A number of candidates totally re-designed the packaging. This type of response should be avoided.

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Question 6

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In part **(a)**, very few candidates correctly explained that the purpose of the pipes was to heat the die which would make forming the plastic easier.

In part **(b)**, two main problems with the design of the die were that there was not anyway that air and/or parison (plastic) could enter the die and that the design was not complete because it did not include a screw thread. The majority of candidates identified at least one appropriate problem which generally related to the lack of a screw thread.

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In part (d), the majority of candidates identified appropriate issues such as blow moulding and injection moulding were quick processes that could operate around the clock (24-7). They required only limited labour to operate the machinery involved and the products produced were identical and consistently of a high standard. Most candidates went on to discuss how these factors could, for example, increase production, reduce labour costs and result in less materials being wasted.

A weakness in many answers was not to provide appropriate conclusions supported by specific examples/evidence. A degree of repetition was seen in almost all responses.

Section C

General comments

Some excellent 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. Some candidates, unnecessarily, spent a long time producing 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 must to be evaluated in a meaningful way. For example, it is questionable how ideas can be evaluated by an 'expert' in an examination situation but this was seen in a number of papers. Evaluation tables with 'star', 'tick' or 'number' ratings were much 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.

For each of the parts (a) - (c) it is important that there is clear evidence that design development has taken place. This should show how the candidate has brought the best parts of their initial ideas into a developed solution for each part of the question. This developed solution should be annotated to give details about materials, joining methods and important sizes. Candidates are not required to describe, stage by stage, how a design could be made. Marks cannot be awarded for design development where a candidate has simply chosen one of their ideas and redrawn it.

A significant number of excellent rendered pictorial drawings were seen in part (d), but in some responses, the rendering was not attempted or was done well. A number of 'multi coloured' drawings with each product in a different colour were seen. Candidates need to be aware of the difference between 'colouring in' and 'rendering'. Rendering should be used to suggest the form (shape) of the product and the material(s) that it is made from.

Comments on specific questions

Question 7

Although this was not the most popular question, it did result in some of the highest marks scored in this section of the paper.

The better responses to part **(a)** were those where candidates had considered how the bulb and shade needed to extend and produced designs for sliding and linkage mechanisms which would allow the required movement to take place. At this level, most ideas included an appropriate method of joining the mechanism to the pole. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker solutions often showed over complex designs which would not have allowed the bulb and shade to fully extend or in some cases move at all. At this level, very few ideas showed how the mechanism could be attached to the pole. Both evaluations and design development were weak and sometimes non-existent.

In part **(b)**, the better responses were those where candidates had produced good, original and workable designs for a lamp shade which included features that would allow the bulb to fit in the lamp shade and allow the lamp shade to be joined to the mechanism designed in **(a)**. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker responses often showed over-elaborate designs which frequently did not show how the bulb would be attached to the lamp shade and/or how the lamp shade would be joined to the mechanism designed in **(a)**. Both evaluations and design development were weak and sometimes non-existent.

The better responses to part **(c)** clearly showed that candidates had taken into account the stability of the base and how it could be joined to the wooden pole. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker responses often showed designs for the base which were over complex and unstable. A number of designs did not include an appropriate method for joining the base to the wooden pole. Both evaluations and design development were weak and sometimes non-existent.

A good number of excellent rendered pictorial drawings were seen in part **(d)**, but in some responses, the rendering was not attempted or was not done well. It is important that the pictorial drawing includes all of the features that have been designed in parts **(a) - (c)**.

Question 8

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

Sizes were a crucial factor in all parts of this question. Almost all candidates who attempted this question did not take sizes into account when producing their responses to this question. Very few top quality answers were seen.

In a limited number of cases candidates incorrectly suggested changing the shape of the packaging for cosmetics.

In general, part **(a)** was not very well answered. The majority of candidates did not take the size and/or shape of the four items of cosmetics into consideration when producing their designs. Very few candidates designed both the card tray and the card insert. Evaluations and design development very generally weak and sometimes not included at all.

Part **(b)** required candidates to design a hexagonal box made from a one piece development which included four windows. The tray and insert designed in **(a)** needed to fit inside the box.

The majority of candidates focused their responses on just the position of the windows.

To gain high marks, responses needed to show:

- a range of ideas for a one piece development to make the hexagonal box;
- possible locations for the four windows;
- how the tray and insert would fit inside the box.

It is important that in questions of this type features that are designed in one part of the question are carried forward to the next part. In this case, very few candidates showed that they had considered the design for the insert and tray that they had produced in (a) when they were designing the box.

The quality of the designs produced in part (c) was very variable. The better responses developed designs for lettering styles which reflected the name '**Moonbeams and Starlight**' by including features such as a moon and stars into the lettering. Only a limited number of responses gave any real consideration to colour or where the lettering would be placed on the box. It is important that candidates read all parts of a question so that they realise how parts (a) - (c) of the question link together to produce the final product that has to be illustrated in part (d).

The quality of the drawings produced in part (d) was very mixed with only a limited number of high quality rendered drawings being seen. Some of the drawings did not show all of the features that had been designed in parts (a) - (c). Common omissions included not showing the lettering and/or not producing an exploded view. 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 parts (a) - (c). It is important that on drawings of this type card is given a thickness and not drawn as a single line.

