DESIGN AND TECHNOLOGY

Paper 9705/01
Written 1

General Comments

The performance of candidates was very mixed and ranged from poor to very good. It was evident that in some cases candidates had only limited knowledge and understanding of the subject matter they had chosen to answer.

Time management proved to be a problem for some with a number of candidates failing to complete all parts of the question they had chosen to answer in ***Section C***.

A good number of candidates used too much paper when producing their answers in ***Section C***. One **side** of A3 plain paper should be used for each of the five **parts (a)** – **(e)**. It is **not** necessary to use **five separate** sheets of A3 plain paper. While candidates are not penalised for using more than the required three sheets of A3 paper it does increase handling problems.

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

Candidates must make sure that their answers are focused on the question being asked and that their responses are concise and display appropriate subject specific knowledge.

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

Question 1

This was the most popular question in this section of the paper and some excellent answers were seen.

In **part (a)** the majority of candidates named a suitable sheet material for making the bent part of the house number. The most common correct answers were acrylic and aluminium.

Suitable reasons for choice included the material could be easily bent, or in the case of acrylic and aluminium, required no surface finish. Fewer candidates than in previous years gave responses that were too general such as 'the material is readily available' or 'the material is easy to work'.

Part (b)(i) required candidates to use notes and sketches to describe how the numbers could be cut out and the edges of the sheet material finished and polished. Some candidates incorrectly spent time describing how the numbers would be marked out before going on to describe the required cutting out process. While almost all candidates showed at least some understanding of how the cutting out process could be carried out some of the methods suggested were not totally appropriate. For example, some candidates suggested that a knife or hot wire could be used to cut the letters from acrylic, while others suggested that an angle grinder could be used the cut the letters from metal sheet. These would not be the safest or most accurate ways to achieve the required shapes. A number of candidates failed to describe how holes would need to be drilled in the numbers before an appropriate cutting tool such as an abrafile or a scroll saw could be used to cut out the numbers. Most candidates correctly described, with varying degrees of success, how files and abrasive paper could be used to finish and polish the edges. Very few candidates mentioned the use of a buffing wheel.

The use of equipment such as a laser cutter was viewed as being perfectly acceptable if the process was **fully** described.

Part (b)(ii) was frequently well answered with the appropriate use of equipment such as a line bender (strip heater) and folding bars being correctly described. Some less appropriate processes were suggested, such as the use of naked flames and vacuum forming. It is important that the tools, equipment and processes used match both the material and the situation and are safe to use. Some important safety requirements, such as wearing protective gloves when using a line bender, were missing from some candidate's answers.

The use of screws was the most popular correct answer that was described by candidates in **part (b)(iii)**. A limited number of candidates suggested some very complex joining methods such as making grooves in the wood for the bent section to slot into. Many of these methods would not hold the two parts securely together. Again, the inappropriate use of tools was in evidence. One of the more common errors was to suggest that a centre punch could be used on acrylic to mark the position of a hole prior to drilling.

Question 2

This was the least popular question in this section of the paper with only a very limited number of candidates choosing to answer it. In general the question was not well answered.

In **part (a)** most candidates were able to name a suitable metal, such as mild steel, from which the gate latch could me made. A high percentage then went on to give an appropriate reason for their choice, such as the metal would be strong enough to withstand the constant opening and closing of the latch.

In **part (b)(i)** a good number of candidates suggested that inappropriate tools such as tin snips, bench shears and angle grinders could be used to cut out part **A**. Tools of the type mentioned would not give the degree of accuracy required and in the case of the angle grinder would be potentially dangerous. While some candidates described how files and abrasive paper could be used to finish and polish the edges of the metal many failed to give any answer to this requirement of the question.

Part (b)(ii) was very poorly answered with very few candidates being able to display any real knowledge or understanding about how a jig could be used to bend part **B**. Most gained only very limited credit for suggesting that the bends could be made in a vice or by using bending bars.

A few good answers were seen to **part (d)** of the question. In these answers candidates correctly described how threads could be made on part **C** and/or part **D** to join the two parts in a semi permanent way. Where candidates identified an appropriate process to join the two parts they were frequently able to describe how the correct tools would be used to cut the required threads.

Question 3

While a reasonable number of candidates attempted this question far fewer were able to display the required levels of knowledge and understanding about the content of some parts of the question to gain high marks. This highlights the importance of reading all parts of a question and a candidate being reasonably sure that they can answer the majority of the question before starting to answer it.

