

DESIGN AND TECHNOLOGY

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

Key messages

- It is important that candidates select the most appropriate material for the modelling of ideas at the end of **Project 1**. The model should then be produced to a high standard with attention to detail so that all aspects of the proposed design idea can be shown.
- Product Development at the beginning of **Project 2** sets out the direction in which the proposed idea will be developed and realised. It is important that this section includes clear evidence of appropriate testing and trialling resulting in reasoned decisions about form, materials and production methods.

General comments

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

Many interesting design problems were considered with successful and useful outcomes of either models, prototypes or final products including: automatic chicken feeder; collapsible rubbish bin; portable solar energy food heater; hammock; medication storage unit; playhouse; umbrella holder; smart phone docking station; cat house; water bucket cart; rain gauge; laundry cart; Bluetooth headphones; projector stand; gas cylinder carrier; white board stand; rubbish compressor; portable water heater; lectern; desk phone charger; multi-purpose sports equipment; manual can crusher; car design; puppy play pen; plastic cup holder; earphone storage; cable organiser; water level sentinel; insulated food delivery container; rucksack; model train station; recycling unit; tie storage and potato cutter.

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

Work was presented clearly labelled and with all documentation complete. It is helpful when the photographic evidence of modelling and realised outcomes is included at the appropriate stage of the design folder, at the end of **Project 1** for the model and at the end of **Project 2** for the final product.

Comments on specific tasks

Project 1

Task 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).

Task 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 specific points and details provided more help when using the specification to evaluate a product at a later stage.

Task 3: Generation and Appraisal of Design Ideas

Candidates offered a wide range of ideas and a high standard of communication techniques was 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 on-going fashion so that other ideas could develop and be drawn together to form the final design solution.

Task 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 9705/04
Project 2

Key messages

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- Product Development at the beginning of **Project 2** sets out the direction in which the proposed idea will be developed and realised. It is important that this section includes clear evidence of appropriate testing and trialling resulting in reasoned decisions about form, materials and production methods.

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

Many interesting design problems were considered with successful and useful outcomes of either models, prototypes or final products including: automatic chicken feeder; collapsible rubbish bin; portable solar energy food heater; hammock; medication storage unit; playhouse; umbrella holder; smart phone docking station; cat house; water bucket cart; rain gauge; laundry cart; Bluetooth headphones; projector stand; gas cylinder carrier; white board stand; rubbish compressor; portable water heater; lectern; desk phone charger; multi-purpose sports equipment; manual can crusher; car design; puppy play pen; plastic cup holder; earphone storage; cable organiser; water level sentinel; insulated food delivery container; rucksack; model train station; recycling unit; tie storage and potato cutter.

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

Work was presented clearly labelled and with all documentation complete. It is helpful when the photographic evidence of modelling and realised outcomes is included at the appropriate stage of the design folder, at the end of **Project 1** for the model and at the end of **Project 2** for the final product.

Comments on specific tasks

Project 2

Task 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. Candidates could improve by providing 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.

Task 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.

Task 7: Product Realisation

The made product forms the culmination and realisation of many hours of detailed design work for most candidates. 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.

Task 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.

Some candidates 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. In order to obtain higher marks, candidates should be encouraged to evaluate critically with reasons and evidence to support their judgements.

DESIGN AND TECHNOLOGY

Paper 9705/11
Written 1

Key messages

Within **Sections A** and **B** where candidates have been well prepared they have been able to access the material. Process knowledge is good. Teachers need to ensure that the specification receives full coverage through the scheme of work that they plan and use to deliver the material.

General comments

Candidates in the main found the three questions accessible with numerous outstanding answers. It is important that in preparation for **Section C** centres reiterate that the terms 'develop' and 'range' mean that the candidates in their care should be offering several different ideas, which they then evaluate allowing further development into a final proposal for each part of the question.

Comments on specific questions

Section A

Question 1

- (a) Candidates often confused blockboard, plywood and MDF – they did however understand that the construction had layers of material.
- (b) (i) Candidates were able to take a large piece of blockboard and systematically take it through marking out, cutting, shaping and smoothing. Some very detailed answers were provided with good safety precautions included.
 - (ii) Where candidates understood the use of knock-down fittings, they answered with lots of detail.
- (c) (i) Candidates were able to communicate the shape of part C very well.
 - (ii) Candidates were able to clearly show the outer shape of part D but occasionally did not add in slots.

