

DESIGN AND TECHNOLOGY

Paper 9705/12
Written 12

Key messages

Sections A and **B** were generally accessible when candidates had prepared well. Process knowledge was good with all three questions in **Section A** attempted with a clear understanding of the basic knowledge.

However, to really excel it is imperative that the specification receives full coverage through the scheme of work to plan the delivery of the material.

Section B Part (d) analysis questions were occasionally well attempted, but candidates did not always identify the key phrases/requirements from the question or include relevant examples to evidence their understanding or extend their answers to justify full understanding of a relevant point.

General comments

Candidates generally found the three questions in **Section C** accessible with some good answers. It is important that candidates understand that the terms 'develop' and 'range' mean that they should offer several different ideas, which they then evaluate to allow further development into a final proposal for each part of the question. Components, mechanisms, and construction techniques were particularly helpful. Having a coherent layout of page with designated areas for a range of designs, evaluation, and development helps candidates to focus their attention and time.

Evaluation of initial ideas was often limited in detail and sometimes did not include any of the aspects that were very clearly part of the question.

Comments on specific questions

Section A

Question 1

- (a) This was generally answered well and most candidates achieved one mark, and many gained both marks with 'will not rust' given regularly as a correct answer.
- (b) (i) There were many good answers clearly detailed both cutting and folding the material with the process of gaining accurate corners generally understood. Many candidates used technical terms for the tools and equipment that were being used. Safety precautions were not always included.
- (ii) Candidates gave a wide variety of answers to this question with stencilling and vinyl lettering being popular responses. Detailed answers included CAD/CAM and some excellent technical details on tools and equipment and how to use them correctly.
- (iii) Candidates often gave good detail within their answers and many responses had sensible processes for joining the vertical planks together accurately.

Question 2

- (a) Most candidates were able to give two reasons for the suitability of cardboard.

- (b)(i) This was generally answered well with stencils, templates and various printing processes often described to add the wording. CAD/CAM was used to good effect within the design of the wording and application. Candidates used technical terms for the tools and equipment that were used but safety precautions were not always included.
- (ii) Candidates usually answered this well with marking out and cutting out often well explained with correctly described tools, equipment, and processes. Unfortunately, a number of candidates did not understand the term 'development or net'.
- (c) When candidates used a correct manufacturing process, such as injection moulding, and then added detailed technical terms such as hopper, heating chamber, mould cavity and repeatability answers were generally strong. Unfortunately, a number of candidates were unable to give such levels of detail and found the question challenging.

Question 3

- (a) Generally, this was answered well. Tubes which could be curved when carrying fluids was a popular response.
- (b)(i) There was a significant amount of detail included in lots of responses with clear explanations of the planks being cut and then planed being well understood. Safety precautions were not always included and on occasion generic responses simply added the wearing of gloves when it was not actually necessary or helpful to the process or safety of the user.
- (ii) There was a good understanding of the need to accurately mark out and then clamp the pieces of wood together to aid further precision whilst drilling. Tools, equipment and processes were mostly covered well.
- (c) There were some well described designs for moving the digger arm up and down. Unfortunately, some candidates did not fully explain how the digger arm could be moved by using syringes and plastic tubing.

Section B

Question 4

- (a) Candidates mostly scored full marks and clearly understood the function of **X**.
- (b) Many candidates answered this question correctly, identifying several different problems with the design of the outdoor bench.
- (c) Most candidates were able to respond to the two problems identified in (b) and use notes and sketches to show how the problems could be overcome. Many answers focused on the gaps between the cotton seats being dangerous and wasting space for other users, problems with the cotton or concrete as materials for an outdoor seat, comfort and stability. Those candidates who correctly identified problems and subsequently followed the instructions gave some excellent fully detailed answers that scored full marks.
- (d) Candidates gave a broad range of answers and those who understood why designers consider the effects of different surface finishes gave good responses. Unfortunately, a number of candidates did not consider visual and tactile senses. Where examples/evidence were used they were generally well linked to the question.