In **part (a)** only a limited number of candidates were able to demonstrate any knowledge about different types of card and why they would be suitable for the given situation. Corrugated card was one of the more suitable types of card suggested by candidates as it would be strong enough to support the weight of the magazines put into the storage box.

For most candidates **part (b)** was the part of the question that they answered best. But even this relatively straight forward development proved too difficult for some. Common errors were failing to include the hole in the front surface of the box and missing out the back or the base of the box.

In **part (c)(i)** most candidates correctly showed some form of slot and tab fixing or suggested the use of Velcro. A few incorrectly stated that the box could be glued together. Some of the tabs that were drawn would not 'lock' into the slots which would result in the box coming apart when magazines were placed inside it. Only a limited number of candidates explained how the fixing method they had shown would work or how it would be made.

Part (c)(ii) was, in general, very poorly answered. Few candidates were able to demonstrate any technical knowledge and understanding about how CAM could be used to cut out the required development. Most responses made little use of sketches and generally little or no reference was made to the specific equipment and processes that would be involved in carrying out the task in a School based situation.

Section B

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

The major weakness in many answers related to the poor levels of 'discussion' that took place in candidates' responses.

Future candidates would be well advised to structure their answers around the instructions given in the questions.

Candidates need to identify relevant issues, discuss why they are important and be able to support their arguments 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 to **part (d)** of the questions with a frequent error being to give the same information two or three times using slightly different words.

Question 4

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

Part (a) of the question was generally answered very well. The majority of candidates were able to explain that the rails stopped the legs from splaying out as a result of the weight of the person sitting on the stool. Credit was also given if a candidate explained that they acted as a 'foot rest'.

In **part (b)** a high percentage of candidates were able to identify at least one problem associated with using a ferrous metal outside. Problems needed to be distinctly different and related to factors such as corrosion and the material getting hot in the sun. Unfortunately, some candidates described the same problem twice using slightly different words while others described problems with the design of the stool rather than the material used in its manufacture.

A number of the responses seen in **part (c)** lacked the depth of explanation required to gain high marks. Brief answers such as 'The stool could be painted' were frequently seen. Answers must explain 'how' and 'why' this would solve the problem identified. It is perfectly acceptable to use sketches to aid the explanations and many of the better answers made use of this method of communication.

When it came to answering **part (d)** many candidates failed to make use of the structure given in the question and frequently failed to fully meet the requirements of the question. Some candidates did little more than describe the three stools.

In **part (i)** the better answers analysed the given situation and identified issues such as the stool had to be used outside and it had to be suitable for using on different surfaces. These answers went on to explain why these issues were relevant in **part (ii)** and discuss how well, or badly, the three given designs would function when evaluated against these issues before making a justified choice about which would be the most suitable design to use in **part (iii)**.

Statements such as, 'it would fall over' or 'it would sink in the sand' must be justified in order to gain high marks. More use needs to be made of words like 'because', for example 'it would fall over because'.

Question 5

In **part (a)** many candidates gained one of the two marks available by identifying that the feature joined the product together but fewer gained the second mark by going on to explain how the feature worked or that it enabled the product to be flat packed

In **part (b)** a good number of candidates were able to identify two problems with the given design. These were generally linked to the product being difficult to carry, the bottle falling out of the ends or the packaging

not being strong enough to hold the weight of the bottle. To gain both marks the problem must be described. For example, 'The bottle would fall out (would be enough to gain the first mark) because …….' (this is where the second mark could be gained).

Answers to **part (c)** were often too short or simplistic to gain full marks. While candidates frequently identified appropriate solutions fewer offered full explanations as to how these could be achieved. The better answers made effective use of sketches when describing solutions to the problems they had identified.

Part (d) of the question was frequently poorly answered with a good number of candidates failing to focus their responses around the requirements of the question. In these cases candidates tended to give lots of general information about recycling rather than structuring their answers on how manufacturers and retailers address the issues associated with the disposal of packaging.

Candidates needed to analyse the situation and identify issues such as manufacturers designing packaging that uses less packaging, both manufacturers and retailers providing more information about the recycling, reuse and safe disposal of packaging as well as providing more recycling facilities. Discussion then needed to take place to explain when these issues were important. This needed to lead onto justified conclusions about the effectiveness of what manufactures and retailers are doing to address the problem and possibly suggesting further improvements that could be made.