Question 2

- (a) Good understanding demonstrated by candidates with some good and detailed sketches to support the answer.
- (b) (i) Candidates could clearly demonstrate the outer shape of part A as well as the three slots being correctly positioned.
 - (ii) The outer shape and the nine folds were clearly shown by many candidates, although they often did not show the six slots that would be needed to allow the two parts to be joined together.
- (c) CAM was understood and often extended into CAD. Some candidates understated the link between the two and the benefits that it would bring to the making of the table.

Question 3

This was a very popular question.

- (a) Very few candidates answered both parts of this question correctly. Plastic often not named.
- (b) Significant amount of detail included for all the responses to **part (b)**.
 - (i) Some quite unusual methods of construction for the mould but generally good awareness of safety precautions.
 - (ii) Candidates answered with step by step information on the process of vacuum forming and clearly understood it.
 - (iii) Candidates understood how hinges work and the process of attaching them but often did not offer any marking out techniques or link the success of the hinged joint to the accuracy of setting up the two halves to be drilled.

Section B

Question 4

Candidates often chose to answer this question.

- (a) Candidates often did not understand the purpose of the component X. However when they did, the answers were detailed and clear.
- (b) Candidates were very successful in identifying that there was a lack of personal protective safety wear and that the plank being cut was unsupported.
- (c) Where candidates understood the problems, the changes stated were good, with some very detailed responses; clamping the board and protective eye-wear being popular responses.
- (d) Generally well answered. Candidates had good awareness of safety issues of corded power tools on construction sites as well as understanding that battery life has improved.

Question 5

This was a popular question.

- (a) Most candidates understood the question and answered accurately.
- (b) This part question was answered well. Problems were identified and clearly explained.
- (c) Well prepared candidates answered well and in the majority of cases, they scored well.
- (d) Candidates did not always fully understand the question and there were a wide range of answers. Explanations were occasionally clear, but for non-relevant issues. Examples were very rare.

Question 6

This was a very popular question.

- (a) Candidates often linked flexibility and the use of the lamination process to increase strength and offer different shapes that did not include a traditional joint.
- (b) Generally answered well. Problems were identified and clearly explained.
- (c) Well prepared candidates answered well and in the majority of cases, they scored well.
- (d) Candidates often answered well and linked several areas of user interaction with modelling, material choices, manufacturing decision-making and ergonomic and aesthetic testing. Overall, this question was very well answered.

Section C

Some outstanding work was seen in this section.

Question 7

- (a) Mostly well-structured answers showing a range of ideas, occasionally limited development and a variety of methods of evaluation. Final solution generally identified and with good detail.
- (b) As above.
- (c) As above.
- (d) Generally well answered with a variety of rendering styles and quality. Many candidates did not apply any render at all. However, some very detailed Isometric views were provided.

Question 8

- (a) Generally well answered. Most candidates produced a range of ideas to display the watch. Typically three ideas were produced and a simple sketch showing some development. Evaluation ranged from tick and crosses through to excellent annotation of positive and negative points.
- (b) Candidates offered a good range and were at ease showing the development net in 2D as well as a 3D image, which was helpful.
- (c) There were some outstanding graphical styles representing the name but others were more basic. There was some impressive use of symbols and equipment to enhance the text.
- (d) This part question was generally answered well with a variety of rendering styles and quality. Many candidates did not apply any render at all. However, some very detailed Isometric views were provided.

Question 9

Very few candidates answered this question.

- (a) Mostly well-structured answers showing a range of ideas, occasionally limited development and a variety of methods of evaluation. Final solution generally identified and with good detail.
- (b) As above.
- (c) As above with some very interesting ideas for different styles of litter bin.
- (d) Generally well answered with a variety of rendering styles and quality. Many candidates did not apply any render at all. However some very detailed Isometric views were provided.

DESIGN AND TECHNOLOGY

Paper 9705/12
Written 1

Key messages

Within **Sections A** and **B** where candidates have been well prepared they have been able to access the material. Process knowledge is good. Teachers need to ensure that the specification receives full coverage through the scheme of work that they plan and use to deliver the material.

General comments

Candidates in the main found the three questions accessible with numerous outstanding answers. It is important that centres reiterate that the terms 'develop' and 'range' mean that the candidates in their care should be offering several different ideas, which they then evaluate allowing further development into a final proposal for each part of the question.