Question 9

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

Part (a) highlighted the need for candidates to make sure that they read questions very carefully before they start their answers. This part of the question required candidates to develop a design which would allow the legs of the drawing and painting easel to be adjusted and fixed at different lengths between 1000 mm and 1500 mm. In a number of cases candidates, incorrectly produced designs which allowed the legs to be adjusted to different angles. Where this error occurred, credit was given in part (b), where this feature was a requirement of the question.

The better responses were those where candidates had produced good, original and workable designs which would allow the legs to be adjusted and fixed at different lengths. In these better responses, ideas had been well evaluated and developed into a workable solution.

The weaker responses often showed over complex designs which frequently would not have fully functioned and/or been dangerous to use. Both evaluations and design development were weak and sometimes non-existent. Only a limited number of candidates took sizes into account when developing their designs.

Responses to part (b) were very mixed. The better responses were those where candidates had considered both how the two sides of the easel could be joined together and how they could be adjusted and fixed at different angles. In these better responses, ideas had been well evaluated and developed into workable solutions. The weaker solutions often showed over complex designs which would not have fully functioned and/or would have been dangerous to use. Many of these weaker solutions did not include a method of joining the two sides together and/or a method that fixed the two sides at a particular angle. Both evaluations and design development were weak and sometimes non-existent.

In part (c), the better responses had considered the design of an appropriate detachable tray, how it could be fixed to the easel and where would be the most suitable place for it to be attached. In these better responses, ideas had been well evaluated and developed into workable solutions.

The weaker solutions often showed over complex designs which would not have fully functioned.

Common omissions included:

- not showing an appropriate method of attaching the tray to the easel;
- not considering size (many trays were either too small or too big);
- not positioning the tray in an appropriate place;

Both evaluations and design development were weak and sometimes non-existent.

A number of very good rendered pictorial drawings were seen in part **(d)**. However in some responses the rendering was not attempted or was not done well. A limited number of two dimensional drawings were seen. It is important that the pictorial drawing includes all of the features that have been designed in parts **(a) - (c)**.

DESIGN AND TECHNOLOGY

Paper 9705/13

Written 1

General comments

The performance of candidates was very mixed. A slight improvement was shown compared to some previous years particular in **Section C**.

The better answers were from those candidates who had looked at the number of marks available for each part of a question and 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 what was asked for in the question. Some of the responses were too short while 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

It is suggested that Centres make the content of this report available to future candidates in order to help them avoid making similar and omissions.

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.

As in previous years the quality of sketching was very mixed. In a significant number of responses, a number of inadequately produced and extremely small sketches were seen. Candidates need to understand that the use of lots of continuous text should be avoided when answering questions in this section of the paper. The use of continuous text often accompanied by very few, if any, sketches continue to be a problem for a significant 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 Specific Questions

Question 1

In part **(a)**, the majority of candidates gained at least one of the two marks available for naming suitable glues. It was a cause for concern that in part **(a)(i)**, a number of candidates suggested the use of chloroform. While this might work, it is totally unsuitable for use in a school situation.

Answers to part **(b)** were very mixed. The better responses to part **(b)(i)** where those that used notes and sketches to describe all of the stages required to make one half of the hull using a vacuum forming machine. 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 low quality sketches (or the lack of them) and the use of excessive continuous text.

While almost all candidates describe at least some of the stages required to make part **A**, many of the responses to part **(b)(ii)** lacked the level of detail required to gain high marks. Only a limited number of candidates correctly described how the bottom of part **A** could be shaped and the holes made in the top. The use of a laser cutter was not considered to be an appropriate way to cut out material of the thickness used to make part **A**. A number of responses were let down by low quality sketches (or the lack of them) and the use of excessive continuous text.

In part **(b)(iii)**, almost all candidates were able to describe at least some of the stages in making part **B** and/or part **C**, but as with earlier parts of the question, many responses lacked the level of detail required to gain high marks. The thickness of material used to make part **B** would allow it to be cut out by a laser cutter. The setting up and safe use of a laser cutter needs to be fully described, in the same way as any other tool or equipment used to carry out a particular task. Some over complex ways of making part **C** were suggested. This part could have simply been made by joining together two pieces of dowel of the correct size.

Question 2

In general, part **(a)** was reasonably well answered, with the majority of candidates stating at least one appropriate way to gather opinions about the proposed design for a torch. Questionnaires and talking to people were two of the more common correct answers that were seen.

The three sections of part **(b)** all required similar processes to be carried out. In general, the strengths and weaknesses in candidates' responses to each of the three parts were similar.

Very few fully correct developments for any of the three parts, **A**, **B** and **C** 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 three parts. A number of responses were let down by low quality sketches (or the lack of them) and the use of excessive continuous text.

The use of CAD/CAM to draw and cut out the various 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 it is fully described, in the same way as any tool or equipment that is used to carry out a particular task.

Question 3

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

The better responses to part **(a)(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 excessive continuous text.

In part **(a)(ii)**, the better responses described, in detail, how a drill could be used to make the holes and a plough plane or router used to make the groove. Some candidates incorrectly suggested that a table saw could be used which would be very unsafe. 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 excessive continuous text.

In general, part **(a)(iii)** was not answered well. The better responses, described how a plane and abrasive papers could be used to create the curved surface on part **C**, the holes drilled, metal rod cut using a hacksaw and the pegs fixed in the hole. Weaker responses often suggested the unsafe use of a sanding machine and inappropriate ways of cutting the mild steel rod. Some even suggested that the pegs needed to be made by casting them. A number of responses were let down by low quality sketches (or the lack of them) and the use of excessive continuous text.

