DESIGN AND TECHNOLOGY

Paper 9705/11
Written 1

Key Messages

- Candidates need to ensure that they understand the requirements of questions before they begin their answers.
- Answers should contain all relevant information, but repetition of points should be avoided.

General Comments

In general the performance of candidates showed an improvement on previous years. Some excellent answers were seen in all sections of the paper.

Candidates should ensure that their answers are focused on the requirements of the question being asked and that their responses are concise and display appropriate subject specific knowledge and understanding.

The majority of candidates responded to all parts of the three questions they had chosen to answer. Some candidates need to manage their time more effectively, particularly in ***Section C***.

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 in written responses was for candidates to repeat the same information two or more times using slightly different words.

Section A

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; the use of lots of continuous text should be avoided when answering questions in this section of the paper.

Question 1

In part **(a)** of the question candidates generally gained some credit by naming the input motion as rotary and/or the output motion as reciprocation. Non-technical terms such as ‘round and round’ and ‘up and down’ should be avoided.

In part **(b)(i)** most candidates could describe how tools and equipment such as saws, rasps, files, sanding discs and abrasive paper could be used to cut out the cam and smooth the edges of the MDF.

The better answers to part **(b) (ii)** showed how three pieces of different sized dowel could be cut, drilled and joined together to make part **A**. Other candidates suggested over complex, inappropriate methods of manufacture that would have been very difficult to make. These included ‘carving’ the shape from one piece of wood.

A number of the responses to part **(b) (iii)** displayed understanding about how the joint shown at B could be made, but generally this part of the question was not very well answered. Answers frequently showed that a saw could be used to make part, or all, of the joint; the amount of detail given was often insufficient. Some answers suggested that a totally different method of joining could be used.

Question 2

This question was often very well answered. The quality of both the sketching and written communication was generally good.

Part **(a)** was well answered by the majority of candidates. Most named acrylic as being a suitable sheet material for making part **A** and went on to give an appropriate reason for its choice, such as it could be easily bent or that it did not require a surface finish.

Some excellent answers were seen to part **(b) (i)** with many candidates clearly describing how the material they had chosen in part **(a)** could be bent. The only omission in many responses concerned the safety precautions that would need to be taken, for example, wearing gloves when handling hot plastic. Some candidates spent too long describing how their chosen material could be marked out and then cut.

Part **(b) (ii)** was generally well answered with most candidates giving at least some details about how tools and equipment such as saws, rasps, files, sanding discs and abrasive papers could be used be used to cut out the rounded corners and smooth the edges of the wood. The better responses gave full and appropriate details. For example they needed to show that the corners needed to be cut a little outside the marked shape to then allow, for example, a sanding disc to be used to smooth the wood down to its required shape. As with part **(b) (i)** some candidates spent too much time explaining how the wood could be marked out.

A good number of candidates gave some details about how parts **A** and **B** could be joined together using countersunk screws. Common omissions included drilling and countersinking the holes and the safety precautions involved. Some candidates stated only that the two parts would be screwed together using a screwdriver.

Question 3

Part **(a)** was generally very well answered. The majority of candidates used a sketch and notes to clearly explain that corrugated cardboard consisted of two outer layers with a corrugated core.

In parts **(b) (i)** and **(b) (ii)** the developments drawn by most candidates showed some of the required features but very few fully correct answers were seen. In part **(i)** the development needed to be the correct shape (rectangle joined to a triangle), have two cut out windows and four correctly shaped and positioned tabs. In part **(b) (ii)** the development needed to be the correct shape (rectangle joined to a triangle), have circular and triangular cut outs and four correctly shaped and positioned tabs.

Most of the candidates' responses to part **(c) (i)** gave some information about how part **A** could be cut out and the folds made; in general, there was insufficient detail to gain full credit. Very few correct names of tools were used. The best answers included the need to use a safe metal edge to cut and score against and to protect the work surface being used.

A number of candidates did not attempt part **(c) (ii)** of the question. The responses that were produced generally contained insufficient detail. Only a few candidates produced more than a single copy drawing of Fig. 3 with some or all of the elastic bands in place. The quality of both the sketching and the written communication produced in part **(c)** was not high.

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 generally well answered by the majority of candidates. Many candidates made good use of the structure and mark allocation given in part **(d);** however, the level of 'discussion' that takes place in candidates' responses remains insufficient in many cases.

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 the same information was often given 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.

Question 4

Part **(a)** was frequently well answered with the majority of candidates gaining some credit. Many correctly identified the copyright symbol; fewer went on to explain that it meant that the material could not be copied without permission.

In part **(b)** a reasonable number of candidates correctly described at least one of the problems with the design of the card. Problems needed to relate to the left hand pop-up creasing when the page was folded, the page would not close properly or the right hand pop-up sticking out of the book when the page was closed.

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 were to reduce the horizontal distance of right-hand pop-up to no more than 30 mm or to increase the page size to 200 mm and to make the left hand pop-up parallel to surfaces of the page. Only a few fully correct solutions were seen.

The main focus of part **(d)** was the use of different types of surface finish. Many candidates concentrated on the types of images that would go on the pages, for example cartoon characters, rather than discussing the use of different materials and texture.

Question 5

Part **(a)** was frequently well answered. The majority of candidates correctly identified feature X as a wrist strap. A good number went on to explain that the feature made it easier to carry or hang up the torch, it made it less likely that the user would drop the torch and it left both of their hands free.

In part **(b)** almost all candidates described at least one appropriate problem with the design of the clockwork radio. Problems needed to relate to it being difficult to wind up the radio and difficult to carry the radio.

The better answers to part **(c)** made full and effective use of notes and sketches to describe both 'how' the design would need to be changed and 'why' this would overcome the problem they had identified. Some candidates suggested major changes to the design, for example adding batteries. Candidates need to understand that changes they suggest must be appropriate for the specific product given in the question. The main features of the given radio were that it was portable and was wind-up clockwork powered.

Candidates could have improved their performance in parts **(b)** and **(c)** by analysing the given information more carefully.

A number of good answers were seen to part **(d)** of the question. The better answers were based on relevant issues such as the availability of the power source, its cost, reliability and ease of use. The question asked candidates to select one power source and discuss the merits of using that power source compared to the other two. A number of candidates only described the type of power source that would be used for each of the three given products.

Question 6

Part **(a)** was reasonably well answered, with a good number of candidates correctly explaining that the feature was a locking bar which prevented the chair collapsing when in use. When released, it enabled the chair to fold.

In part **(b)** the vast majority of candidates correctly described at least one problem with the design of chair A. While most candidates described a problem related to the chair's poor stability, fewer identified that the chair did not have any form of folding 'mechanism'. In a number of cases the stability problem was described twice using slightly different words.

The better answers to part **(c)** made full and effective use of notes and sketches to describe both 'how' the design would need to be changed and 'why' this would overcome the problem they had identified. A good number of the solutions that were suggested to overcome the problem of stability would have resulted in the chair not being able to fold.

Part **(d)** required candidates to "Discuss why design A might be considered more 'environmentally friendly' than the other designs". The better responses were based around issues such as the chair was made from renewable and sustainable resources, the materials from which the chair was made were biodegradable and less pollution was caused in the chair's production than would be the case with the other two designs. A good number of candidates misinterpreted the term 'environmentally friendly' and incorrectly based their responses around how well the chair would fit into the 'environment' (surroundings) it was going to be used in. Some of responses contained only a description of the three designs.

Candidates could have improved their performance in parts **(b)**, **(c)** and **(d)** by analysing the given information more carefully.

Section C

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 about 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 a 3D view showing exactly the same design idea.

The better evaluations were those that used concise notes to identify clearly 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 should appreciate that ideas need 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' 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)-(d)** 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 initials ideas into a final solution for each part of the question. This final 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.

Question 7

Some excellent responses were seen to all parts of the question. In general both the quality of sketching and the written communication were of a good and frequently very good standard.