Comments on specific questions

Section A

Question 1

- (a) Generally well answered.
- (b)(i) Some candidates needed to improve on their understanding of what a pattern is and its importance in the process.
 - (ii) The casting process was generally well explained with some very detailed responses.
 - (iii) Very few candidates included the use of a tapping drill. Most candidates had a good understanding and awareness of health and safety issues.

Question 2

- (a) Good understanding demonstrated.
- (b)(i) Candidates often explained how to produce the lettering onto the card but not all included the printing process that was required.
 - (ii) Making the slots was well answered but very few candidates explained the use of templates.
 - (iii) Lots of very good answers with connectors well covered.
 - (iv) The linkage was generally explained clearly with a good amount of detail.

Question 3

Many candidates selected this question.

- (a) Very few candidates answered both parts of (a) correctly but lots of subject expertise shown within either of the two components.
- (b) A significant amount of detail was included for all the responses to part (b). There were some quite unusual methods of construction, but generally there was good awareness of health and safety.
- (iii) This part question proved to be a more difficult component to manufacture. No candidates used a mortice machine. Many candidates used jigsaws and routers or even fabricated the shape from a number of cut components.

Section B

Question 4

Very few candidates attempted this question.

- (a) Candidates often did not understand the purpose of the component X.
- (b) Some candidates understood the significance of the switch but very few explained clearly why the direction of the disc or the safety guard was an issue.
- (c) Where candidates understood the design flaws then changes were good. Often the improvements were not really relevant to the question.
- (d) Generally well answered, there is a good awareness of health and safety in the schools assessed.

Question 5

Many candidates selected this question.

- (a) Most candidates understood the question and answered accurately.
- (b) Generally answered well. Problems identified and clearly explained.
- (c) It is clear that well prepared graphics candidates found this section accessible and in the majority of cases they scored well.
- (d) Candidates did not always fully understand the question and there were a wide range of answers. Explanations were clear but for non-relevant issues. Examples were very rare.

Question 6

Many candidates selected this question.

- (a) This question was answered well as most candidates understood the need for water to drain away from the surfaces of the table and seats. Some candidates just wrote out the properties of mild steel rather than referring to the question.
- (b) This question was generally answered well. Problems were identified and clearly explained.
- (c) Candidates found this section accessible and in the majority of cases they scored well.
- (d) Candidates did not always fully understand the question and there were a wide range of answers. Explanations were clear but for non-relevant issues. Examples were very rare.

Section C

Question 7

- (a) Mostly well-structured answers showing a range of ideas, occasionally limited development and a variety of methods of evaluation. Final solution generally identified and with good detail.
- (b) Mostly well-structured answers showing a range of ideas, occasionally limited development and a variety of methods of evaluation. Final solution generally identified and with good detail.
- (c) Range of ideas for the drawer layout but very few candidates showed **how** the drawers could be attached to the main structure.
- (d) Generally well answered with a variety of rendering styles and quality. Many candidates needed to improve their understanding of this question as they did not apply any render at all.

Question 8

- (a) Generally well answered. Most candidates produced a range of ideas showing how the net could be held together without glue. Typically three ideas were produced and a simple sketch showing some development. Evaluation ranged from tick and crosses through to excellent annotation of positive and negative points.
- (b) Some candidates mixed the two parts of the question together while others separated the two distinct parts. On the whole, a very well answered question.
- (c) There were some outstanding graphical styles representing the name, whilst others were more basic. There was some impressive use of symbols and equipment to enhance the text.
- (d) Generally well answered with a variety of rendering styles and quality. Many candidates needed to improve their understanding of this question as they did not apply any render at all.

Question 9

Very few candidates answered this question – they fell into two distinct areas where they obviously had a great deal of knowledge and provided a detailed response or they lacked the subject expertise and gave a very basic response.

DESIGN AND TECHNOLOGY

Paper 9705/13
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DESIGN AND TECHNOLOGY

Paper 9705/31
Written 2

Key messages

- It is important that wherever possible, candidates have an opportunity to practice this paper. In order to fully complete two questions from Section A and one question from Section B in sufficient detail, careful time management is essential.
- Questions in Section A often ask candidates to 'use notes and sketches' to describe a process. The best way to respond is to use a sequence of three or four annotated sketches of the key stages to clearly describe, step by step, the given process.
- Many candidates do not achieve high marks in the analysis and specification section in questions in Section B. It is critical that candidates focus on the chosen task and not produce generic statements and points of specification that apply to any product.