Part **(b)** was generally reasonably well answered. The majority of candidates correctly showed that the size of the holder would need to be increased.

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.

Future candidates would be well 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. 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

No candidates attempted this question.

Question 5

In part **(a)**, a reasonable number of candidates correctly explained factors such as the use of double sided tape made it easier and cheaper for a printer to send box to a sweet manufacture because it could be sent flat pack, no additional materials were required to assemble the box, it was less messy and quicker to use than glue.

In part **(b)**, the majority of candidates correctly identified at least one appropriate problem with the development. Two major problems were that the lid would not fold to the correct shape for display purposes and that the box could not be assembled as there were not enough glue tabs.

At least some appropriate glue tabs were added by most candidates in part **(c)**. A number of candidates added too many additional glue tabs and some did not add them in the correct place. Additional cut and fold lines needed to be added to enable the lid to fold in the correct way. A significant number of candidates added lines in the correct place but frequently did not differentiate between cut (solid) and fold (dotted) lines. 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 were familiar with products that had more than one use. Most were able to identify relevant issues and discussed (with varying

degrees of success) their importance. A significant number supported their conclusions by making reference to products that they were familiar with that had more than one use.

Examples of appropriate issues included

- Potential to reduce costs, one product meeting several needs
- Potential to save space (certainly the case with packaging and shop display materials)
- More appealing to end user
- Has potential to use less materials and other resources
- Some products (such as the example used in the question) will get used for a longer period
- Better value for money

A degree of repartition was seen in most answers.

Question 6

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

In part (a), the majority of candidates understood that the feature shown at X had to do with attaching the bathroom fitting to a wall. The better responses used notes and a sketch to show that a screw went through the hole and screwed into the wall. Weaker responses suggested that a nail should be used.

In part (b), the majority of candidates correctly identified at least one appropriate problem with the design of the bathroom fitting. Two major problems were that the beaker would go through the hole and just rest on the lower part of the fitting and it would be very difficult to get the toothbrushes in and out of the holes.

The majority of responses to part (c) explained that the problem associated with getting toothbrushes in and out of the fitting could be overcome by making holes in the top section or by removing a small section of the top above the existing holes. Fewer appropriate solutions were seen to the problem associated with the beaker. The better responses explained that the distance between the two horizontal pieces should be reduced which would allow part of the beaker to protrude above the top surface preventing the beaker from falling off the fitting. Weaker solutions incorrectly said that the size of the hole should be changed or a different beaker used. In a few cases, candidates produced totally different designs for the fitting. This type of response should be avoided.

In part (d), a significant number of candidates focused their responses on just the bathroom fitting rather than the broader factors associated with selecting materials for use, based on their characteristics, properties and performance.

The better responses were able to identify relevant issues and discussed (with varying degrees of success) their importance. A good number supported their conclusions by making reference to materials that they were familiar with and situations that they were used in.

Examples of appropriate issues included:

- Selecting materials suited to the environment they will be used in
- The functional requirements of the material
- Matching the material to its intended use
- Availability and supply
- Economics (cost)
- Mechanical and physical requirements of the material.

A degree of repartition was seen in most responses.

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, unnecessarily, spent a long time producing 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 how their chosen design would be made, stage by stage.

Some candidates had very little or no evidence of design development and just selected one of their ideas. Some 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.

Lack of time management was an issue for some candidates. They had spent too long on earlier parts of the question leaving them insufficient time to complete part (d).

A general improvement from some previous years was seen in the quality of the pictorial drawings that were produced in part (d).

Comments on Specific Questions

Question 7

Part (a) of the question required candidates to develop the incomplete idea given in Fig. 8 into a design for the case of periscope.

The better responses were those that explored different ways in which the case could be constructed, including how one side of the case could open and be securely closed. A few candidates considered other materials, but most designs were based on a wooden case. Very few candidates took into account the given sizes.

The weaker responses frequently gave very few, if any constructional details.

A number over complex designs were seen some of which completely changed the given shape of the case. Designs must be based on the information given in the question.

The majority of the ideas produced in part (b) had the potential to work, but most of the responses did not give sufficient details about how the mirrors could be fixed in the case and/or the features that would enable them to be easily removed for cleaning. A significant number of candidates did not relate their design work to the case that they had developed in part (a). Some of the designs for over complex cases that had been produced in part (a) made it difficult to fit the mirrors in the positions shown in Fig. 8.

In part (c), almost all responses showed some form of handle (or handles) that had the potential to function effectively. The better responses included and least some information about how the handle/s could be made and how and where they could be attached to the case. These details were frequently missing from

weaker responses. A few candidates had considered the comfort of the user when designing the handle/s. Very few candidates considered sizes.

A reasonable number of good rendered pictorial drawings were seen in part **(d)**, but 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)**. A common omission was not to fully show the mirrors. This was often because one side of the case had not been shown in an open position.

Question 8

The better responses to part **(a)** were from those candidates who had considered all of the design requirements for a cardboard box to package a cycle helmet. These responses showed ideas for a box which was made one a one piece development with a window and included details about how the box could be opened and closed. Ideas had been well evaluated and there was clear evidence of design development. A significant number of candidates had not taken into account all of the design requirements and sometimes did not show how the box could be closed. Weaker responses frequently did not include sufficient details about the development required to make their proposed design. In a limited number of cases, candidates incorrectly suggested changing the shape and/or size of the box. This often resulted in designs for a box into which the cycle helmet would not fit.