In a few cases it would appear that candidates had misread the word 'dispose' as 'display'.

In questions of this type candidates need to make better use of the structure that they are given in the question.

Question 6

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

Part (a) of the question was reasonably well answered with a good number of candidates gaining one mark for stating that the feature gave the bracket additional strength/support. Fewer candidates gained the second mark by explaining how this additional strength/support stopped the horizontal part of the bracket bending when weight was put on it.

In **part (b)** the majority of candidates were able to describe at least one problem that would occur with wooden shelves when they were full of books. Generally such problems related to the shelf bending or breaking. Other appropriate problems linked to the method of joining the shelf to the vertical sides or the shelf falling off the end supports. Some candidates identified the same problem twice using slightly different words. As with other questions in this section some candidates did not gain the second mark for each of the problems because they 'stated' the problem rather than 'describing' it. Statements such as 'The shelf would bend' need to be followed by a description of how and/or why the bending occurs in order to gain both available marks.

Most candidates in **part (c)** were able, at least in part, to explain how the problems they had identified in **part (b)** could be overcome. However, in common with other questions in this section, the explanations sometimes lacked the required depth to gain high marks. While many candidates stated that the problems could be overcome by increasing the thickness, or by providing more or better supports, fewer explained how and/or why these changes would overcome the problems. Explanations must include reasons and justifications.

In general **part (d)** was poorly answered with some candidates displaying little or no knowledge and understanding about the merits of testing designs and materials before manufacturing a product.

In **part (i)** candidates needed to analyse the situation and identify issues related to factors such as 'What needs to be tested?', 'How could it be tested', and 'How would testing help?'

Candidates needed to explain and justify their choices in **part (ii)**. For example, 'It is important to test public opinion about the design of a proposed new product to see if they like it and if they would be prepared to buy it'.

In **part (iii)** the ways in which testing can highlight potential problems and lead to improvements being made in areas such as the appearance of a product, its safety, the sales of a product and the lifetime of a product

needed to be explained and discussed. Arguments and/or conclusions must be supported using specific examples and/or evidence.

Part (iii) must be based around, and make reference to, the issues identified and justified in **parts (i)** and **(ii)**.

Section C

The quality and quantity of work produced in this section was very mixed. While some excellent design work and presentation drawings were seen there were some fundamental errors in the way that some candidates responded to the requirements of the questions in this section.

Common errors were to present only one design idea or to produce several drawings that gave the same information but in a different form. For example both a 2D and 3D view showing exactly the same design idea.

Ideas were frequently not evaluated in a meaningful way. Candidates should use quick, free flowing sketches to produce around three distinctly different ideas for all or part of the product that they are designing in each part of the question. These should be evaluated, developed and design decisions made.

Some candidates, unnecessarily, spent a long time producing very 'neat' drawings or explaining stage by stage how a design would be made. While basic details about materials and construction are required candidates do not have to explain the whole production process.

In **part (e)** a good number of candidates failed to render their drawings. A good deal of inappropriate 'colouring in' was seen. It should be remembered that rendering requires candidates to use colour, shading and texture to enhance the three dimensional appearance of a drawing and to represent the materials from which the product is made.

Poor time management was an issue with some candidates. They spent too long on the earlier parts of the question leaving them with insufficient time to complete the whole question. Errors of this type severely restrict the number of marks available to some candidates.

Question 7

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

Part (a) of the question was generally well answered with many candidates developing workable designs for attaching the wheels to the trolley. The more common solutions showed a thread cut on the end of the axle with either locking nuts preventing the wheel coming off or a hole in the axle with a split or cotter pin through it to keep the wheel in place. Some solutions failed to take into account the need for some form of shoulder on the axle to prevent too much movement of the wheel along the axle. A few candidates incorrectly suggested that permanent methods such as welding could be used to join the wheel to the axle.

While in **part (b)** many candidates realised that the trolley would need to be cut into two parts a good number of the solutions produced did not rejoin the parts securely together. In these cases candidates generally used two springs (or something similar to join the two parts). The better answers showed the development of a design which included some form of hinge mechanism together with a system that would lock the bottom section of the trolley in both an open and closed position.

A good number of excellent design solutions were seen in **part (c)**. Some of the best solutions showed telescopic systems that incorporated a locking system which enabled the sides to extend and retract so that the handle could be fixed at different heights. This is an example of where candidates could focus part of their design work on just part of the product, i.e. the locking system, rather than on the whole product.