Question 5

- (a) Most candidates understood the function of **X**.
- (b) Many candidates answered this question correctly, identifying several different problems with the design of the point-of-sale display.
- (c) Most candidates were able to respond to the two problems identified in (b) and used notes and sketches to show how the problems could be overcome. Many answers focused on the security of the phone being displayed, issues with the choice of materials, surface graphics for marketing and

stability. Those candidates who had correctly identified problems and subsequently followed the instructions gave some excellent fully detailed answers that scored full marks.

- (d) Unfortunately, candidates did not always understand the key phrases in this question relating to designers and manufacturers working to a detailed specification of requirements. Candidates who discussed issues that a specification of requirements offers such as a checklist for the designer, materials information, safety standards and other legislation answered well. Examples were not always given.

Question 6

- (a) Candidates often demonstrated an understanding of what **X** was but did not always fully justify their answers.
- (b) Many candidates answered this question correctly, identifying several different problems with the design of the electric vacuum cleaner.
- (c) Candidates found this section straightforward if **Section B** had been answered well, often with good diagrams included.
- (d) On occasion candidates had some understanding of the basic control principles but many candidates found this question challenging and did not extend their answers or give many examples.

Section C

Question 7

- (a) There were many well-structured answers showing some ideas for a gardening aid. Often ideas were limited to a single response or very similar and occasionally development was a little limited. The final solution was often realistic with good detail. Evaluation ranged from generic commentary through to some good comments on positive and negative points.
- (b) Candidates offered some good ideas for a holder for garden tools that could attach to the gardening aid. Technical detail of how the holder attached was sometimes limited.
- (c) Candidates offered some good answers but often answers were similar to (b) above, and a number only gave a single idea.
- (d) This question was generally answered well with a variety of rendering styles and quality. However, some candidates did not apply any render at all. There were some outstanding responses with excellent three-dimensional drawings.

Question 8

- (a) Those candidates that chose this question produced a range of ideas for the design of a brand for the hand care gift set. Three ideas were mostly produced with some candidates showing development. Evaluation ranged from generic commentary through to some excellent annotation of positive and negative points.
- (b) Candidates did not always offer a range of different ideas for a plastic tray, with many similar outcomes and limited development.
- (c) When candidates understood the term 'one piece development net' they produced a range of practical and innovative ideas for a package to hold the plastic tray.
- (d) This question was generally answered well with a variety of rendering styles and quality. However, some candidates did not apply any render at all. There were some outstanding responses with superb three-dimensional drawings.

Question 9

- (a) Some candidates found this question challenging. While they produced a range of ideas for viable solutions, they did not always show the required technical detail needed to demonstrate how a mechanism to shred paper could work. Three ideas were regularly produced with some candidates showing development. Evaluation ranged from generic commentary through to some excellent annotation of positive and negative points.
- (b) Candidates gave many good answers that detailed sensible ideas for a case for the paper shredder that allowed easy replacement of the batteries.
- (c) Candidates offered several different and sensible options for a clamping mechanism and usually included detail of how it could be easily removed.
- (d) This question was generally answered well with a variety of rendering styles and quality. However, some candidates did not apply any render at all. There were some outstanding responses with superb three-dimensional drawings.

DESIGN AND TECHNOLOGY

Paper 9705/02 Project 1
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Key messages

- Candidates are advised to focus on the design need and brief throughout the analysis and research stages of the project rather than on any preconceived idea of an outcome.
- Research should be fully analysed, and conclusions drawn that will impact upon the design specification. The inclusion of large amounts of information copied from websites is of little value unless analysed and conclusions drawn.
- A wide range of appropriate ideas should be proposed and appraised in terms of fitness for purpose.
- The modelling of ideas should be fully recorded using high-quality photographic evidence.

General comments

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

Centres introduce this important part of the Design and Technology course to their candidates in slightly different ways, but it is important that evidence produced matches the requirements of the assessment criteria. Some centres set a common theme or topic to which candidates respond in their own way while others encourage each candidate to identify their own design problem which may be derived from interests, life at home or wider issues such as the sustainability.

Centres are reminded of the requirement to include detailed photographic evidence of the model for Project 1 and the final realised product for Project 2.