In part **(b)**, the vast majority of candidates showed a method of carrying the box which had the potential to work. The better responses went on to explore various materials that could be used, ways in which the carrying method could be attached to or cut out from the main structure of the box and where it could be located on the box. Weaker responses often focused on just the appearance of the carrying method. 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 been able to function fully when located on the design chosen in part **(a)**.

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 '**Ride like the wind**'. These responses incorporated features that suggested the wind or were associated with cycling 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.

The quality of the drawings produced in part **(d)** was very mixed with only a limited number of high quality rendered drawings being seen. The better responses showed the box open which allowed at least some details about how the box was constructed to be shown. Some of the drawings did not show all of the features that had been designed in parts **(a) - (c)**. Common omissions included not showing the lettering and/or the carrying method. 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 parts **(a) - (c)**. It is important that on drawings of this type card is given a thickness and not drawn as a single line.

Question 9

Responses to all parts of this question were very mixed.

The better responses to part **(a)** were those where candidates had considered the design of a seat suitable for the given situation, how the seat could be adjusted and fixed at different heights and where the seat could be located on the tricycle. It was rare to find all of these considerations taken into account. Few responses gave sufficient details about materials, construction or sizes. Some designs were over complex, frequently resulting in seats that would be uncomfortable and potentially dangerous to use.

Weaker responses often focused on just the shape of the seat.

In part **(b)**, the better responses were those where candidates had considered both the design of the handle bars and how they could be joined to the tricycle. Weaker responses often did not take into account how the handlebars could be joined to the tricycle. Few responses gave sufficient details about materials and construction or sizes. Some designs were over complex, which resulted in some designs that would be uncomfortable and potentially dangerous to use.

In general, part **(c)** was not very well answered. The better responses were those where candidates had considered the design of the front wheel, the design of the pedals and how the wheel and pedals could be

joined to the tricycle. It was rare to find all of these considerations taken into account. Few responses gave sufficient details about materials, construction or sizes. Most of the designs produced for the front wheel were appropriate but many of the designs for the pedals were over complex. A number of responses suggested the use of chains which was totally inappropriate for the given situation and potentially dangerous.

Only a 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 show all of the features that had been designed in parts **(a) - (c)** of the question and were often not rendered.

DESIGN AND TECHNOLOGY

Paper 9705/02

Project 1

Key messages

- Candidates should focus on the design need and brief throughout the analysis and research stages of their project, rather than on any preconceived idea of an outcome. The product specification should evolve from this analysis and research so that it can be referred to throughout the generation and development of ideas.
- Design folders that are presented neatly and in the order of the assessment criteria make it easier for the reader to follow the design thinking that has taken place. It also helps the candidate to check that no stage is missing.

General comments

Candidates clearly became very involved in their Design and Technology project work, identifying design problems that were close to their own needs and producing outcomes that were of use to themselves or others. There are certain advantages to this approach as the whole design process then becomes more meaningful to the candidate concerned. Another successful approach was to focus on a suggested theme, such as community issues or entertainment, with candidates then being required to identify a design need or situation within this.

As is the case every year, many interesting design problems were considered. Successful and useful outcomes of either models, prototypes or final products included: solar tracking system; car creeper; camera extension pole; portable musician's chair; outdoor heater; wine storage system; candidate's study table; pet play house; gate for drive to house; camping shower; can crusher; tool holder for boating; fishing bait release device; animal scarer; chicken roost heater; wine bottle holder; mechanical saw; staff storage module; carport; cycle repair stand; pet animal cage; social seating; children's furniture; city car; electric guitar; beach hut; dog shelter; point of sale display; laptop stand; sports score display unit; school lectern; cheese press; child's camping chair; perfume bottle; cutlery for disabled people; cable storage system; leg exercise device; cricket ball storage unit; mechanical log gripper; aquarium; water heater; wheel clamping device; pantry organiser; percussion instrument; and tree house.

Many design situations resulted in the production of architectural models that were produced to very high standards, and represented the proposed buildings realistically.

The Moderator would like to thank the majority of Centres for presenting work for moderation clearly labelled and with all documentation complete. It is helpful when the photographic evidence of realised outcomes is included at the appropriate stage of the design folder, at the end of Project 1 for the model and at the end of Project 2 for the final product.

Comments on individual assessment criteria

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

It is important for the reader of a design folder to be able to identify the nature of the design situation as soon as possible. This introductory section of the folder identifies the precise design problem and subsequent design brief.

Most candidates were aware of the need to include a detailed description of the need and to identify the intended user(s).

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

The majority of candidates did carry out some form of analysis of the topic being considered but this was not always a clear analysis of the design brief. Candidates need to consider all aspects of the use and purpose of the product that will satisfy the design need so that relevant data and information can be collected for use in the generation of design ideas. Most candidates considered existing products that might meet the need and identified some good and bad features of each.

Specifications were generally well written and many candidates realised that generic points are of little help when using the specification to evaluate a product at a later stage.

3. Generation and appraisal of design ideas

Candidates should be congratulated on the wide range of ideas offered and the 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.

It is important that different ideas are annotated with comments linked to the design specification so that all important aspects of the need are considered. Successful candidates recorded all ideas that came to them however practical or appropriate they appeared at the time. These were then appraised in an ongoing fashion so that other ideas could develop and be drawn together to form the final design solution.