General comments

The majority of candidates used their time effectively in both sections of the paper. There were very few rubric errors.

The overall standard of candidate performance was good this year with a number of outstanding scripts. There were some particularly good examples of creative and innovative design responses in Section B.

Responses to Section A were generally good, making very good use of annotated sketches to support their answers. A number of candidates produced very brief and limited responses in this section, lacking the detail necessary to achieve the middle to high mark ranges.

Candidates were well prepared for Section B with most candidates fully completing all of the requirements. Some candidates did not make best use of the time available and did not fully complete the development section and a few candidates made no attempt at the final proposal and evaluation.

In Section A, Part A was the most popular with a number of candidates attempting Part C. Very few candidates made attempts at questions in Part B.

In Part A, **Question 2** and **Question 3** were the most popular.

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

In Section B, **Question 10** and **Question 12** were the most popular. Few candidates attempted **Question 11**.

Comments on specific questions

Section A

Part A – Product Design

Question 1

There was a wide range of responses to this question. Most candidates demonstrated a good understanding of how designers use most of the given examples of modelling and their importance in a design process. Not all candidates were able to explain the use of mock ups.

Some candidates produced very short responses and did not include appropriate examples, or the level of detail required to achieve the higher mark ranges.

Question 2

- (a) The majority of candidates stated an appropriate material for the shape sorter frame and gave valid reasons for choice.
- (b) Candidates answered this part particularly well. Most selected the key stages of production and made very good use of notes and sketches to include appropriate detail. Some candidates produced over lengthy answers, taking too long to sketch every possible stage in the process. The best responses used three or four well annotated sketches of the key stages of manufacture to support a detailed description of the sequence of manufacture.
- (c) Most candidates correctly described in detail the quantity manufacture of the triangular shape. Some candidates misread the question and focused on the frame. Injection moulding and extrusion were very popular responses although some candidates did not include details of the mould or die in those processes and consequently did not access the full mark range.

Question 3

Laminating and compression moulding were the most popular responses to this question.

- (a) Most candidates used notes and sketches effectively to describe the chosen process. Some candidates incorrectly described lamination as the addition of a plastic layer to the chair seat and back rather than the gluing of thin layers of wood in a former.
- (b) Most candidates explained why the process is suitable for the production of the item. A significant number of candidates responded with single word answers with little explanation and did not access the full mark range.

Part B – Practical Technology

Question 4

Very few candidates attempted this question.

- (a) Candidates answered parts (i) and (ii) correctly.
- (b) Very few candidates made full and correct attempts at parts (i) and (ii).

Question 5

There were no attempts at this question

Question 6

There were no attempts at this question

Part C – Graphic Products

Question 7

Relatively few candidates attempted this question.

- (a) Some candidates produced accurate cam profiles although most did not construct the rise and fall using simple harmonic motion. Most candidates produced a displacement diagram.
- (b) Most candidates gave an appropriate application of a ratchet mechanism and described how it works.

Question 8

This was a popular question with some excellent responses.

- (a) The crank mechanism was generally drawn accurately and the loci plotted. Some candidates did not plot enough points to generate an accurate path.
- (b) Most candidates produced a good quality exploded isometric drawing of the truck.

Question 9

There was a full range of responses to this question. Some were fully detailed, cogent and structured, and achieved very high marks

The best responses focused on modern and emerging digital technology, new materials and printing techniques and the benefits to business and consumers. Most candidates supported their answers with appropriate examples.

Section B

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

Most candidates answered **Questions 10** and **12**, with very few answering **Question 11**.

There were a number of very innovative and creative responses, particularly for **Question 10**.

Whilst most candidates complete their responses in the time allocated, there were a number of candidates who explored a very limited range of possibilities and did not fully complete the development, final proposal and evaluation sections.

Many candidates consider the initial thoughts and broader issues related to the given problem/situation in their analysis. This provides the key points to help to develop a specification.

A significant number of candidates produce generic charts that have no specific reference to the problem, and receive little credit.

For the specification, points must be justified and appropriate to the task. Some candidates gave single word or generic statements with no reference to the product, and did not gain a mark.

The exploration of ideas was generally good. The majority of candidates produced a range of at least three different design ideas, many including the exploration of sub-problems.

Most candidates made reference to appropriate specific materials and justified their use.

Whilst most candidates produced an on-going evaluation of design ideas, a number of candidates did not give any reasons for the selection of ideas for further development. Reference to the original specification would be expected.