Comments on specific assessment criteria

Question 1

Identification of a need or opportunity leading to a design brief

This section of the project was generally completed to a good standard, with many candidates scoring maximum marks.

Some candidates considered several different design situations, identified a number of design problems and then chose one to work on, whilst others focused on one design situation.

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

Question 2

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

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

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

Specifications were generally well formulated and included many specific requirements of the product to be designed. Generic points, that could apply to almost any product, should not be included in the specification unless fully justified.

Successful candidates clearly demonstrated how the analysis of their research led to the formulation of a detailed specification.

Question 3

Generation and Appraisal of Design Ideas

A good range and high standard of communication techniques was used in the presentation of design proposals. Freehand sketching, with annotations, was the most commonly seen communication technique used to show design ideas. This communication technique allowed candidates to demonstrate how their thought process had developed.

Some candidates chose to use Computer Aided Design (CAD) to generate ideas, which in some cases appeared to restrict the flow of the design thinking.

Many candidates showed a high degree of flair in the creation of ideas. However, a few candidates presented a range of drawings not linked to the specification or did not comment on their possible suitability for the problem being considered.

The importance of presenting a wide range of different ideas, however impractical they may appear at the time, cannot be understated and these should then be considered against the specification with some form of written appraisal alongside each.

Question 4

Modelling of Ideas

Modelling should be seen as one stage of the consideration, testing and evaluation of design ideas so that a final design can be presented and subsequently developed, perhaps in Project 2. Many candidates produced high-quality and meaningful models that formed part of this process whereas others simply produced a mock-up of the chosen design idea. In these cases, it was sometimes difficult to identify how it contributed to the design process.

The quality of photographic evidence used to record the modelling process and the outcomes was variable and sometimes with very few supporting notes.

A number of candidates modelled different aspects of their design ideas and used these to test for suitability and practicality in the production of a complete solution to their design problem. In this way, the modelling stage played a meaningful part in designing.

DESIGN AND TECHNOLOGY

Paper 9705/32
Written 32

Key messages

- Candidates should be advised to plan a question with the command 'to discuss' carefully. A list of points or issues is insufficient to achieve a high mark. The response should be structured and include a critical analysis of issues raised by the question, a clear interpretation and explanation of the issues and should draw upon evidence or examples to support the response.
- When answering questions requiring the candidate to show how a given product or component is made in a school workshop, more focus should be given to the key manufacturing stages. Many candidates spent a great deal of time describing marking out procedures and often omitted key constructional detail.
- The analysis of the given situation for questions in **Section B** was often generic and could refer to most design situations. Candidates must focus on the specific problem to achieve marks for this part.

General comments

Candidates used sketches well to describe the stages of particular processes and to support their answers to questions in **Section A**.

Questions requiring candidates 'to discuss' were often very brief and, in some cases, written using bullet points which was an inappropriate way to present a response.

In **Section B**, candidates should be reminded to focus on their analysis of the design situation and not copy out the given details. Analysis and specifications were often presented as generic statements or a single word.

In **Section A**, **Part A** was the most popular choice. Most candidates attempted **Question 1** and **Question 3**. Very few candidates attempted questions from **Part B** and **Part C**.

Comments on specific questions

Section A

Part A – Product Design

Question 1

This was a very popular question with a range of responses.

- (a) A range of appropriate, specific materials were stated and valid reasons for choice for the handle given. Although most candidates gave valid reasons for their choice, a number listed properties of the material with limited reference to the earphone holder.
- (b) Most responses gave appropriate methods of making the earphone holder in a school. Some candidates did not consider the manufacture of all features of the holder or possible assembly details.
- (c) Most candidates changed materials and explained how the earphone holder could be injection moulded. This process was unsuitable for a batch of 50 earphone holders.

Question 2

Very few candidates attempted this question.

The one-off item of jewellery and the batch of twenty stools for a café were the most popular selections. Most candidates did not focus on unit costs and available manufacturing processes relating to the chosen selection in their answer.

Question 3

- (a) The HIPS tray and the aluminium picture frame component were the two most popular choices of item.

Most candidates gave clear and full descriptions of the vacuum forming process for the tray but a number gave no details of the former and so could not access the full mark range.