4. Modelling of ideas

Modelling has a clear purpose in any design process and it is important that candidates give due care and attention to the quality of construction. Although materials used tend to be semi-resistant in nature there is no reason why high standards of manufacture should not be possible. Only when this has been achieved can high marks be awarded.

Where candidates know from the beginning of the project that, for example, an architectural model is to form the final product then this should be stated in the specification so that meaningful evaluation can be carried out later.

DESIGN AND TECHNOLOGY

Paper 9705/31

Written 2

General Comments

Candidates were generally well prepared for this paper. The overall standard of performance was similar to that of previous years. A number of candidates produced outstanding scripts. Most candidates used their time effectively and there were relatively few rubric errors.

Over the last few examination sessions, there have been a rising number of candidates who answer only one question from **Section A**. In some cases, candidates appear to spend too much of their allocated time on **Section B** at the expense of lack of detail in their responses in **Section A**.

Candidates continue to make very good use of appropriate sketching and annotation to support their answers to questions in **Section A**.

Most candidates fully completed all of the requirements for **Section B**. Some candidates copied out the question or rewrote a brief. This is unnecessary and wastes valuable time.

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

In **Section A**, Part **A** was the most popular.

In Part **A**, **question 1** was the most popular followed by **question 3**. **Question 6** was the most popular in Part **B**. There were very few attempts at **question 4** and **question 5**.

There was an even spread of attempts across all questions in Part **C**.

In **Section B**, **question 10** and **question 12** were 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

This was a very popular question with a full range of responses. Candidates generally made very good use of annotated sketches to support their answer.

- (a) A wide range of appropriate materials were stated. The most popular responses were aluminium and acrylic. A number of candidates did not fully justify their reasons for choice. Single word answers without justification will not be awarded a mark.
- (b) A wide range of appropriate manufacturing methods were given. Most candidates produced excellent annotated sketches to describe the key stages and details of manufacture.
- (c) Most candidates selected appropriate methods for producing a batch of 5000. Press forming and injection moulding were the most popular responses.

Some candidates described the process well but did not give details possible changes in design or features of the moulds or formers that would be required.

Question 2

The best responses to this question focused on advertising and promotions and the competition factors such as lead time to sale.

Responses were generally well structured and most candidates followed the instructions on the front cover of the examination paper. Some candidates did not achieve the higher mark ranges by not including specific examples or evidence to support their answer.

Question 3

This was a popular question with a fairly equal spread of attempts across all of the given three items.

This question was generally very well answered. Most candidates made excellent use of notes and sketches to support their answer.

- (a) Some candidates described the outline of GRP layout, but a significant number incorrectly described a vacuum forming process. A number of candidates produced fully detailed descriptions of the turning processes for the pulley wheel. Some candidates only described turning the outside diameter and did not include other details required to access the higher mark ranges.

There were a range of corner joints correctly described for the storage unit frame that included mortise and tenon, mitre and bridle. Generally, all key stages of cutting the joint were included.

- (b) Candidates answered this part of the question very well. Most candidates explained why the process was particularly suitable for the specific item and achieved full marks. Some candidates gave brief, generic statements about the process with no reference to the item and consequently did not access the full mark range.

Part B – Practical Technology

Question 4

Relatively few candidates attempted this question. Only a very few candidates answered all parts.

- (a) Most candidates calculated the forces at A and B.
- (b) Only a very few candidates answered this part in detail. Most candidates were able to describe in outline either sand casting or die casting. A very few candidates commented on their suitability for one off or volume production.

Question 5

There were very few attempts at this question. Some responses were fully detailed with candidates making good attempts at each part of the question. Most responses were very brief and lacking appropriate detail.

Question 6

There were few attempts to this question. Some responses were excellent; full and detailed.

- (a) Most candidates described AC and DC current and gave appropriate examples.
- (b) Most candidates correctly calculated the current and power dissipated.
- (c) Most candidates identified the transistor and LDR and gave an appropriate application of each. Only a small number of candidates identified the thermistor.

Part C – Graphic Products

Question 7

There were a wide range of responses to this question. Some answers were outstanding; fully detailed and excellent examples used. The best responses included sketches of the examples to exemplify points. Some candidates did not explain cut-away drawings.

Question 8

There were some outstanding responses to this question. All candidates produced an isometric drawing. Some candidates did not apply the correct scale but the overall quality of accuracy and presentation was generally very good.

Question 9

There were a number of outstanding responses to this question.

Most candidates produced a fully detailed planometric drawing to an appropriate scale, with most features included.

Some candidates did not draw the shelves on the 2 m high cabinet.

A very small number of candidates did not draw the kitchen view from arrow A.

Section B

There were an increased 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.

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

There were a number of candidates who did not use their time effectively and did not fully complete the development, 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 produce generic charts for their analysis which bear no specific reference to the problem and receive little credit. Candidates should be encouraged to consider how the generic points of analysis link to the chosen design task.

The analysis should then lead to justified and appropriate specification points. Single word or generic statements, with no reference to the product will not gain a mark.

The exploration of ideas was generally very good. Many candidates produced a range of possible solutions with some very innovative and creative ideas.

Reference to appropriate specific materials was also generally very good. Most candidates gave appropriate justifications for their use.

Cambridge International Advanced Level
9705 Design and Technology November 2015
Principal Examiner Report for Teachers

Many candidates produced an on-going evaluation of design ideas. Colour coding was used effectively by some candidates to highlight the evaluative comments which help to select features for further development. A number of candidates did not give reasons for the selection of ideas for further development. It is important that candidates consider all points of specification when designing. Tick charts against the specification only achieve credit if the specification has focused points and that some specific evaluative comment is made.