The higher marks are achieved when candidates give evaluative comments of their ideas and make a reasoned judgement on the best solution or features to take forward.

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

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

Most proposed solutions were feasible and well presented.

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

Some candidates produced full, valid evaluations of their proposal; describing the positive features and functional details and suggesting further modifications or improvements. Some candidates use a tick chart which will not access the higher mark ranges.

Question 10

Some responses to this question were exceptionally innovative and creative.

Acceptable specification points included:

- the shelter must be stable and well secured to cope with possible harsh weather conditions
- the shelter must have adequate ventilation
- the shelter could have simple partitioning for privacy
- the shelter could incorporate a water collection facility
- the shelter must be constructed of materials that are lightweight but will not tear or rip easily

Some responses had excellent, creative design thinking. Some ideas were too simplistic and lacked any detail of how structures would be joined and/or held in place. The development section was particularly good on this question.

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

Question 11

This was the least most popular question in Section B.

Candidates created a range of appropriate sculptures with innovative mechanisms to create movement and sound.

Acceptable specification points included:

- the sculpture should reflect some aspects of the school
- the sculpture should be constructed of materials that will resist degradation as it will be sited outdoors
- the sculpture must be robustly constructed so as not to be damaged by high winds
- the structure could be periodically modified to change items that are moved or create new sounds to refresh interest
- the moving parts of the structure must pose no risk to observers

Most ideas were visually interesting but some candidates gave little detail of the materials and construction methods to be used.

Question 12

There was a good range of responses to this question. Most candidates fulfilled all requirements of the question, some candidates did not consider the point of sale display in their designing.

Acceptable specification points included:

- the packaging must hold the band and connecting cable securely to prevent damage in transportation
- the packaging must be compact and easily stackable for storage and transportation
- the packaging must have a window to allow the customer to see the product
- the point of sale display must be stable and allow the customer to easily select and replace the bands

Most candidates produced effective packaging for the band and connecting cable. Not all candidates developed ideas for the point of sale display. There were some exceptional ideas relating to the *uFit* branding on the packaging and point of sale display.

Many candidates made excellent use of developments (nets) and demonstrated a solid understanding of packaging technology.

DESIGN AND TECHNOLOGY

Paper 9705/32
Written 2

Key messages

- It is important that wherever possible, candidates have an opportunity to practice this paper. In order to fully complete two questions from Section A and one question from Section B in sufficient detail, careful time management is essential.
- Questions in Section A often ask candidates to 'use notes and sketches' to describe a process. The best way to respond is to use a sequence of three or four annotated sketches of the key stages to clearly describe, step by step, the given process.
- Many candidates do not achieve high marks in the analysis and specification section in questions in Section B. It is critical that candidates focus on the chosen task and not produce generic statements and points of specification that apply to any product.

General comments

Most candidates used their time effectively and there were few rubric errors.

In some cases, candidates appear to spend too much of their allocated time on Section B at the expense of lack of detail in their responses in Section A.

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

Section B was answered well by many candidates with a number of outstanding responses. There is still a tendency for some candidates to copy out the question or rewrite a brief. This is unnecessary and can waste valuable time.

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

In Section A, Part A was the most popular.

In Part A, **Question 1** was the most popular followed by **Question 2**.

Question 5 was the most popular in Part B. There were very few attempts at **Question 4** and **Question 6**.

Question 7 and **Question 8** were the most popular questions in Part C.

In Section B, **Question 12** was the most popular with candidates correctly interpreting 'flat pack' for either graphic or resistant material approaches. **Question 10** was the next most popular question with very few candidates attempting **Question 11**.

Comments on specific questions

Section A

Part A – Product Design

Question 1

The most popular question in Part A, generally well answered where extrusion and mortise and tenon joint were chosen. The better responses were those that used a sequence of three or four annotated sketches of the key stages to clearly describe, step by step, the given process.

- (a) There were some excellent responses, mostly for extrusion and mortice and tenon joint. Candidates tended to confuse the annealing process with the forming process for the bowl so were unable to access the full range of marks.
- (b) Some candidates fully explained the suitability of the given process, a significant number of candidates however, produced very brief responses, lists of points or in some case single words with no clarification.

Question 2

A very popular question with some outstanding responses.

- (a) Most candidates named a suitable material and gave reasons why it was suitable.
- (b) Generally well answered with many candidates making good use of annotated sketches. The trough was the most popular choice with a wide range of appropriate manufacturing methods proposed.
- (c) Although there were some full and detailed responses to this part, many candidates tended to identify a change in process and then describe that process and not justify its use.