In part **(a)** of the question the majority of candidates produced appropriate designs for the base of the seesaw. Most considered, with varying degrees of success, how the problem of stability could overcome. The better solutions were generally those that had a base which was shaped in the form of a cross. Some solutions only considered stability in one direction which resulted in a seesaw that could very easily fall sideways. It was not always clear in the responses of some candidates how the base would have been fixed to the sides of the seesaw.

Part **(b)** was generally answered well and almost all candidates produced a design for a seat that had the potential to work. Many had considered comfort and safety, but some of the materials suggested would not have been appropriate for outdoor use. A fair number of candidates only looked at the shape of the seat, and did not always give details about how it could be constructed and/or fixed to the main bar of the seesaw. A few over-complex designs were seen.

Many good designs for handles were seen in part **(c),** the majority of which had the potential to work. Comfort, safety and ease of use were frequently considered. However, a number of responses did not consider how the handle could be constructed and/or how it could be fixed to the seesaw. A few over-complex designs were seen.

The majority of candidates produced a workable design which allowed the seesaw to pivot. Various components such as nuts and bolts were used to good effect in many of the designs. Most of the solutions that were proposed would have allowed the seesaw to be taken apart.

A good number of excellent rendered pictorial drawings were seen in part **(e)**. In some responses, the rendering was not attempted or was poorly done. A number of 'multicoloured' drawings were seen when each part of the seesaw was a different colour. Candidates need to be aware of the difference between 'colouring in' and 'rendering'. Rendering should be used to suggest the form (shape) of the object and the material/s that it is made from.

Question 8

A number of the responses did not display sufficient knowledge and understanding about how the material (corrugated cardboard) could be used to make the required designs.

The better answers to part **(a)** generally used one of two methods to support the removable shelf at the required height. The first of these used various pieces of card to support the shelf from underneath while the second added tabs to the shelf which then fitted into slots made in the main structure of the display stand. A good number of over-complex designs were seen, many of which would have prevented the display stand from being made in a flat-pack form. Some designs made use of inappropriate material such as wood.

Most of the designs produced in part **(b)** reflected the name of the company. Many shaped the top of the information board in the form of a mountain range. A number of designs showed only the shape of the information board and did not give any details about how and where it could be attached to the display stand. The better responses showed how various types of slots and tabs or material such as Velcro could be used to good effect to join the board to the stand. Some boards were attached to the stand in a position that would have made it very hard to see. In many of the better responses the board was attached so that it stood up above the main structure of the stand.

A good number of candidates produced designs for a leaflet holder in part **(c)** which had the potential to work. While the shape of many of the proposed designs were suitable there was frequently little or no consideration given as to how the leaflet holder could be constructed and/or attached to the stand without the use of glue or other additional materials. The better responses showed nets from which the leaflet holder could be made and how slots and tabs could be used in both the construction of the leaflet holder and its attachment to the stand.

Some good lettering designs were seen in part **(d)**. The majority of the designs produced reflected the name of the company. The better designs made effective use of colour and gave at least some consideration as to where the lettering could be positioned on the display stand.

The quality of the drawings produced in part **(e)** was very mixed with few high-quality rendered drawings being seen. Some of the drawings did not show all of the features that had been designed in parts **(a)** – **(d)** of the question.

Question 9

In general, this question was well answered with good responses being seen to all parts of the question. Both the quality of sketching and written communication produced by the majority of candidates was of a good standard.

In part **(a)** many of the candidates produced designs for a stable base that would have supported the rest of bicycle repair stand. The better responses showed how the base could be constructed and how it could be joined to the vertical support.

Part **(b)** of the question required candidates to allow the vertical support to be adjusted and fixed at different heights. A number of good solutions were seen. Some of the better responses showed various types of telescopic systems that incorporated a locking system which enabled the vertical support to be easily extended and retracted so that it could be fixed at different heights. This was an example of where a candidate could focus part of their design work on just part of the product, in this case the locking system, rather than the whole adjusting mechanism.

Some good designs were seen in response to part **(c)** which would have securely held the bicycle while it was being worked on. Som simply showed a method of 'hooking' the bicycle to the stand. Designs of this type would not have prevented the bicycle moving around when it was being worked on. In some cases insufficient details were given about how the bicycle could be attached to the design and/or how the design could be attached to the vertical support.

The better designs in part **(d)** not only gave details about the shape of the tool storage tray but also gave information about its construction and how it could be attached to the stand. Many candidates did not consider the type of tools that the storage tray would need to hold. When designing products, candidates should consider the product's function as well as its shape and form.

A number of good pictorial rendered drawings were seen in part **(e)**. In some responses, the rendering was not attempted or was poorly done. A number of 'multicoloured' drawings were seen when each part of the bicycle repair stand was a different colour. Candidates need to be aware of the difference between 'colouring in' and 'rendering'. Rendering should be used to suggest the form (shape) of the object and the material/s that it is made from.

DESIGN AND TECHNOLOGY

Paper 9705/12

Written 1

Key Messages

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- Answers should contain all relevant information, but repetition of points should be avoided.

General Comments

In general the performance of candidates showed an improvement on previous years. Some excellent answers were seen in all sections of the paper.

Candidates should ensure that their answers are focused on the requirements of the question being asked and that their responses are concise and display appropriate subject specific knowledge and understanding.

The majority of candidates responded to all parts of the three questions they had chosen to answer. Some candidates need to manage their time more effectively, particularly in ***Section C***.

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 in written responses was for candidates to repeat the same information two or more times using slightly different words.

Section A

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; the use of lots of continuous text should be avoided when answering questions in this section of the paper.

Question 1

In part **(a)** of the question candidates generally gained some credit by naming the input motion as rotary and/or the output motion as reciprocation. Non-technical terms such as ‘round and round’ and ‘up and down’ should be avoided.

In part **(b)(i)** most candidates could describe how tools and equipment such as saws, rasps, files, sanding discs and abrasive paper could be used to cut out the cam and smooth the edges of the MDF.

The better answers to part **(b) (ii)** showed how three pieces of different sized dowel could be cut, drilled and joined together to make part **A**. Other candidates suggested over complex, inappropriate methods of manufacture that would have been very difficult to make. These included ‘carving’ the shape from one piece of wood.

A number of the responses to part **(b) (iii)** displayed understanding about how the joint shown at B could be made, but generally this part of the question was not very well answered. Answers frequently showed that a saw could be used to make part, or all, of the joint; the amount of detail given was often insufficient. Some answers suggested that a totally different method of joining could be used.

Question 2

This question was often very well answered. The quality of both the sketching and written communication was generally good.

Part **(a)** was well answered by the majority of candidates. Most named acrylic as being a suitable sheet material for making part **A** and went on to give an appropriate reason for its choice, such as it could be easily bent or that it did not require a surface finish.

Some excellent answers were seen to part **(b) (i)** with many candidates clearly describing how the material they had chosen in part **(a)** could be bent. The only omission in many responses concerned the safety precautions that would need to be taken, for example, wearing gloves when handling hot plastic. Some candidates spent too long describing how their chosen material could be marked out and then cut.

Part **(b) (ii)** was generally well answered with most candidates giving at least some details about how tools and equipment such as saws, rasps, files, sanding discs and abrasive papers could be used be used to cut out the rounded corners and smooth the edges of the wood. The better responses gave full and appropriate details. For example they needed to show that the corners needed to be cut a little outside the marked shape to then allow, for example, a sanding disc to be used to smooth the wood down to its required shape. As with part **(b) (i)** some candidates spent too much time explaining how the wood could be marked out.

A good number of candidates gave some details about how parts **A** and **B** could be joined together using countersunk screws. Common omissions included drilling and countersinking the holes and the safety precautions involved. Some candidates stated only that the two parts would be screwed together using a screwdriver.

Question 3

Part **(a)** was generally very well answered. The majority of candidates used a sketch and notes to clearly explain that corrugated cardboard consisted of two outer layers with a corrugated core.