In **part (d)** some candidates tried to produce over complex designs that would have been expensive to produce and difficult to use. These designs frequently consisted of one large bin into which various smaller bins could be placed. The better solutions were those where a candidate had developed a design based on the use of either an elasticated cord or an adjustable belt. Some candidates failed to show how their proposed design would be attached to the trolley.

A good number of excellent drawings were seen in **part (e)**. However, a few candidates just traced the drawing given on the question sheet and some produced 2D rather than pictorial drawings. In some cases

rendering was not attempted or poorly done. Candidates need to be aware of the difference between 'rendering' and 'colouring in'.

Question 8

Part (a) required candidates to consider three factors when producing their solutions to this part of the question. Where the rotating discs would be positioned, how the discs would be attached to the calendar and how the dates could be seen on the front of the calendar. It was rare to see solutions where candidates had taken all of these factors into account. Some of the methods for fixing the discs to the calendar were inappropriate. These included cylinders of paper, pins and pockets for the discs to go into. Other methods such as nuts, bolts and screws were more suitable for using with metal and wood rather than card. Appropriate joining methods included eyelets and paper fasteners (like split pins). The positions that some of the discs were placed in would have made them very hard to rotate.

In **part (b)** some of the proposed designs for the pen and pencil holder were unnecessarily complex and would have been difficult to make and possibly hard to use. Designs often lacked details about how they would be attached to the calendar. In a number of cases the suggested design would not have held the pens and pencils securely are would easily have become detached from the calendar. While a good number of designs featured slot and tab fixings many of the tabs shown would not lock into place when pushed into the slot.

While in **part (c)** almost all candidates showed some form of support most of the designs were not totally appropriate. Common errors were failing to consider that the support needed to allow the calendar to slop backwards to prevent it falling over, not showing how the support would be attached to the calendar or how it would lock in place when opened.

While in **part (d)** some good lettering designs were in evidence some of the styles seen were, perhaps, more suitable for use in 'street art' rather than on a company's promotional calendar. Often little consideration seemed to have been given to the proportion, consistent size and suitability of the style of lettering produced. In some cases the lettering lacked the formality required to make it suitable for the given situation. A number of candidates incorrectly just used the initials GCD in their designs, rather than the company's full name.

Many of the answers seen to **part (e)** were disappointing. A lot of the drawings produced, while pictorial, were not exploded and sometimes did not show all of the features that the candidate had designed. A number of 2D views were also seen. A good deal of inappropriate colour work was in evidence. Few candidates made any real attempt to use variations in tone to enhance the 3D appearance of their drawing.

Question 9

This was the least popular of the questions in this section of the paper and was answered by only a limited number of candidates.

In **part (a)** the majority of candidates correctly based their designs around a bevel gear mechanism. The better solutions showed the principle of bevel gears being used in a simplified design that used two circular discs with pegs evenly spaced around their circumferences. A vertical disc was fixed to the horizontal bar and a horizontal disc to the person. A common error was failing to show how the mechanism would be attached to the bar and the person.

The better answers to **part (b)** were those that used either a crank or a cam to achieve the required movement of the dog's tail. While a good number of candidates based their designs on one of these types of mechanisms some had little or no understanding, about how to make the tail move up and down. As with **part (a)** a common error was failing to show how the mechanism would be attached to other parts of the design. For example the cam follower was often left floating in mid air.

Surprisingly, **part (c)** of the question was poorly answered by the majority of candidates. Most designs were appropriately based on a rectangular box but frequently lacked details about how the box would be constructed or how the front and back of the box would be attached.

Part (d) was reasonably well answered with most candidates considering ergonomic factors when designing the operating handle. The better solutions incorporated a crank on the end of the bar, gave details about how the handle would be attached to the bar and showed a feature that would prevent the bar being pulled out of the box.

The quality of the drawings produced in **part (e)** was variable with only a limited number of high quality appropriately rendered illustrations being seen. In some cases candidates had chosen to draw their final designs in a way that failed to show all of the features they had designed. This particularly applied to the mechanisms.