Question 3

Generally well answered with most candidates showing a good understanding of the plastic dip coating process and the varnishing process. Very few candidates attempted the anodising process.

Part B – Practical Technology

Question 4

Relatively few candidates attempted this question. Very few candidates answered all parts.

- (a) Most candidates correctly calculated the force at **A**.
- (b)(i) Very few candidates identified the correct material profile.
- (ii) Very few candidates identified the features on profile **B** but some were able to describe the features and gained credit.
- (c) Very few candidates made an attempt at this part.

Question 5

This question was quite popular and generally answered well.

- (a) The most popular selections were Teak, Bronze, stainless steel, MDF, polystyrene and copper. Very few candidates chose Phenol formaldehyde, zinc, HDPE or polyurethane.
- (b) Many candidates produced very limited responses to this part and did not include sufficient detail to access the higher mark ranges.

Question 6

Very few candidates answered this question.

- (a) Many candidates who attempted this question often misinterpreted, referring to CAM used in industry rather than schools, or referred to CAD rather than CAM.
- (b) Some responses to this part were fully detailed, referring to speed and quality of production for the manufacturer and reliability and cost benefits to the consumer.

Part C – Graphic Products

Question 7

A popular question with many candidates achieving high marks. Most drew very accurate planometric drawings of the bathroom although the mirror was often missed and care was not taken over the drawing of the bath.

Question 8

Most candidates who attempted **Question 7** answered this question. Although a few candidates complied with all of the rubric to produce high quality orthographic views, a significant number did not plan out the views in correct projection. Many candidates did not draw all of the three views and very few added four dimensions correctly.

Question 9

There were very few responses to this question. Some responses were full and detailed, focusing on key issues. Some candidates tended to concentrate solely on the advertising side of marketing without considering other issues.

Section B

There were many excellent responses in Section B. Presentation skills were generally of a very high standard and candidates demonstrated their knowledge of appropriate materials and construction techniques.

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

A significant number of candidates did not use their time effectively and did not fully complete the development, final proposal and evaluation sections.

A few candidates ignored the rubric and wrote their own design brief. This is to be discouraged as candidates do not have access to the full mark range.

The analysis and specification sections were generally good. Many candidates considered the initial thoughts and broader issues related to the given problem/situation. This provided the key points to help to develop a specification.

Some candidates however, produced brief, generic charts for their analysis with no specific reference to the problem and therefore received little credit. Generic points of analysis can be a starting point but candidates must then link them to the chosen design task.

Specifications should be specifically related to the chosen task and points should be detailed and justified. Too many candidates produced specifications that could apply to virtually any product.

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

Candidates made appropriate reference to specific materials and gave appropriate justifications for their use.

Many candidates produced an on-going evaluation of their design ideas. A number of candidates, however, did not give any reasons for the selection of an idea(s) for further development. Many candidates used tick

charts against the specification. Credit can only be achieved if the specification has focused points and that some specific evaluative comment is made.

The higher mark ranges are achieved when candidates give evaluative comments on their ideas and can make a reasoned judgment on the best solution or features to take forward.

The development of an ideas section continues to be strong. Many candidates however, focused only on a plan for manufacture and did not consider the reasoning that leads to a single design proposal.

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

Most proposed solutions were feasible and well presented. For high marks in the detail section, candidates are expected to include key dimensions, materials and possible finishes.

The response to the evaluation section continues to improve. Some candidates produced detailed, valid evaluations of their proposal; describing the positive features and functional details and suggesting further modifications or improvements. A significant number of candidates produced very brief evaluations often in the form of tick chart against an outline specification. The higher mark ranges can only be accessed if the specification is detailed and a supporting evaluative comment is made.

Question 10

This question was generally well answered. Most responses were feasible and met the initial specification points. Some candidates applied a 'black box' approach to propulsion without describing the system used to launch the bag. Many candidates repeated the specifications given and added generic points such as aesthetically pleasing, environmentally friendly and did not add any further specific, justified points.

Acceptable specification points included:

- the product must be stable in use to provide accurate launching
- the product must not require excessive force to launch the bag
- the product must have a method of being secured firmly when used inside and outside
- the product should be easy to assemble and disassemble for ease of storage.

Some candidates produced a wide range of possible solutions, selecting and justifying appropriate materials. Many focused on one type of propulsion method.