In parts **(b) (i)** and **(b) (ii)** the developments drawn by most candidates showed some of the required features but very few fully correct answers were seen. In part **(i)** the development needed to be the correct shape (rectangle joined to a triangle), have two cut out windows and four correctly shaped and positioned tabs. In part **(b) (ii)** the development needed to be the correct shape (rectangle joined to a triangle), have circular and triangular cut outs and four correctly shaped and positioned tabs.

Most of the candidates' responses to part **(c) (i)** gave some information about how part **A** could be cut out and the folds made; in general, there was insufficient detail to gain full credit. Very few correct names of tools were used. The best answers included the need to use a safe metal edge to cut and score against and to protect the work surface being used.

A number of candidates did not attempt part **(c) (ii)** of the question. The responses that were produced generally contained insufficient detail. Only a few candidates produced more than a single copy drawing of Fig. 3 with some or all of the elastic bands in place. The quality of both the sketching and the written communication produced in part **(c)** was not high.

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 generally well answered by the majority of candidates. Many candidates made good use of the structure and mark allocation given in part **(d);** however, the level of 'discussion' that takes place in candidates' responses remains insufficient in many cases.

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 the same information was often given 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.

Question 4

Part **(a)** was frequently well answered with the majority of candidates gaining some credit. Many correctly identified the copyright symbol; fewer went on to explain that it meant that the material could not be copied without permission.

In part **(b)** a reasonable number of candidates correctly described at least one of the problems with the design of the card. Problems needed to relate to the left hand pop-up creasing when the page was folded, the page would not close properly or the right hand pop-up sticking out of the book when the page was closed.

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 were to reduce the horizontal distance of right-hand pop-up to no more than 30 mm or to increase the page size to 200 mm and to make the left hand pop-up parallel to surfaces of the page. Only a few fully correct solutions were seen.

The main focus of part **(d)** was the use of different types of surface finish. Many candidates concentrated on the types of images that would go on the pages, for example cartoon characters, rather than discussing the use of different materials and texture.

Question 5

Part **(a)** was frequently well answered. The majority of candidates correctly identified feature X as a wrist strap. A good number went on to explain that the feature made it easier to carry or hang up the torch, it made it less likely that the user would drop the torch and it left both of their hands free.

In part **(b)** almost all candidates described at least one appropriate problem with the design of the clockwork radio. Problems needed to relate to it being difficult to wind up the radio and difficult to carry the radio.

The better answers to part **(c)** made full and effective use of notes and sketches to describe both 'how' the design would need to be changed and 'why' this would overcome the problem they had identified. Some candidates suggested major changes to the design, for example adding batteries. Candidates need to understand that changes they suggest must be appropriate for the specific product given in the question. The main features of the given radio were that it was portable and was wind-up clockwork powered.

Candidates could have improved their performance in parts **(b)** and **(c)** by analysing the given information more carefully.

A number of good answers were seen to part **(d)** of the question. The better answers were based on relevant issues such as the availability of the power source, its cost, reliability and ease of use. The question asked candidates to select one power source and discuss the merits of using that power source compared to the other two. A number of candidates only described the type of power source that would be used for each of the three given products.

Question 6

Part **(a)** was reasonably well answered, with a good number of candidates correctly explaining that the feature was a locking bar which prevented the chair collapsing when in use. When released, it enabled the chair to fold.

In part **(b)** the vast majority of candidates correctly described at least one problem with the design of chair A. While most candidates described a problem related to the chair's poor stability, fewer identified that the chair did not have any form of folding 'mechanism'. In a number of cases the stability problem was described twice using slightly different words.

The better answers to part **(c)** made full and effective use of notes and sketches to describe both 'how' the design would need to be changed and 'why' this would overcome the problem they had identified. A good number of the solutions that were suggested to overcome the problem of stability would have resulted in the chair not being able to fold.

Part **(d)** required candidates to "Discuss why design A might be considered more 'environmentally friendly' than the other designs". The better responses were based around issues such as the chair was made from renewable and sustainable resources, the materials from which the chair was made were biodegradable and less pollution was caused in the chair's production than would be the case with the other two designs. A good number of candidates misinterpreted the term 'environmentally friendly' and incorrectly based their responses around how well the chair would fit into the 'environment' (surroundings) it was going to be used in. Some of responses contained only a description of the three designs.

Candidates could have improved their performance in parts **(b)**, **(c)** and **(d)** by analysing the given information more carefully.

Section C

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 about 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 a 3D view showing exactly the same design idea.

The better evaluations were those that used concise notes to identify clearly 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 should appreciate that ideas need 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' 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)-(d)** 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 initials ideas into a final solution for each part of the question. This final 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.

Question 7

Some excellent responses were seen to all parts of the question. In general both the quality of sketching and the written communication were of a good and frequently very good standard.

In part **(a)** of the question the majority of candidates produced appropriate designs for the base of the seesaw. Most considered, with varying degrees of success, how the problem of stability could overcome. The better solutions were generally those that had a base which was shaped in the form of a cross. Some solutions only considered stability in one direction which resulted in a seesaw that could very easily fall sideways. It was not always clear in the responses of some candidates how the base would have been fixed to the sides of the seesaw.

Part **(b)** was generally answered well and almost all candidates produced a design for a seat that had the potential to work. Many had considered comfort and safety, but some of the materials suggested would not have been appropriate for outdoor use. A fair number of candidates only looked at the shape of the seat, and did not always give details about how it could be constructed and/or fixed to the main bar of the seesaw. A few over-complex designs were seen.

Many good designs for handles were seen in part **(c),** the majority of which had the potential to work. Comfort, safety and ease of use were frequently considered. However, a number of responses did not consider how the handle could be constructed and/or how it could be fixed to the seesaw. A few over-complex designs were seen.

The majority of candidates produced a workable design which allowed the seesaw to pivot. Various components such as nuts and bolts were used to good effect in many of the designs. Most of the solutions that were proposed would have allowed the seesaw to be taken apart.

A good number of excellent rendered pictorial drawings were seen in part **(e)**. In some responses, the rendering was not attempted or was poorly done. A number of 'multicoloured' drawings were seen when each part of the seesaw was a different colour. Candidates need to be aware of the difference between 'colouring in' and 'rendering'. Rendering should be used to suggest the form (shape) of the object and the material/s that it is made from.

Question 8

A number of the responses did not display sufficient knowledge and understanding about how the material (corrugated cardboard) could be used to make the required designs.

The better answers to part **(a)** generally used one of two methods to support the removable shelf at the required height. The first of these used various pieces of card to support the shelf from underneath while the second added tabs to the shelf which then fitted into slots made in the main structure of the display stand. A good number of over-complex designs were seen, many of which would have prevented the display stand from being made in a flat-pack form. Some designs made use of inappropriate material such as wood.

Most of the designs produced in part **(b)** reflected the name of the company. Many shaped the top of the information board in the form of a mountain range. A number of designs showed only the shape of the information board and did not give any details about how and where it could be attached to the display stand. The better responses showed how various types of slots and tabs or material such as Velcro could be used to good effect to join the board to the stand. Some boards were attached to the stand in a position that would have made it very hard to see. In many of the better responses the board was attached so that it stood up above the main structure of the stand.

A good number of candidates produced designs for a leaflet holder in part **(c)** which had the potential to work. While the shape of many of the proposed designs were suitable there was frequently little or no consideration given as to how the leaflet holder could be constructed and/or attached to the stand without the use of glue or other additional materials. The better responses showed nets from which the leaflet holder could be made and how slots and tabs could be used in both the construction of the leaflet holder and its attachment to the stand.

Some good lettering designs were seen in part **(d)**. The majority of the designs produced reflected the name of the company. The better designs made effective use of colour and gave at least some consideration as to where the lettering could be positioned on the display stand.

The quality of the drawings produced in part **(e)** was very mixed with few high-quality rendered drawings being seen. Some of the drawings did not show all of the features that had been designed in parts **(a)** – **(d)** of the question.

Question 9

In general, this question was well answered with good responses being seen to all parts of the question. Both the quality of sketching and written communication produced by the majority of candidates was of a good standard.