The higher mark ranges 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 strong in most cases. Some candidates however, focused only 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 ideas leading to a final design.

The majority of proposed solutions were feasible and well presented.

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

The response to the evaluation section was greatly improved. Many candidates produced valid evaluations of their proposal. They described the positive features and functional details and suggested further modifications or improvements. Some candidates produce very brief evaluations often in the form of tick or cross against an outline specification. This will only access the higher mark ranges if the specification is detailed and supporting evaluative comment is made.

Question 10

This question was generally well answered with a full range of responses. Most responses were feasible and met the initial specification points. The question required a design for a product to enable a person to sit or recline in a comfortable and relaxing position. Some candidates misinterpreted the question and produced multiple user seats.

Acceptable specification points included:

- the product must be able to accommodate a range of different sizes and weights of users
- the product must not allow water to collect if left outdoors
- the product must have appropriate protection or made of appropriate materials to cater for outdoor use
- the product should offer some protection from sun when used outside

Most candidates produced a wide range of possible solutions, selecting and justifying appropriate materials.

Material and constructional detail was generally detailed and appropriate.

Final proposals were suitable and detailed. The best responses included full dimensions and details of appropriate finish.

Evaluations were often weak. Only a very few candidates made specific reference to the final proposal and suggested possible improvements.

Question 11

There was a wide range of responses to this question with a number of well engineering solutions proposed. Most candidates produced valid ideas to support the mobile phone on a cycle. Only a few candidates produced feasible solutions to secure the phone and support and prevent theft.

Acceptable specification points included:

- the product must be easy to access and view
- the product should not impact upon the overall control of the cycle
- the product should be suitable for use in all weather conditions
- the product must protect the phone from damage in a collision or from adverse weather conditions

Question 12

There was a wide range of responses to this question. In general, candidates produced creative and feasible products, despite the restriction of assembling the product from one sheet of card. Most candidates produced very innovative graphics to reflect the image of the Green Valley Sports Hotel.

Acceptable specification points included:

- the product must be robust enough to support the sandwiches and drink carton in transit
- the product must not allow spills or leakage to escape
- the product could have a handle or other method of holding for ease of carrying
- the product should have an adjustable work surface (A3 size) to allow comfort when working
- the product should be easily opened and closed

The best responses looked at a wide range of shapes and ideas to store the items before making decisions. Candidates explored a wide variety of graphics to reflect the image of the Hotel.

DESIGN AND TECHNOLOGY

Paper 9705/32

Written 2

General Comments

Candidates were generally well prepared for this paper. The overall standard of performance was similar to that of previous years. A number of candidates produced outstanding scripts. Most candidates used their time effectively and there were relatively few rubric errors.

Over the last few examination sessions, there have been a rising number of candidates who answer only one question from **Section A**. In some cases, candidates appear to spend too much of their allocated time on **Section B** at the expense of lack of detail in their responses in **Section A**.

Candidates continue to make very good use of appropriate sketching and annotation to support their answers to questions in **Section A**.

Most candidates fully completed all of the requirements for **Section B**. Some candidates copied out the question or rewrote a brief. This is unnecessary and wastes valuable time.

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In **Section A**, Part **A** was the most popular.

In Part **A**, **question 1** was the most popular followed by **question 3**. **Question 6** was the most popular in Part **B**. There were very few attempts at **question 4** and **question 5**.

There was an even spread of attempts across all questions in Part **C**.

In **Section B**, **question 10** and **question 12** were 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

This was a very popular question with a full range of responses. Candidates generally made very good use of annotated sketches to support their answer.

- (a) A wide range of appropriate materials were stated. The most popular responses were aluminium and acrylic. A number of candidates did not fully justify their reasons for choice. Single word answers without justification will not be awarded a mark.
- (b) A wide range of appropriate manufacturing methods were given. Most candidates produced excellent annotated sketches to describe the key stages and details of manufacture.
- (c) Most candidates selected appropriate methods for producing a batch of 5000. Press forming and injection moulding were the most popular responses.

Some candidates described the process well but did not give details possible changes in design or features of the moulds or formers that would be required.

Question 2

The best responses to this question focused on advertising and promotions and the competition factors such as lead time to sale.

Responses were generally well structured and most candidates followed the instructions on the front cover of the examination paper. Some candidates did not achieve the higher mark ranges by not including specific examples or evidence to support their answer.

Question 3

This was a popular question with a fairly equal spread of attempts across all of the given three items.

This question was generally very well answered. Most candidates made excellent use of notes and sketches to support their answer.

- (a) Some candidates described the outline of GRP layout, but a significant number incorrectly described a vacuum forming process. A number of candidates produced fully detailed descriptions of the turning processes for the pulley wheel. Some candidates only described turning the outside diameter and did not include other details required to access the higher mark ranges.

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Part B – Practical Technology

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Some candidates did not draw the shelves on the 2 m high cabinet.

A very small number of candidates did not draw the kitchen view from arrow A.

Section B

There were an increased 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.

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

There were a number of candidates who did not use their time effectively and did not fully complete the development, 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 produce generic charts for their analysis which bear no specific reference to the problem and receive little credit. Candidates should be encouraged to consider how the generic points of analysis link to the chosen design task.

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The majority of proposed solutions were feasible and well presented.