Material and constructional detail was generally detailed and appropriate.

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

Evaluations were often weak; very few candidates made specific reference to the final proposal and did not suggest possible improvements.

Question 11

Very few candidates attempted this question. Some candidates misinterpreted the question and focused solely on the design of a storage unit.

Acceptable specification points included:

- the kit parts must be robust so as to cope with possible misuse
- the kit must include a set of clear, easy to understand instruction sheets to guide the students
- the kit parts must be able to be assembled easily and remain in place so that the mechanisms and structures will hold together and can be tested
- the kit parts should be colour coded so that parts for constructions are easily identified.

The best responses looked at a wide range of possible options, taking ideas from existing kits to modify and suggest different options. Most candidates considered effective storage methods.

Question 12

This was the most popular question with a wide range of responses. Many candidates produced very innovative products to hold the containers and menus, using card based materials to enable a flat pack solution. Some candidates produced flat pack solutions by using resistant materials, and designed creative connecting methods and/or used knock down fittings in their proposals. Some candidates did not access the full mark range as they did not recognise the requirement for the product to be produced as a flat pack.

Specification points included:

- the product must hold the containers securely to avoid spillage
- the product should reflect the restaurant chain image
- the product should be constructed with a material or suitable finish that allows it to be wiped clean if accidental spillages occur
- the product must allow customers to easily access the contents and return them.

The best responses looked at a wide range of ideas to store the items and enable easy transportation. Some exceptionally innovative developments (nets) and interlocking joining systems were explored by some candidates. A significant number of candidates presented very similar versions of ideas rather than using the opportunity to be creative and innovative.

DESIGN AND TECHNOLOGY

Paper 9705/33
Written 2

Key messages

- It is important that wherever possible, candidates have an opportunity to practice this paper. In order to fully complete two questions from Section A and one question from Section B in sufficient detail, careful time management is essential.
- Questions in Section A often ask candidates to 'use notes and sketches' to describe a process. The best way to respond is to use a sequence of three or four annotated sketches of the key stages to clearly describe, step by step, the given process.
- Many candidates do not achieve high marks in the analysis and specification section in questions in Section B. It is critical that candidates focus on the chosen task and not produce generic statements and points of specification that apply to any product.

General comments

The majority of candidates used their time effectively in both sections of the paper. There were very few rubric errors.

The overall standard of candidate performance was good this year with a number of outstanding scripts. There were some particularly good examples of creative and innovative design responses in Section B.

Responses to Section A were generally good, making very good use of annotated sketches to support their answers. A number of candidates produced very brief and limited responses in this section, lacking the detail necessary to achieve the middle to high mark ranges.

Candidates were well prepared for Section B with most candidates fully completing all of the requirements. Some candidates did not make best use of the time available and did not fully complete the development section and a few candidates made no attempt at the final proposal and evaluation.

In Section A, Part A was the most popular with a number of candidates attempting Part C. Very few candidates made attempts at questions in Part B.

In Part A, **Question 2** and **Question 3** were the most popular.

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

In Section B, **Question 10** and **Question 12** were the most popular. Few candidates attempted **Question 11**.

Comments on specific questions

Section A

Part A – Product Design

Question 1

There was a wide range of responses to this question. Most candidates demonstrated a good understanding of how designers use most of the given examples of modelling and their importance in a design process. Not all candidates were able to explain the use of mock ups.

Some candidates produced very short responses and did not include appropriate examples, or the level of detail required to achieve the higher mark ranges.

Question 2

- (a) The majority of candidates stated an appropriate material for the shape sorter frame and gave valid reasons for choice.
- (b) Candidates answered this part particularly well. Most selected the key stages of production and made very good use of notes and sketches to include appropriate detail. Some candidates produced over lengthy answers, taking too long to sketch every possible stage in the process. The best responses used three or four well annotated sketches of the key stages of manufacture to support a detailed description of the sequence of manufacture.
- (c) Most candidates correctly described in detail the quantity manufacture of the triangular shape. Some candidates misread the question and focused on the frame. Injection moulding and extrusion were very popular responses although some candidates did not include details of the mould or die in those processes and consequently did not access the full mark range.

Question 3

Laminating and compression moulding were the most popular responses to this question.

- (a) Most candidates used notes and sketches effectively to describe the chosen process. Some candidates incorrectly described lamination as the addition of a plastic layer to the chair seat and back rather than the gluing of thin layers of wood in a former.
- (b) Most candidates explained why the process is suitable for the production of the item. A significant number of candidates responded with single word answers with little explanation and did not access the full mark range.