In part **(a)** many of the candidates produced designs for a stable base that would have supported the rest of bicycle repair stand. The better responses showed how the base could be constructed and how it could be joined to the vertical support.

Part **(b)** of the question required candidates to allow the vertical support to be adjusted and fixed at different heights. A number of good solutions were seen. Some of the better responses showed various types of telescopic systems that incorporated a locking system which enabled the vertical support to be easily extended and retracted so that it could be fixed at different heights. This was an example of where a candidate could focus part of their design work on just part of the product, in this case the locking system, rather than the whole adjusting mechanism.

Some good designs were seen in response to part **(c)** which would have securely held the bicycle while it was being worked on. Som simply showed a method of 'hooking' the bicycle to the stand. Designs of this type would not have prevented the bicycle moving around when it was being worked on. In some cases insufficient details were given about how the bicycle could be attached to the design and/or how the design could be attached to the vertical support.

The better designs in part **(d)** not only gave details about the shape of the tool storage tray but also gave information about its construction and how it could be attached to the stand. Many candidates did not consider the type of tools that the storage tray would need to hold. When designing products, candidates should consider the product's function as well as its shape and form.

A number of good pictorial rendered drawings were seen in part **(e)**. In some responses, the rendering was not attempted or was poorly done. A number of 'multicoloured' drawings were seen when each part of the bicycle repair stand was a different colour. Candidates need to be aware of the difference between 'colouring in' and 'rendering'. Rendering should be used to suggest the form (shape) of the object and the material/s that it is made from.

DESIGN AND TECHNOLOGY

Paper 9705/13

Written 1

Key Messages

- Candidates need to ensure that they understand the requirements of questions before they begin their answers.
- Answers should contain all relevant information, but repetition of points should be avoided.

General Comments

There was a wide range in the performance of candidates.

Candidates should ensure that their answers are focused on the requirements of the question being asked and that their responses are concise and display appropriate subject specific knowledge and understanding.

The majority of candidates responded to all parts of the three questions they had chosen to answer. Some candidates need to manage their time more effectively, particularly in ***Section C***.

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 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

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. The quality of sketching was very mixed.

The use of lots of continuous text should be avoided when answering questions in this section of the paper. In a number of responses too much use had been made of continuous text at the expense of appropriate sketches.

Question 1

Part **(a)** was frequently well answered. The most common surface finish named was varnish. The majority of candidates went on to give an appropriate reason for its choice such as it would enhance the appearance of the wood or protect the surface.

In part **(b) (i)** most candidates were able to describe at least some of the stages involved in cutting the ends of part **A** to the correct shape and smoothing the edges of the wood. However, most responses lacked the level of detail required to gain high marks. A number of simplistic answers such as ‘You would use a saw’ were seen. Details needed to be given about the type of saw, how it would be used, how the work would be held and the fact that the cut needed to be made on the waste side of the line to allow the material to be smoothed. A limited number of candidates suggested the use of a laser cutter. While these answers gained some credit, this was not the best way to cut out this thickness of material.

The better answers to part **(b) (ii)** described, stage by stage, how parts **A** and **B** could be joined together using countersunk screws. The stages needed to include drilling and countersinking the holes and using some form of screwdriver to put the screws in. As with part **(i)** some of the responses seen did not have sufficient level of detail.

In part **(b) (iii),** the majority of candidates correctly identified a nut and bolt as being one of the best ways of joining parts **A** and **C** together so that the rack could fold flat. The better responses described how holes could safely be drilled in the two parts and the bolts, nuts and washers could be assembled using appropriate tools such as a spanner. Some answers went no further than to draw a nut and bolt.

Question 2

In part **(a)** of the question many correctly stated that a thickness of 1-2 mm (1000-2000) microns was a suitable thickness of card for making the leaflet holder. Fewer went on to give an appropriate reason for their choice. An appropriate reason needed to relate to the strength/stability of the material and its ability to support the weight of the leaflets while still being thin enough to cut and fold.

Part **(b)** was reasonably well answered. The majority of candidates produced a pictorial view of the leaflet which showed most of the required details. Very few responses showed the quadrant shaped locking pieces in a folded down position. The quality of the sketching was very mixed.

Most of the candidates responses to part **(c)** gave some information about how part **A** could be cut out and the folds made, but most did not have sufficient level of detail. Many types of knife were suggested for cutting out the shape, but very few correct names were used. The best answers referred to the need to use a safe metal edge to cut and score against and to protect the work surface being used.

In part **(d),** some good answers were seen; the best responses demonstrated understanding that the die cutting process involved stamping or pressing a design out using thin strips of metal bent to the required shape. Some responses were seen which did not have sufficient level of detail. Most answers did not make enough use of sketches and contained too much written text.

Question 3

Part **(a)** was frequently well answered with acrylic being the most common correct material that was named. The majority explained that their chosen material would be easy to bend and/or did not require a surface finish.

In part **(b) (i)** the majority of candidates described (at least in part) how their chosen material could be bent. Using a strip heater to bend acrylic was the most common process described. Safety precautions, such as wearing gloves when handling hot plastic, were frequently not considered. Some responses did not make enough use of sketches and often contained too much continuous text.

In part **(b) (ii)** the use of hand tools or a laser cutter were both suitable processes that candidate described for cutting out part **B** and smoothing the edges of the material. Where the use of hand tools was the process chosen candidates showed varying degrees of knowledge and understanding about how tools and equipment such as saws, files, abrasive paper and buffing wheels could be used. The majority of candidates who described the use of a laser cutter were able to give some details about how the equipment would be set up and used but in a few cases simply made reference to sending the file to a teacher. Some responses did not make enough use of sketches and often contained too much continuous text.

The answers to part **(b) (iii)** were very mixed. Many candidates described successfully how the twelve holes could be marked out using a protractor or set square; some responses showed an incorrect number of holes. The drilling process was described in varying degrees of detail. Common omissions were not to include details about how the work would be held when drilling and/or the safety precautions involved. Some candidates selected the use of a laser cutter and appropriate credit was given to these responses. In common with other parts of part **(b)** some responses did not make enough use of sketches and often contained too much continuous text.

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 generally well answered by the majority of candidates. Many candidates made good use of the structure and mark allocation given in part

(d); however, the level of ‘discussion’ that takes place in candidates’ responses remains insufficient in many cases.

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

Question 4

In part **(a)** the majority of candidates understood that the symbol had something to do with recycling; fewer explained that the symbol meant that the packaging was made from 40% recycled material.

In part **(b)** almost all candidates were able to describe at least one problem with the design of the packaging. Appropriate problems included that the egg could move around in the box and could easily get broken and that the box was poorly secured because there were no features such as fold over flaps.

The better responses to part **(c)** were those that used notes and sketches to good effect to explain how features such as inner packaging to support the egg, fold over flaps and security tags could added to overcome the problems identified in part **(b)**. The quality of sketching was very variable and some candidates used far too much continuous text in their responses.

The majority of candidates were able to identify at least one or two relevant issues around which to base their responses to part **(d)**. These included that some packaging, such as sweet wrappers, was instantly thrown away and caused litter, some packaging, for example tetra packs, were hard to recycle, that production and/or disposal of some packaging caused pollution. To access higher marks, statements need to be justified and/or explained by making more use of words like ‘because’. For example, “Packaging is often considered ‘environmentally unfriendly’ because it causes litter; this is relevant because ….. Examples of packaging that is thrown away and the problems this causes are ……”

Question 5

The vast majority of candidates gained some credit in part **(a)**. Better answers explained that the feature both acted as a handle for the drawer and provided a space for a label to slot in.

Part **(b)** was frequently well answered. The majority of candidates correctly identified problems linked to the poor stability of the design and the fact that the CDs could easily fall out of the slot. It is important that candidates do not just ‘identify’ a problem; they must go on to describe ‘why’ it is a problem. For example, “Design A would easily fall over (1 mark) because …” (second mark). Some candidates described the same problem twice using slightly different words.

The better answers to part **(c)** made full and effective use of notes and sketches to explain how the problems could be overcome. Some brief answers were seen, such as “The base needs to be bigger”. In order to gain high marks, answers such as this needed to go on to explain how the base could be made bigger and why this would overcome the problem.