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

The response to the evaluation section was greatly improved. Many candidates produced valid evaluations of their proposal. They described the positive features and functional details and suggested further modifications or improvements. Some candidates produce very brief evaluations often in the form of tick or cross against an outline specification. This will only access the higher mark ranges if the specification is detailed and supporting evaluative comment is made.

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Material and constructional detail was generally detailed and appropriate.

Final proposals were suitable and detailed. The best responses included full dimensions and details of appropriate finish.

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The best responses looked at a wide range of shapes and ideas to store the items before making decisions. Candidates explored a wide variety of graphics to reflect the image of the Hotel.

DESIGN AND TECHNOLOGY

Paper 9705/33

Written 2

General Comments

The overall standard of candidate performance was good this year with an increased number of outstanding scripts. Candidates are well prepared for this paper. The majority had followed the rubric correctly and used the time available effectively.

The quality and use of appropriate sketching and annotation continues to be very good throughout the paper.

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

Section A

General Comments

Responses to **Section A** were an improvement upon last year although there was a significant number of candidates who produced very brief responses, lacking the detail necessary to achieve middle to high mark ranges.

Part **A** was the most popular option with a number of candidates attempting questions in Part **C**. In Part **A**, **questions 1** and **2** were the most popular with relatively few candidates attempting **question 3**.

Very few candidates made attempts at questions in Part **B**.

Questions 8 and **9** were the most popular in Part **C**.

Comments on Specific Questions

Section A

Part A – Product Design

Question 1

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

- (a) Injection moulding the glue stick lid was a popular choice and was answered particularly well. Some candidates did not describe the features of the mould required for such a shape and did not access the higher mark range. Most candidates demonstrated a clear knowledge and understanding of the process of drawing wire and cutting a housing joint.

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 involved.

- (b) Most candidates were able to correctly explain why the relevant process was suitable for the production of the items.

Question 2

This was a very popular question with some outstanding responses.

- (a) Most candidates stated a suitable material for the spoon with valid reasons. Acrylic and aluminium were the most common correct responses.
- (b) This part was answered particularly well. Candidates selected the key stages of production and made very good use of notes and sketches to include appropriate detail.
- (c) Some candidates correctly described the use of formers and simple press tools to produce a batch of 100 spoons. Injection moulding would not be appropriate for such a small batch.

Question 3

There were very few responses to this question. The best responses focused on issues such as fashion trends, targeted promotions and advertising.

Some responses were very brief, lacking any evidence of key issues and did not contain enough detail or quality to access the middle to high mark range.

Part B – Practical Technology

Question 4

There were no responses for this question.

Question 5

There were no responses for this question.

Question 6

There were very few responses for this question.

- (a) Most candidates knew the term frame structure.
- (b) Most candidates did not accurately determine the direction and magnitude of the equilibrant forces.
- (c) Responses to this part were generally very brief and lacking any appropriate detail.

Part C – Graphic Products

Question 7

There were no responses for this question.

Question 8

There was a wide range of responses to this question. It was generally answered well with some excellent responses that achieved very high marks. Most candidates demonstrated a good knowledge and understanding of reprographic techniques with both examples of production in part (a) answered equally well.

Candidates generally answered part (b) well, producing well-structured responses. Some candidates described issues but did not contrast the reprographic techniques with respect to cost and quality of print. These candidates did not access the higher mark range.

Question 9

There were a range of responses to this question.

- (a) Some candidates produced one or more correct elevations of the chair. Very few candidates were able to accurately complete all views.
- (b) Some candidates produced appropriate developments. Several candidates constructed partly correct developments that could not be assembled.
- (c) Most candidates included the use of tabs. A significant number ignored the instruction to assemble with the need for glue.

Section B

General Comments

This section was answered well with most candidates fully completing all of the requirements. A minority of candidates did not use their time effectively and did not fully complete the development section. Some candidates made no attempt at the final proposal and evaluation.

Presentation skills were generally of a very good standard. Candidates demonstrated their knowledge of appropriate materials and construction techniques.

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

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 produced generic charts for their analysis with no specific reference to the problem and received little credit. Candidates should be encouraged to consider how the generic points of analysis link to the chosen design task. The analysis should then lead to justified and appropriate specification points. Single word or generic statements, with no reference to the product will not gain a mark.

The exploration of ideas was generally very good. Many candidates produced a range of possible solutions with some very innovative and creative ideas. Reference to appropriate specific materials was also generally very good. Most candidates gave appropriate justifications for their use.

Many candidates produced an ongoing evaluation of design ideas. Colour coding was used effectively by some to highlight the evaluative comments which help to select features for further development. A number of candidates did not give reasons for the selection of ideas for further development. It is important that candidates consider all points of specification when designing. Tick charts against the specification only achieve credit if the specification has focused points and that some specific evaluative comment is made. The higher mark ranges 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 strong in most cases. Some candidates focused only 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; for full marks in the detail section, candidates would be expected to include dimensions, materials and possible finishes.

The response to the evaluation section was greatly improved. Many candidates produced valid evaluations of their proposal, describing the positive features and functional details and suggesting further modifications for improvements. Some candidates produced very brief evaluations often in the form of tick or cross against an outline specification. As mentioned earlier, this will only access the higher mark ranges if the specification is detailed and supporting evaluative comment is made.

Question 10 was the most popular in this section, followed by **question 12**. Relatively few candidates attempted **question 11**.

Comments on Specific Questions

Question 10

This question was well answered. Most responses were feasible and met the initial specification points. Some work was exceptionally innovative and creative.