DESIGN AND TECHNOLOGY

Paper 9705/02

Project 1

General comments

There is obviously a variety of acceptable approaches to the way that Centres introduce this important part of the Design and Technology course to their candidates. Some set a common theme or topic and others encourage their candidates to identify their own design problem. In any event outcomes resulted from a wide variety of design problems and it was obvious that many candidates had developed a keen interest in the area being studied. In addition to the usual range of household items and furniture, interesting outcomes included: powder packing machine; baby incubator; electric guitar; motor cycle lifter; car roof rack fixtures; camping trailer; cycle clothing; cycle handlebars; beach tent; bunk bed; golf aid; fruit picker; tree house; privacy screen; can crusher; water purifier; go cart; hammock; falcon pen and interesting architectural models as diverse as a pet cemetery and a prison.

The Moderator would like to thank Centres for encouraging their candidates to present design folders neatly and in such an order that the design process can be followed. Centres are reminded of the need to include clear photographic evidence of Models made for Project 1 and the Product Realisation for Project 2.

Comments on Individual Assessment Criteria

1. Identification of a Need or Opportunity leading to a Design Brief

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

2. Analysis of and Research into the Design Brief which results in a Specification

Most candidates considered a wide range of existing products and commented on these in relation to their own design brief. However, some failed to analyse the actual design problem to assist in their identification and collection of relevant data. This is a very important aspect of this stage of a design process as it provides information on which an accurate Specification can be formulated.

The Moderator is forced to repeat a comment that has been made so many times before. Some Centres continue to allow their candidates to include vast amounts of information on materials, constructions, finishes and fittings, in this section, before any design ideas have been considered. Inclusion of this type of material together with, for example, historical records of the area being studied cannot be awarded any marks.

3. Generation and Appraisal of Design Ideas

It was pleasing to see that so many candidates for this examination showed a high degree of flair in the creation of ideas and this is to be applauded. However, others presented a range of drawings not linked to the Specification or even commented on regarding their possible suitability for the problem being considered.

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

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

4. Modelling of Ideas

Modelling should be seen as one stage of the consideration, allowing testing and evaluation of design ideas so that a final design can be presented and subsequently developed. Some candidates produced high quality and meaningful models that formed part of this process whereas others simply produced a mock up of the chosen design idea and it was difficult to identify the reason for its inclusion.

The Moderator was pleased to see that more candidates are modelling different aspects of their design ideas and using these to test for suitability and practicality in the production of a solution to their design problem. In this way the modelling stage plays a more meaningful part in the design process.

DESIGN AND TECHNOLOGY

Paper 9705/03
Written 2

General comments

Centres are again to be congratulated on their prompt and accurate administration of scripts.

It is pleasing to see that Centres continue to act upon the advice given in reports and this year there have been improvements in the effective use of time of candidates and in specific areas of ***Section B***.

Rubric errors are very low although a number of candidates only answered one question from ***Section A***.

The quality and use of appropriate sketching and annotation was generally good throughout the paper. Candidates described in detail the stages of particular processes, and used appropriate annotated diagrams to support their answers to questions in ***Section A***.

Some candidates are using in ***Section B*** the design skills they have demonstrated previously on the new 9705/01 paper, generating free flowing sketch ideas to propose different ideas for whole and part solutions.

In ***Section A***, part **A** was again the most popular option with **Questions 1** and **2** the most popular. There was an even spread of responses in part **B** and **Questions 7** and **8** were the most popular in part **C**.

In ***Section B***, **Question 10** was marginally the most popular. Very few candidates attempted **Question 11**.

It would be helpful if this report is read in conjunction with a question paper and mark scheme.

Comments on specific questions

Section A

Part A – Product Design

Question 1

Many candidates answered this question in detail. Most candidates selected the injection moulded identification tab and the laminated wine rack shelf.

Part **(a)** was answered very well, with the majority of candidates making excellent use of notes and sketches to describe the manufacturing process. Some, however, took over 4 pages to present their answer, which is too much for only 7 marks.

Part **(b)** was generally not so well answered. Candidates, in general, did not refer to why the process was suitable for the given item.

Identification tab. The injection moulding process was described in detail, only a few candidates produced specific details of the split mould required.

Fishing lure body. Only a few candidates attempted to describe the die casting process, most were very successful. Some candidates incorrectly described a sand casting process.

Wine rack shelf. Most candidates correctly described the process including use of an odd number of laminates or veneers, which are glued and clamped together in a shaped former. The veneers would usually be 1.5 mm thick or less and can be bent without the need for steaming.

Question 2

This was the most popular question. Many answers were fully detailed and a number of candidates achieved very high marks. Most candidates gave an appropriate, specific material and proposed valid reasons for choice.