In part **(d)** candidates were asked to discuss “The ways in which a designer would use a prototype model of a CD storage system to test the design before the final product is manufactured”. In the better answers, issues such as testing for stability, ease of use/access to CDs and how securely CDs were held were identified. These answers frequently went on to discuss why these issues were relevant and give specific examples of how these tests could be carried out and the benefits this would have prior to manufacture starting. Some candidates did little more than compare the three designs.

Question 6

This question was generally well answered.

In part **(a)** the majority of candidates gained some credit. The better responses explained that the feature shown at X was a spring which allowed to board to sway in the wind and it was therefore harder to knock/blow the board over.

There were a high percentage of good answers seen to part **(b)** with the vast majority of candidates describing at least one problem with design A. Problems needed to relate to things such as the two boards not being joined together at the top and the boards being able to slide apart easily because there was no form of stay holding them together.

Some very good solutions to the problems were shown in part **(c)**. Most responses made good use of notes and sketches to show how hinges could be used to join the boards together at the top while still allowing them to fold and a length of rope or chain or a stay used to stop the boards sliding apart. The quality of sketching was generally good.

Part **(d)** of the question was frequently very well answered. Appropriate issues that were identified included things such as it being easier and quicker to change the information on the board, costs are lower both in terms of the cost of the board and because there is no need to print posters, and the board being easier to transport and store. Candidates frequently supported there statements by using examples from their local community. For example, local cafes that needed to change information on the board on a regular basis to show special offers and daily specials.

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 about 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 used far too much continuous text. A few candidates, unnecessarily, spent a long time producing very neat drawings of their initial ideas.

Some 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 a 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' 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. Development should be seen as more than the re-drawing of 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 do not have to develop each one of their initial ideas. As part of the development process basic details about materials, joining methods and important sizes should be given. Candidates are not required to explain stage by stage how their chosen design would be made.

In part **(e)** 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.

Time management could be improved for some candidates. Some spent too long on earlier parts of the question leaving them insufficient time to complete part **(e)**.

Question 7

Part **(a)** was generally well answered and almost all candidates produced a design for a seat that had the potential to work. Many had considered comfort and safety but a fair number of candidates only looked at the shape of the seat, and did not give details about how it could be constructed and/or fixed to the push-along toy. A few over-complex designs were seen.

Some reasonable designs were seen to part **(b)** most of which had the potential to work. Some responses only showed the shape of the footrests and the hand holds, and did not give important technical information about how they would be constructed and/or fixed to the push-along toy. Some candidates designed only footrests or only handholds rather than both.

In part **(c)** the better answers did not try to design over-complex wheels and went on to show how they could be attached to either a single or directly to the pieces protruding below the wing of the push-along toy. Some designs made appropriate use of threaded pieces of bar along with nuts and washers to attach the wheel to the aeroplane. Technical details about how the wheels could be made and/or attached to the push-along toy frequently did not include sufficient level of detail. Some candidates considered only the design of the wheels and not how they could be attached to the aeroplane.

Most of the handle designs produced in part **(d)** had the potential to work; some did not include the technical details required about how they could be constructed and/or attached to the push-along toy. In some cases the handles would have been uncomfortable to use and would have required the adult to bend down or pull the aeroplane along rather than push it.

The quality of the drawings produced in part **(e)** was very mixed. Some did not show all of the features that had been designed in parts **(a)-(d)**. Rendering was generally not very well done, and in some cases not attempted. Some candidates had traced the given drawing, for which credit could not be given.

Question 8

Most candidates overlooked that the display stand was to be manufactured in flat pack form from 5 mm thick corrugated cardboard.

Many of the designs produced in part **(a)** had the potential to work and most would have supported the shelf unit at a height of 500 millimetres above the ground. Many of these designs did not contain sufficient technical details about how they could be constructed and/or how the base unit could be attached to the shelf unit. The use of inappropriate materials such as MDF was also evident.

In part **(b)** almost all of the designs produced divided the shelf unit into twelve spaces; some did not consider the size of a DVD, resulting in some spaces being either too small or two large. A few responses showed the DVDs in position and/or dimensioned their sketches. The better responses also showed how the dividers could be attached to the display stand without the use of glue or other additional materials. Some designs made use of inappropriate materials.

Many of the designs for a holder for entry forms in part **(c)** had the potential to work in practice. The shape of many of the proposed designs was suitable; but there was frequently little or no consideration given as to how the leaflet holder could be constructed and/or attached to the stand without the use of glue or other additional materials. The better responses showed nets from which the leaflet holder could be made and how slots and tabs could be used in both the construction of the holder and its attachment to the stand.

Some very good lettering designs were seen in part **(d)**. The majority of the designs produced reflected the title of the DVD. The better designs made effective use of colour and gave some consideration as to where the lettering could be positioned on the display stand.

Some reasonable drawings were seen in part **(e).** Other did not show all of the features that had been designed in parts **(a)-(d)**. Rendering was generally not very well done, and in some cases not attempted at all.

Question 9

Part **(a)** of the question required candidates to develop a design which allowed 20 trays full of dirty crockery to be put in the trolley. Many of the designs produced provided space for the required 20 trays, but often did not take into account the fact that the trays were full of crockery. Candidates should read questions carefully and make use of all of the information given. Most responses contained appropriate details about construction and/or materials.

Most of the designs for handles that were produced in part **(b)** had the potential to work. Some of the better answers had considered ergonomics and how easy and comfortable the handle would be to use. Often insufficient details were given about where the handle would be positioned on the trolley, how it could be constructed and how it could be attached to the trolley.

All of the responses to part **(c)** considered the shape of the waste bin and most considered some form of lid. Many of the designs had the potential to work, but sometimes there were insufficient details about how the lid of the bin could be made to open and close easily and how the product could be constructed. The bin's location on the trolley was another important factor that was frequently overlooked.

The better designs produced in part **(d)** were those where the candidate had considered that the bin needed to be attached and easily removed from the trolley. Effective ways of attaching the bin to the trolley while still allowing it to be removed included various types of hook and the use of wing nuts. The attachment and/or positioning of the bin were sometimes not fully taken into account. Some fixing methods required the use of additional equipment such as a screwdriver or spanner.

Some good drawings were seen in part **(e)**; others did not show all of the features that had been designed in parts **(a)-(d)**. Rendering was generally not very well done, and in some cases not attempted at all.

DESIGN AND TECHNOLOGY

Paper 9705/02

Project 1

Key messages

- Successful candidates focus on the design need and brief throughout the analysis and research stages of their project rather than a preconceived idea of an outcome.
- 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.

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 theme, such as global issues or the environment, with candidates then being required to identify a design need or situation within this.

Many interesting topics were considered again this year and outcomes of either models or final products included: baby's cradle, can crusher, fruit picker, vehicle lifting device, teacher's desk, automatic car park barrier, bicycle storage system, crocodile trap, fish trap, wood fired boiler, solar water heater, wind generator, car crawler, solar powered fruit drier, car washing system, water borehole windlass, runner's starting block, bird transporter unit, solar turbine, coat hanger, portable drawing board, pencil sharpener, decorator's steps, water sprinkler system, cycle speakers, cycle mudguard, flagpole, portable shower, clothes drier, portable goalposts.

The majority of Centres presented work for moderation clearly labelled and with all documentation complete. It is helpful when the photographic evidence of either the model of final product is included at the appropriate stage of the design folder.

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

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

Key messages

- Candidates should ensure that they divide their time appropriately between the different sections on this paper.
- Generic statements should be avoided in answers to questions concerning specific products.

General comments

There was a full range of responses to all questions on this paper. Candidates were generally well prepared and there were very few rubric errors.

Whilst the majority of candidates used the time available effectively and made full attempts at all sections of the paper, a significant number only answered one question from ***Section A*** or produced very brief responses.

Some candidates attempted more than two questions from ***Section A***. The marks from two questions only can be credited.