Acceptable specification points included:

- the product must be easily and quickly erected
- the product must be constructed for materials that can withstand outdoor working conditions
- the product must have a non-slip surface to prevent injury when working in wet conditions
- the product must be able to be disassembled to enable easy storage.

Many responses had clear, flowing design thinking. Candidates considered a range of possibilities for each of their specification points. The safety of users was a strong consideration.

Final proposals were realistic. Most included details of materials or important dimensions.

Question 11

Very few candidates attempted this question.

Some candidates who attempted the question did not include the basic electrical circuit/s required to be able to make the product function.

Acceptable specification points included:

- the product should allow an easy change of battery
- the product should hold the fuse in position to test continuity
- the product should be either hand held or fitted to a wall for ease of accessibility
- the product may be stored in an electricians tool box so must be robust and resist damage.

Question 12

There was a wide range of innovative responses to this question. Some of the work produced was outstanding. Most candidates produced effective and workable solutions. A small number of candidates did not consider the requirement of the package to hold 5 ECO BULBS.

Acceptable specification points included:

- the packaging and point of sales display should use minimum materials to comply with conservation of resources
- the point of sale display should contain graphics/information to encourage shoppers to buy the bulbs but also be environmentally aware
- the packaging must be robust enough to protect the bulbs in transit.

Most candidates produced effective methods of packaging and appropriate point of sales displays, embracing the need to reflect energy saving and conservation of resources.

A number of candidates produced exceptional design work; innovative, commercially viable ideas showing a very good knowledge and understanding of packaging methodology and materials.

Proposed solutions were generally fully dimensioned and detailed. Most evaluations included the identification of strengths and weaknesses and gave proposals for modifications or improvement.

DESIGN AND TECHNOLOGY

Paper 9705/04

Project 2

Key messages

- Candidates should focus on the design need and brief throughout the analysis and research stages of their project, rather than on any preconceived idea of an outcome. The product specification should evolve from this analysis and research so that it can be referred to throughout the generation and development of ideas.
- Design folders that are presented neatly and in the order of the assessment criteria make it easier for the reader to follow the design thinking that has taken place. It also helps the candidate to check that no stage is missing.

General comments

Candidates clearly became very involved in their Design and Technology project work, identifying design problems that were close to their own needs and producing outcomes that were of use to themselves or others. There are certain advantages to this approach as the whole design process then becomes more meaningful to the candidate concerned. Another successful approach was to focus on a suggested theme, such as community issues or entertainment, with candidates then being required to identify a design need or situation within this.

As is the case every year, many interesting design problems were considered. Successful and useful outcomes of either models, prototypes or final products included: solar tracking system, car creeper, camera extension pole, portable musician's chair, outdoor heater, wine storage system, candidate's study table, pet play house, gate for drive to house, camping shower, can crusher, tool holder for boating, fishing bait release device, animal scarer, chicken roost heater, wine bottle holder, mechanical saw, staff storage module, carport, cycle repair stand, pet animal cage, social seating, children's furniture, city car, electric guitar, beach hut, dog shelter, point of sale display, laptop stand, sports score display unit, School lectern, cheese press, child's camping chair, perfume bottle, cutlery for disabled people, cable storage system, leg exercise device, cricket ball storage unit, mechanical log gripper, aquarium, water heater, wheel clamping device, pantry organiser, percussion instrument and tree house.

Many design situations resulted in the production of architectural models that were produced to very high standards, and represented the proposed buildings realistically.

The Moderator would like to thank the majority of Centres for presenting work for moderation clearly labelled and with all documentation complete. It is helpful when the photographic evidence of realised outcomes is included at the appropriate stage of the design folder, at the end of Project 1 for the model and at the end of Project 2 for the final product.

Comments on individual assessment criteria

5. Product development

Successful candidates included a great deal of drawn and written information in this section of their design folders, so that the reader could see details of the intended product and how it would be assembled and finished. This usually included details of all materials, form and constructions, as required by the nature of the chosen design. Unfortunately, there was sometimes little evidence to indicate why these materials and methods had been chosen and how other materials were considered before making the final choice.

Candidates who had been awarded high marks also showed how they had carried out some form of trialling or testing on some of these aspects. For example, these successful candidates showed how they had tested materials or trialled alternative constructions before finalising their choices.

6. Product planning

The majority of candidates successfully fulfilled this requirement of their design work, giving a sensible overall plan of the intended stages of manufacture, together with clear working drawings of the product and a list of all materials and components to be used.

7. Product realisation

The made product forms the culmination and realisation of many hours of detailed design work for most candidates and it is always pleasing to see just how much care has been given to this stage of their project. It was obvious that many candidates had developed fairly advanced making skills, whether this was through the use of resistant materials, graphics or other media. It was clear that most products were constructed and finished to the required standard for use and candidates should be congratulated on these successful outcomes.

It was helpful where candidates had included not only detailed and clear photographic evidence of the final realisation, as required by the syllabus, but also of the product in use.

8. Testing and evaluation

There has been a continuing improvement in this section of design folders as more candidates carry out meaningful testing and evaluation and include evidence of this taking place. This can only be completed successfully if the results of the testing are then compared to the original design specification.

There is obviously a temptation for some candidates to simply produce a list of the specification points and then complete a tick box alongside when it is felt that a particular requirement has been met. This simplistic approach is insufficient for the awarding of high marks and candidates should be encouraged to evaluate critically with reasons and evidence to support their judgements.