Part **(b)** was answered very well although some methods of joining the sides to the back when wood was used were not appropriate. A joint would be far more preferable than nails.

Most candidates gave full details of appropriate finish (if required)

Part **(c)** was generally not well answered. The question requires candidates to explain changes in the design, manufacturing method used and material selected if 100 holders were used. Many candidates spent far longer on part **(b)** (8 marks) than on part **(c)** (9 marks)

Injection moulding would be more appropriate for 1000+ holders but candidates who explained the necessary changes in design and material and who described the mould required received credit.

Question 3

This was the least popular question in part **(a)**. Most candidates could explain when and why a designer would use computer modelling, 3D mock-ups and a scaled prototype. 2D modelling usually involves the use of card to model simple linkages or mechanisms or to produce different profiles / templates of shapes.

Many candidates did not give examples of the use of models.

Part B - Practical Technology

Question 4

There were a number of excellent answers to this question. Many candidates correctly described how the motions could be achieved, the most common being **(a)** bevel gears, **(b)** cam, **(c)** linkage system, **(d)** snail cam.

Some candidates were unable to state the name of the motion produced **(a)** rotary, **(b)** reciprocating, **(c)** oscillating, **(d)** reciprocating (or linear)

Question 5

Very few candidates attempted this question. Many were able to give an example of use and a specific adhesive for the materials given. The most common correct responses were:

Wood to wood – PVA or Cascamite
Metal to metal – Epoxy resin
Plastic to Plastic – Tensol cement for acrylic
Plastic to wood – impact adhesive.
Processes and safety precautions were generally well described.

Question 6

Toughness, was correctly defined by most candidates as the ability to resist sudden impact,

Many candidates, correctly defined ductility as the ability to be drawn into wire.

Correct materials and product applications included:

Toughness – ABS or polypropylene for telephone handsets and vacuum cleaners
Tempered high carbon steel for hammer heads (medium carbon steel is the toughest steel)
Ductility – Copper for electric wires
– Aluminium for small diameter cables and wires

Only a few candidates described an impact testing system to compare the toughness of materials. Most candidates produced outlines of hardness tests.

Most candidates answered part **(b)** very well. They introduced up to three issues relating to cost, aesthetic and physical properties, explained the issues well and included at least one piece of supporting evidence.

Part C – Graphic Products

Question 7

A popular question, almost all candidates were able to produce a correct planometric view of the room. A number of candidates produced isometric drawings, which did meet the requirements of the question. The best answers were to an appropriate scale, each feature detailed, and drawn to a very high standard.

Question 8

A few candidates produced fully detailed responses to this question. They demonstrated a good understanding of the geometrical concepts involved and answered every part of the question. A significant number of candidates attempted this question with no knowledge of how to create a full elevation or produce accurate and detailed developments of the head and handle.

Question 9

This was the least popular question in part **C**. The best responses demonstrated a clear understanding of loci and were presented as clear and easily understood outlines. Some produced sketches showing the step by step stages but did not include any explanatory commentary.

Section B

This Section was answered well by the vast majority of candidates. Candidates are using their time far more effectively although a number of candidates did not fully complete a detailed final proposal. Some did not leave time to evaluate their final proposal.

All candidates prepared their answers on A3 paper as instructed.

Communication is particularly impressive in the exploration and development sections.

Although most candidates analyse the problem fully, a significant number produced generic scatter-charts with little or no specific relevance to the problem.

For the specification, too many candidates repeat the details given in the question rather than develop focused design requirements.

A number of candidates produce a brief, which is not necessary.

Most candidates were able to produce a list of at least 5 justified specification points.

Each question provides initial specification points or data. Candidates are expected to produce a list of five other points. No marks are awarded for repeating given data. Generic terms such as ‘must be safe’ did not gain a mark.

A quick test for candidates would be to read their analysis and specification and see if they can tell what the product is.

The annotation of the exploration of ideas has improved significantly. Most candidates produce a range of at least three different full design ideas. More candidates are beginning to break the problem down and look at different design ideas for particular features, such as, different step systems and different assembly methods for **Question 10**.

Most candidates made reference to specific materials, a number only referred to one material, often a generic term such as wood. It is recommended that candidates show their understanding of the appropriate use of a wider range (at least three) of appropriate materials.