The quality and use of appropriate sketching and annotation was of a good standard throughout the paper. Candidates used sketches to describe the stages of particular processes and support their answers to questions where appropriate in ***Section A***.

Most candidates fully completed all of the requirements for ***Section B***. Some spent too long on this Section at the expense of lack of detail in their responses in ***Section A***.

Comments on specific questions

Section A

Part A – Product Design

Question 1

This was generally well answered.

(a) The most popular correct response given for an appropriate material was acrylic. Most candidates correctly gave appropriate reasons such as: good aesthetic qualities, easily shaped and self-finishing. Some candidates offered acceptable materials but did not give appropriate reasons or describe the correct manufacturing method for that material.

(b) Candidates answered this part of the question very well. Shaping, finishing and forming of sheet material was correctly described by most candidates.

There were a few responses for the single item that were inappropriate such as compression moulding and injection moulding. This meant some candidates did not know what to write for part **(c)** as they had already used a preferred industrial manufacturing method.

Candidates used annotated sketches too good effect in this question.

(c) Most candidates chose injection moulding as the manufacturing method to produce 500 clock parts.

In most cases, candidates produced an outline of the process and did not give details of the mould, material used and any necessary modifications of the design.

Question 2

The best responses to this question described the heat treatment processes in detail and included appropriate examples.

Some candidates described the process but did not give an appropriate use.

Question 3

There was a wide range of responses to this question. There were a number of excellent responses to this question. Some candidates did not allocate a proportionate amount of time for this question, and a significant number did not include sufficient appropriate detail to access the higher marks.

The most popular processes chosen were rotational moulding and laminating.

(a) The best responses gave details of specific materials and described the key aspects of the process chosen.

(b) Most candidates were able to give at least one reason why the process was suitable for the item. To achieve full marks, candidates are expected to show that they can clearly identify the specific suitability of the process for the given product.

Part B - Practical Technology

Question 4

(a) (i) Most candidates described a screw-thread in varying degrees of detail as a temporary fixing method. The best responses used fully detailed sketches and notes including the specific tools and equipment required.

(ii) Most candidates correctly identified welding as a suitable permanent joining method, but many did not describe the process in sufficient detail.

(b) A significant number of candidates did not attempt this part of the question. The most common, correct responses given were sand casting or die casting. Some candidates did not consider the requirement to produce a one-piece component.

Question 5

Some candidates gave fully detailed and correct responses to each part of this question. Other candidates made correct responses to parts **(a)** and **(b)** but did not give a response to part **(c)**.

Question 6

There were only a few fully correct answers to parts (**a)** and **(b)**.

Part C – Graphic Products

Question 7

This was generally well answered. Many candidates correctly produced accurate and detailed planometric drawings. A significant number used an incorrect presentation technique, isometric or perspective.

Question 8

There were a large number of very good answers to this question.

(a) (i) Most candidates correctly and accurately drew the full size front elevation required. A significant number of candidates did not include details of the transparent panel.

(ii) Developments were generally correct and accurately constructed with full details of glue tabs. Most candidates included the panel in this part.

(b) A large number of candidates did not attempt this part of the question. Successful candidates gave full details of specific materials and construction methods.

Question 9

Good responses discussed specific issues such as the speed of communication and the link to production methods, the storage and quick retrieval of data and cost implications of equipment, manpower and training.

A significant number focused on the generic use of computers and did not support their discussion with appropriate graphics/print industry examples.

Section B

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

The overall performance of candidates on this section was generally good. Most candidates used their time effectively and fully completed all requirements of the questions attempted. Some candidates produced outstanding responses, displaying creative and innovative thinking. Candidates need to explore a good range of ideas or sub-ideas to score well on this section.

Presentation skills were generally impressive with most candidates showing knowledge of appropriate materials and construction techniques.

There has been an improvement in the analysis and specification sections in recent years. For many candidates, the analysis, in the form of scatter-charts or lists, was focused on the requirements of the given problem. Some candidates produce generic charts that have no specific reference to the problem.

Candidates should not simply repeat the question in the form of a brief.

This analysis should lead to justified specification points. Single word or generic statements, with no reference to the product do not gain credit.

The majority of candidates produced a range of at least three discrete and different design ideas, many including the exploration of sub-problems, e.g. handle designs to make the music storage system in **Question 12** portable.

Most candidates made good reference to appropriate specific materials, giving justifications for their use. Reference to generic terms such as wood, plastic or metal cannot be credited and should be avoided. It is recommended that candidates show their understanding of the appropriate use of a wider range (at least three) of appropriate materials.

A number of candidates employed tick lists to evaluate their ideas and identify a chosen solution. They are not always appropriate, unless they are suitably qualified. The best responses are when candidates give evaluative comments on ideas and can make a reasoned judgement on the best solution or features to take forward for further development.

Most candidates included evidence of decision making to show the improvements or modifications to their idea. The majority of candidates identified and justified the materials and constructional methods that will be used.

Candidates are again advised to not include superficial development of features such as 'round off corners'.

Most proposed solutions were feasible and well presented; better solutions were also exciting and creative. Most included overall dimensions in their final proposal; candidates are expected to include dimensions, materials and possible finishes.

Some candidates produced valid evaluations of their proposal, describing the positive features, functional details and suggesting further modifications or improvements. Many candidates copied out their specification points and placed a tick to show whether the point has been satisfied or not. This is not sufficient.

Question 10

This question was generally well answered with a full range of responses. Some candidates interpreted the 'matching set' requirement as packaging and in some cases did not pay sufficient attention to the design of the individual items of jewellery.

Acceptable specification points included:

- the jewellery items must have a common theme or shape to be worn at the same time;
- the jewellery must be adjustable or able to accommodate different body sizes;
- the jewellery must be designed to be worn with comfort;
- the materials used must not react with human skin to cause irritation;
- the jewellery should be attractive in terms of shape, colour, pattern and texture for the identified target market.

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

A significant number of candidates did not take the opportunity to explore a creative and exciting range of possibilities. The exploration and development of ideas did not include as wide a range of production techniques as would be expected.

Final proposals were generally realistic with most including details of specific materials. The best responses included full details of appropriate dimensions and additional findings required.

Question 11

Some candidates were able to draw on their electronic and mechanical knowledge to propose effective solutions to this problem. A number of candidates focused on the door/ramp of the coop and did not consider the system required for automatic operation.

Acceptable specification points included:

- the system must not make excessive noise and disturb the chickens
- the system must lower the ramp steadily in a controlled manner to avoid damage
- the system must use a reliable and self contained power source
- the mechanisms and sensors used should be protected for use in the outdoor environment
- the system should be easily maintained by the owners

Many candidates produced functional proposals for some elements of the question e.g. the ramp and the locking/lowering method.

Some candidates explored the use of mechanisms such as gears and pulleys that could lower the ramp. The most successful ideas integrated the mechanisms and sensors for a fully automated system.

Question 12

Most candidates produced a range of feasible and realistic ideas. The very best responses explored a wider and more creative range of possibilities. Candidates need to explore more than one basic concept to achieve high marks. The analysis of most candidates tended to be generic with very few focusing on the specific task.

Acceptable specification points included:

- the storage method must protect the delicate items of the music system;
- the storage method must be stable in use to prevent accidental damage;
- the storage method could have a handle to make it portable
- the storage method must have clear areas for each component so that they are stored effectively and easily;
- the storage method must have a window so that components can be easily seen to see if items are missing.

Some candidates looked at basic concepts to enclose the items of the music system. The best responses looked at a wide range of methods of holding and storing the items securely. They included details of a range of appropriate specific materials and construction methods.

A number of candidates considered only one material: card. To achieve higher marks, different specific types of card and/or other appropriate materials should be considered. The development section was generally very good with many candidates giving details of appropriate construction methods, particularly when using card.

The evaluation of the final design solution was strongest on this question. Many candidates used the points of their specification to make judgements on the functionality of their proposal.