Part B – Practical Technology

Question 4

Very few candidates attempted this question.

- (a) Candidates answered parts (i) and (ii) correctly.
- (b) Very few candidates made full and correct attempts at parts (i) and (ii).

Question 5

There were no attempts at this question

Question 6

There were no attempts at this question

Part C – Graphic Products

Question 7

Relatively few candidates attempted this question.

- (a) Some candidates produced accurate cam profiles although most did not construct the rise and fall using simple harmonic motion. Most candidates produced a displacement diagram.
- (b) Most candidates gave an appropriate application of a ratchet mechanism and described how it works.

Question 8

This was a popular question with some excellent responses.

- (a) The crank mechanism was generally drawn accurately and the loci plotted. Some candidates did not plot enough points to generate an accurate path.
- (b) Most candidates produced a good quality exploded isometric drawing of the truck.

Question 9

There was a full range of responses to this question. Some were fully detailed, cogent and structured, and achieved very high marks

The best responses focused on modern and emerging digital technology, new materials and printing techniques and the benefits to business and consumers. Most candidates supported their answers with appropriate examples.

Section B

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

Most candidates answered **Questions 10** and **12**, with very few answering **Question 11**.

There were a number of very innovative and creative responses, particularly for **Question 10**.

Whilst most candidates complete their responses in the time allocated, there were a number of candidates who explored a very limited range of possibilities and did not fully complete the development, final proposal and evaluation sections.

Many candidates consider the initial thoughts and broader issues related to the given problem/situation in their analysis. This provides the key points to help to develop a specification.

A significant number of candidates produce generic charts that have no specific reference to the problem, and receive little credit.

For the specification, points must be justified and appropriate to the task. Some candidates gave single word or generic statements with no reference to the product, and did not gain a mark.

The exploration of ideas was generally good. The majority of candidates produced a range of at least three different design ideas, many including the exploration of sub-problems.

Most candidates made reference to appropriate specific materials and justified their use.

Whilst most candidates produced an on-going evaluation of design ideas, a number of candidates did not give any reasons for the selection of ideas for further development. Reference to the original specification would be expected.

The higher marks are achieved when candidates give evaluative comments of their ideas and make a reasoned judgement on the best solution or features to take forward.

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

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

Most proposed solutions were feasible and well presented.

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

Some candidates produced full, valid evaluations of their proposal; describing the positive features and functional details and suggesting further modifications or improvements. Some candidates use a tick chart which will not access the higher mark ranges.

Question 10

Some responses to this question were exceptionally innovative and creative.

Acceptable specification points included:

- the shelter must be stable and well secured to cope with possible harsh weather conditions
- the shelter must have adequate ventilation
- the shelter could have simple partitioning for privacy
- the shelter could incorporate a water collection facility
- the shelter must be constructed of materials that are lightweight but will not tear or rip easily

Some responses had excellent, creative design thinking. Some ideas were too simplistic and lacked any detail of how structures would be joined and/or held in place. The development section was particularly good on this question.

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

Question 11

This was the least most popular question in Section B.

Candidates created a range of appropriate sculptures with innovative mechanisms to create movement and sound.

Acceptable specification points included:

- the sculpture should reflect some aspects of the school
- the sculpture should be constructed of materials that will resist degradation as it will be sited outdoors
- the sculpture must be robustly constructed so as not to be damaged by high winds
- the structure could be periodically modified to change items that are moved or create new sounds to refresh interest
- the moving parts of the structure must pose no risk to observers

Most ideas were visually interesting but some candidates gave little detail of the materials and construction methods to be used.

Question 12

There was a good range of responses to this question. Most candidates fulfilled all requirements of the question, some candidates did not consider the point of sale display in their designing.

Acceptable specification points included:

- the packaging must hold the band and connecting cable securely to prevent damage in transportation
- the packaging must be compact and easily stackable for storage and transportation
- the packaging must have a window to allow the customer to see the product
- the point of sale display must be stable and allow the customer to easily select and replace the bands

Most candidates produced effective packaging for the band and connecting cable. Not all candidates developed ideas for the point of sale display. There were some exceptional ideas relating to the *uFit* branding on the packaging and point of sale display.

Many candidates made excellent use of developments (nets) and demonstrated a solid understanding of packaging technology.