The selection of ideas for further development is generally good, however some candidates still use a tick list only to select an idea. The higher marks are achieved when candidates give evaluative comments on ideas.

Candidates made good use of the supporting information e.g. anthropometric data, to make decisions on the size of key features such as the height of the stand in **Question 12** and step height in **Question 10**.

The development of ideas, where candidates develop selected features, clearly showing their reasoning behind decisions, continues to improve. Most candidates comment on the changes and modifications needed for the development of a complete solution. Some candidates focus solely on the production of a lengthy step-by-step procedure for manufacture and miss out on the top band of marks for this section.

Proposed solutions were mostly feasible and well presented. The majority of candidates included key dimensions. A number of candidates however, do not support their final drawing with any other details such as key dimensions, materials, possible finishes and miss out on the 5 marks available.

Some candidates fully evaluated their final proposal in terms of fitness for purpose, stating successful features and suggesting improvements or modifications. A large number of candidates provide a table for evaluation, using tick lists against specification points. In most cases this does not give a clear appraisal of the final product.

Question 10

Generally well answered with some outstanding responses to this question.

Acceptable specification points included:

- must be built out of materials that will withstand all weather conditions as the product will be used outdoors;
- must have supports/hand rails to help children climb the equipment without falling;
- must have a safe/soft area at the bottom of the slide to prevent injury;
- must be securely assembled so that the structure does not become unstable;
- must be brightly coloured and/or include interesting shapes to encourage children to want to use the equipment.

Candidates generated a range of different ideas, some were very exciting and innovative.

Final proposals were generally realistic but often lacked any details of materials or important dimensions.

Question 11

Very few candidates attempted this question. Specifications were generally weak, repeating the points given in the question.

Acceptable specification points included:

- must be very easy to operate as the child may have to switch the unit on in the dark;
- must be stable to avoid be easily knocked off a surface;
- must provide sufficient light to make a child feel comfortable but not too bright to keep the child awake;
- must be easy to change the battery when it runs out;
- must have no sharp corners or parts of the night-light that could trap fingers as it will be operated by a young child.

Some of the responses focused on the design of basic shapes for the night-light container and lacked any specific details of the basic electronic components required to make the product function.

Question 12

A popular question, generally well answered.

Many candidates repeated the requirements of the stand and did not include any other specification points.

Acceptable specification points included:

- the stand must be stable in use to avoid being knocked over easily;
- the stand must hold the sunglasses firmly so that they do not fall from the stand and get damaged;

- the stand must be able to rotate so that customers can easily access the full range of sunglasses;
- the stand must be able to be easily cleaned so that dust or grease cannot get onto the sunglasses;
- the design for Ray Shades must use colours and text styles that would appeal to the teenage/young adult market.

Whilst some of the responses were of a very high quality, showing a range of innovative possibilities, a significant number of candidates produced only a minimal range of very basic ideas.

Most candidates considered the required features such as mirror and brand name and produced ideas for an appropriate stand. Many did not fully consider how the sunglasses would be held on the stand.

A number of candidates did not give sufficient detail of materials and construction methods.

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Project 2

5. Product Development

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

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

In some projects it is not clear why selections have been made and there is often a big gap between the chosen design idea and the final product made. Once these decisions have been made, the final part of the development should include details of the final solution, mainly in the form of drawings, from which a skilled person could make the product.

6. Product Planning

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

Candidates are not required to include photographic evidence of all stages of manufacture, as this is taking place, although photographs can be helpful when highlighting certain aspects of the manufacturing process.

7. Product Realisation

It is always a pleasure to see that many candidates have produced high quality products that could clearly be put to their intended use. Candidates should be congratulated on the care and enthusiasm put into the making of their design outcomes in terms of construction methods and finishing techniques and it is reassuring to see that there are many well developed practical skills being applied.

Centres are reminded of the need to include clear and detailed photographic evidence of made products in line with the guidance set out in the syllabus document. Many candidates include photographs of the product in use and this is helpful to the Moderator.

8. Testing and Evaluation

The Moderator is pleased to report that many more candidates are carrying out meaningful testing and evaluation. This can only be achieved if the product is put to the use intended and the results compared to the original design specification. It is always helpful when candidates include photographs of the product being tested in this way.

Unfortunately, some candidates still see the completion of questionnaires and the unqualified views of others as the only evidence required. This type of data is only of any use where the results can be compared to the intended use of the product and some form of qualified judgement made and recorded.