DESIGN AND TECHNOLOGY

Paper 9705/32
Written 2

Key messages

- Candidates should ensure that they divide their time appropriately between the different sections on this paper.
- Generic statements should be avoided in answers to questions concerning specific products.

General comments

There was a full range of responses to all questions on this paper. Candidates were generally well prepared and there were very few rubric errors.

Whilst the majority of candidates used the time available effectively and made full attempts at all sections of the paper, a significant number only answered one question from ***Section A*** or produced very brief responses.

Some candidates attempted more than two questions from ***Section A***. The marks from two questions only can be credited.

The quality and use of appropriate sketching and annotation was of a good standard throughout the paper. Candidates used sketches to describe the stages of particular processes and support their answers to questions where appropriate in ***Section A***.

Most candidates fully completed all of the requirements for ***Section B***. Some spent too long on this Section at the expense of lack of detail in their responses in ***Section A***.

Comments on specific questions

Section A

Part A – Product Design

Question 1

This was generally well answered.

(a) The most popular correct response given for an appropriate material was acrylic. Most candidates correctly gave appropriate reasons such as: good aesthetic qualities, easily shaped and self-finishing. Some candidates offered acceptable materials but did not give appropriate reasons or describe the correct manufacturing method for that material.

(b) Candidates answered this part of the question very well. Shaping, finishing and forming of sheet material was correctly described by most candidates.

There were a few responses for the single item that were inappropriate such as compression moulding and injection moulding. This meant some candidates did not know what to write for part **(c)** as they had already used a preferred industrial manufacturing method.

Candidates used annotated sketches too good effect in this question.

(c) Most candidates chose injection moulding as the manufacturing method to produce 500 clock parts.

In most cases, candidates produced an outline of the process and did not give details of the mould, material used and any necessary modifications of the design.

Question 2

The best responses to this question described the heat treatment processes in detail and included appropriate examples.

Some candidates described the process but did not give an appropriate use.

Question 3

There was a wide range of responses to this question. There were a number of excellent responses to this question. Some candidates did not allocate a proportionate amount of time for this question, and a significant number did not include sufficient appropriate detail to access the higher marks.

The most popular processes chosen were rotational moulding and laminating.

(a) The best responses gave details of specific materials and described the key aspects of the process chosen.

(b) Most candidates were able to give at least one reason why the process was suitable for the item. To achieve full marks, candidates are expected to show that they can clearly identify the specific suitability of the process for the given product.

Part B - Practical Technology

Question 4

(a) (i) Most candidates described a screw-thread in varying degrees of detail as a temporary fixing method. The best responses used fully detailed sketches and notes including the specific tools and equipment required.

(ii) Most candidates correctly identified welding as a suitable permanent joining method, but many did not describe the process in sufficient detail.

(b) A significant number of candidates did not attempt this part of the question. The most common, correct responses given were sand casting or die casting. Some candidates did not consider the requirement to produce a one-piece component.

Question 5

Some candidates gave fully detailed and correct responses to each part of this question. Other candidates made correct responses to parts **(a)** and **(b)** but did not give a response to part **(c)**.

Question 6

There were only a few fully correct answers to parts (**a)** and **(b)**.

Part C – Graphic Products

Question 7

This was generally well answered. Many candidates correctly produced accurate and detailed planometric drawings. A significant number used an incorrect presentation technique, isometric or perspective.

Question 8

There were a large number of very good answers to this question.

(a) (i) Most candidates correctly and accurately drew the full size front elevation required. A significant number of candidates did not include details of the transparent panel.

(ii) Developments were generally correct and accurately constructed with full details of glue tabs. Most candidates included the panel in this part.

(b) A large number of candidates did not attempt this part of the question. Successful candidates gave full details of specific materials and construction methods.

Question 9

Good responses discussed specific issues such as the speed of communication and the link to production methods, the storage and quick retrieval of data and cost implications of equipment, manpower and training.

A significant number focused on the generic use of computers and did not support their discussion with appropriate graphics/print industry examples.

Section B

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

The overall performance of candidates on this section was generally good. Most candidates used their time effectively and fully completed all requirements of the questions attempted. Some candidates produced outstanding responses, displaying creative and innovative thinking. Candidates need to explore a good range of ideas or sub-ideas to score well on this section.

Presentation skills were generally impressive with most candidates showing knowledge of appropriate materials and construction techniques.

There has been an improvement in the analysis and specification sections in recent years. For many candidates, the analysis, in the form of scatter-charts or lists, was focused on the requirements of the given problem. Some candidates produce generic charts that have no specific reference to the problem.

Candidates should not simply repeat the question in the form of a brief.

This analysis should lead to justified specification points. Single word or generic statements, with no reference to the product do not gain credit.

The majority of candidates produced a range of at least three discrete and different design ideas, many including the exploration of sub-problems, e.g. handle designs to make the music storage system in **Question 12** portable.

Most candidates made good reference to appropriate specific materials, giving justifications for their use. Reference to generic terms such as wood, plastic or metal cannot be credited and should be avoided. It is recommended that candidates show their understanding of the appropriate use of a wider range (at least three) of appropriate materials.

A number of candidates employed tick lists to evaluate their ideas and identify a chosen solution. They are not always appropriate, unless they are suitably qualified. The best responses are when candidates give evaluative comments on ideas and can make a reasoned judgement on the best solution or features to take forward for further development.

Most candidates included evidence of decision making to show the improvements or modifications to their idea. The majority of candidates identified and justified the materials and constructional methods that will be used.

Candidates are again advised to not include superficial development of features such as 'round off corners'.

Most proposed solutions were feasible and well presented; better solutions were also exciting and creative. Most included overall dimensions in their final proposal; candidates are expected to include dimensions, materials and possible finishes.

Some candidates produced valid evaluations of their proposal, describing the positive features, functional details and suggesting further modifications or improvements. Many candidates copied out their specification points and placed a tick to show whether the point has been satisfied or not. This is not sufficient.

Question 10

This question was generally well answered with a full range of responses. Some candidates interpreted the 'matching set' requirement as packaging and in some cases did not pay sufficient attention to the design of the individual items of jewellery.

Acceptable specification points included:

- the jewellery items must have a common theme or shape to be worn at the same time;
- the jewellery must be adjustable or able to accommodate different body sizes;
- the jewellery must be designed to be worn with comfort;
- the materials used must not react with human skin to cause irritation;
- the jewellery should be attractive in terms of shape, colour, pattern and texture for the identified target market.

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

A significant number of candidates did not take the opportunity to explore a creative and exciting range of possibilities. The exploration and development of ideas did not include as wide a range of production techniques as would be expected.

Final proposals were generally realistic with most including details of specific materials. The best responses included full details of appropriate dimensions and additional findings required.

Question 11

Some candidates were able to draw on their electronic and mechanical knowledge to propose effective solutions to this problem. A number of candidates focused on the door/ramp of the coop and did not consider the system required for automatic operation.

Acceptable specification points included:

- the system must not make excessive noise and disturb the chickens
- the system must lower the ramp steadily in a controlled manner to avoid damage
- the system must use a reliable and self contained power source
- the mechanisms and sensors used should be protected for use in the outdoor environment
- the system should be easily maintained by the owners

Many candidates produced functional proposals for some elements of the question e.g. the ramp and the locking/lowering method.

Some candidates explored the use of mechanisms such as gears and pulleys that could lower the ramp. The most successful ideas integrated the mechanisms and sensors for a fully automated system.

Question 12

Most candidates produced a range of feasible and realistic ideas. The very best responses explored a wider and more creative range of possibilities. Candidates need to explore more than one basic concept to achieve high marks. The analysis of most candidates tended to be generic with very few focusing on the specific task.

Acceptable specification points included:

- the storage method must protect the delicate items of the music system;
- the storage method must be stable in use to prevent accidental damage;
- the storage method could have a handle to make it portable
- the storage method must have clear areas for each component so that they are stored effectively and easily;
- the storage method must have a window so that components can be easily seen to see if items are missing.

Some candidates looked at basic concepts to enclose the items of the music system. The best responses looked at a wide range of methods of holding and storing the items securely. They included details of a range of appropriate specific materials and construction methods.

A number of candidates considered only one material: card. To achieve higher marks, different specific types of card and/or other appropriate materials should be considered. The development section was generally very good with many candidates giving details of appropriate construction methods, particularly when using card.

The evaluation of the final design solution was strongest on this question. Many candidates used the points of their specification to make judgements on the functionality of their proposal.

DESIGN AND TECHNOLOGY

Paper 9705/33
Written 2

Key messages

- Candidates should ensure that they divide their time appropriately between the different sections on this paper.
- Generic statements should be avoided in answers to questions concerning specific products.

General comments

Candidates were well prepared for this examination and there were very few rubric errors.

Most candidates used their time effectively in both sections of the paper. Some candidates answered ***Section A*** only.

The overall standard of candidate performance was good this year with some outstanding scripts.

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

Responses to ***Section B*** were good. It is clear that candidates are well prepared for this Section with virtually all candidates fully completing all of the requirements.

In ***Section A***, Part **A** was the most popular, followed by Part **C**. There were no attempts at questions in Part **B**.

Comments on specific questions

Section A

Part A – Product Design

Question 1

There was a wide range of responses to this question. The best responses were those that produced fully detailed descriptions, using clear sketching and annotation, of the two or three key stages of the manufacturing process chosen.

(a) Candidates who chose to describe the riveting of the handle to the wok generally gave fully detailed descriptions.

Many candidates correctly described the process of compression moulding; some did not include details of its primary use for thermosetting plastic products. Simple diagrams were used to describe the key features of the process.

There was a range of responses to the process of joining with a mortice and tenon joint. Some candidates produced fully detailed answers, but a number used a disproportionate number of stages for the marks awarded.

(b) Most candidates were able to explain correctly why the relevant process was suitable for the production of the items. Riveting, and joining with a mortice and tenon joint were explained fully by most candidates. Some candidates gave general reasons such as speed. The best responses were those that made reference to its appropriate use for thermosetting plastics, high-quality finish and minimal wastage of material.

Question 2

Most candidates gave appropriate materials and reasons for suitability.

Acrylic, aluminium and specific hard/softwoods were the most popular correct responses. Some candidates did not read the instruction to consider the frame only and made reference in parts **(a)** and **(b)** to the base.

Candidates correctly described a wide range of forming/ bending and assembly methods. The use of annotated sketching was very good on this question.

Most candidates gave details of jigs and templates that would be required to manufacture a batch of 500.

Question 3

The responses to this question were mostly fully detailed and included specific details of natural and kiln seasoning. Most candidates knew a range of manufactured boards and had a good understanding of the implications of using them in the manufacture of furniture.

Part B - Practical Technology

Question 4

There were no attempts at this question.

Question 5

There were no attempts at this question.

Question 6

There were no attempts at this question.

Part C – Graphic Products

Question 7

Responses were generally accurate, drawn in correct orthographic to the correct scale, with the proper use of associated conventions.

Question 8

There were a number of well answered responses to this question. Candidates selected and compared the one-off architectural card model with the batch of 20 000 presentation folders. They demonstrated a good understanding of the rationale and production methods used for the manufacture of the items. Most answers were full and well composed. Some candidates would have benefited from preparing a simple outline of their proposed response to ensure that all key points are addressed and that their answer is structured.

Question 9

There were some excellent responses to this question.

Candidates generally had a good grasp of the use of one-point perspective and produced accurate and fully detailed views of the kitchen.

Section B

There were some outstanding responses to this section of the paper. Presentation skills were generally of a very good standard and candidates showed their knowledge of appropriate materials and construction techniques. Many initial proposals were exciting, innovative and creative.

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

Most candidates achieved high marks for their analysis, producing scatter-charts or lists focused on the requirements of the given problem. Candidates went on to give justified and appropriate specification points.

Single word or generic statements, with no reference to the product do not receive a mark.

The exploration of ideas was generally very good. The majority of candidates produced a range of at least three discrete and different design ideas, many including the exploration of sub-problems e.g. a range of water collection methods for **Question 10**.

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

Most candidates produced an on-going evaluation of design ideas. Some candidates, however, did not give reasons for the selection of an idea/s for further development. It is important that candidates consider all points of the specification when designing.

The best responses are when candidates give evaluative comments on ideas and can make a reasoned judgement on the best solution or features to take forward for further development.

The development of the idea/s to a final solution was generally very good. Most candidates use annotated sketches to show improvements or modifications to their idea and make clear the materials and constructional methods that will be used.

Candidates who develop selected features, clearly showing their reasoning behind decisions will generally achieve higher marks.

Most proposed solutions were feasible and well presented; some were exceptional ideas with potential commercial possibility. Most included overall dimensions; in general, candidates need to give more detailed dimensions such as the section or thickness of materials used. For full marks in the detail section, candidates would be expected to include dimensions, materials and possible finishes.

Evaluations were generally very good. Many candidates described successful and unsuccessful elements of their design proposal and gave details of improvements or modifications.

Question 10

This question was generally well answered.

Acceptable specification points included:

- the product must be operated by a single person.
- the product must be constructed from weather resistant materials or materials that are suitably finished for outdoor use.
- the product must be designed to be able to go up and down steps as not all schools are at one level.
- The product must have an effective rainfall collection system that could be integrated in the design or connected to a downpipe from a roof.
- The product must reflect the spirit of the school, incorporating a logo or use school colours.

Most candidates generated a good range of ideas, some presented exciting, new and innovative solutions. Many responses had excellent, flowing design thinking; candidates were considering a range of possibilities for each of the specification points.

Final proposals were generally realistic with most including details of materials or important dimensions.

Question 11

Very few candidates attempted this question.

Question 12

There was a wide range of responses to this question. Most candidates produced exciting and innovative solutions, considering all of the requirements. Some would have benefited from exploring more than one basic concept for the packaging and producing more evidence for the logo and shop name. Some candidates did not respond to the requirement to take seedlings home in a combination of 4, 8 or 12.

Acceptable specification points included:

- the packaging must hold the seedlings securely to prevent damage
- the packaging must not react/degrade with water as the seedlings would need to be watered
- the packaging must have a comfortable handling/carrying system
- the packaging must be produced as flat pack for ease of storage and possible re-use
- the name and logo should be clear and easily printed on the packaging

Most candidates looked at simple card tray concepts, taking into consideration the need for simplicity and batch production. Some produced very inventive connection/handling systems that would enable 4, 8 and 12 combinations. A few candidates spent too much time on the name and logo for the Garden Shop and did not explore the functional packaging requirements in sufficient detail.

Some candidates do not give details of the types of card suitable for this type of application or show appropriate construction methods when using card.

DESIGN AND TECHNOLOGY

Paper 9705/04

Project 2

Key messages

- Successful candidates focus on the design need and brief throughout the analysis and research stages of their project rather than any preconceived idea of an outcome.
- 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.

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 theme, such as global issues or the environment, with candidates then being required to identify a design need or situation within this.

Many interesting topics were considered again this year and outcomes of either models or final products included: baby's cradle, can crusher, fruit picker, vehicle lifting device, teacher's desk, automatic car park barrier, bicycle storage system, crocodile trap, fish trap, wood fired boiler, solar water heater, wind generator, car crawler, solar powered fruit drier, car washing system, water borehole windlass, runner's starting block, bird transporter unit, solar turbine, coat hanger, portable drawing board, pencil sharpener, decorator's steps, water sprinkler system, cycle speakers, cycle mudguard, flagpole, portable shower, clothes drier, portable goalposts.

The majority of Centres presented work for moderation clearly labelled and with all documentation complete. It is helpful when the photographic evidence of either the model of final product is included at the appropriate stage of the design folder.

Comments on Individual Assessment Criteria

5. Product Development

Successful candidates included much 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. However, there was sometimes little evidence to indicate why these materials and methods had been chosen and how others 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 fulfilled successfully 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.

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, showing 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 award of high marks and candidates should be encouraged to evaluate critically with reasons and evidence to support their judgements.