Many candidates made good use of annotated sketches to support their answers.

Some candidates incorrectly described an extrusion process more suitable for plastic extrusion rather than extruding aluminium.

A few candidates correctly described the turning and boring process required to make the hardwood lamp base.

- (b) Candidates answered this part of the question well. Most candidates gave valid explanations as to why the process was suitable for the specific item and achieved high marks.

Part B – Practical Technology

There were no responses to **Question 4** or **6**.

Question 5

Very few candidates attempted this question.

- (a) Candidates identified and described the function of the components and described the function of the 2 k Ω resistor.
- (b) Discussions tended to be very brief and did not follow the instructions given at the top of the page.

Part C – Graphic Products

Very few candidates answered questions in **Part C**.

Question 7

- (a) Some candidates stated appropriate materials to make a scale presentation model of the hotel room and reasons for their suitability. Some candidates incorrectly gave materials that would be used in a full-scale hotel room.
- (b) Some responses were full and included clear, well annotated sketches showing appropriate modelling techniques for key parts of the room. Other responses were very brief focusing on one aspect of the room.

Question 8

Some examples were full, and candidates made very good use of sketches and notes to demonstrate a good understanding of the techniques given. Some responses were very brief and focused on only one or two techniques.

Question 9

Some candidates had a clear knowledge and understanding of style and fashion but made limited reference to their influence upon designers. For other candidates, discussions tended to be very brief and did not follow the instructions given at the top of the page.

Section B

The overall performance of candidates on this section was generally good. Most candidates made good use of their time and fully completed all requirements of the question.

Candidates should be reminded to focus their analysis on the given design situation. Many produced generic, single word responses for their analysis. Some candidates copied out the given details for their specification and did not include additional specification points stating the main functions and qualities of the product.

Most candidates produced an adequate range of annotated and different design ideas. Some focused on a single concept which restricted access to the higher mark ranges.

Some candidates used a tick list to evaluate their ideas and select a solution for development. Tick lists are appropriate if they are adequately qualified. For many candidates there was very limited evidence of their design thinking when deciding which features should be taken forward.

The development of ideas section was mostly good. Some candidates showed improvements to their design clearly and gave proposals for construction. Many candidates focused solely on manufacturing details. Candidates needed to consider the reasoning and composition of ideas that leads to a single final design proposal to access the higher mark range.

Most proposed solutions were feasible and presented well.

Evaluations of the proposed solution were mostly too brief with some candidates restating their specification and applying ticks. Candidates needed to evaluate their proposed solution by describing the positive features, possible weaknesses, suggesting possible improvements.

Question 10

This was a popular question and it was generally answered well. There were some excellent responses.

Acceptable specification points included:

- the product must fix securely to the bicycle to avoid movement when cycling
- the product must not impede the rider
- the product must be made from weather resistant materials or suitably protected as it will be used outdoors
- the product must be evenly balanced when secured to the bicycle
- the product could include advertising for the restaurant.

Most candidates produced a range of possible solutions, selecting and justifying appropriate materials. Some candidates did not consider how the product could be securely attached to the bicycle.

Material and constructional detail was generally clear and appropriate to the design situation.

Most final proposals were generally valid and included important dimensional details.

Some evaluations considered strengths and weaknesses but most were rewritten specifications with a tick or stating that the design complied with the original specification with no further qualification.

Question 11

There were a number of very good responses with candidates exploring a wide range of well-engineered possibilities.

Acceptable specification points included:

- the barrier system must be able to easily and securely interconnect
- the barrier system must be stable to take the strain of several people pushing against the barrier
- the barrier system must have a secure assembly system that cannot be adjusted by members of the public
- the barrier system must be of an appropriate height to prevent someone from falling over it.

Most candidates produced feasible responses with some creative and innovative solutions. Material and constructional proposals were very good, showing a very clear understanding of functional requirements and the appropriateness of materials and assembly methods.

The development section was particularly strong for many candidates. Possible technical weaknesses were identified and improved upon and appropriate constructional methods described.

Some final proposals lacked detail and did not include all of the features required of the barrier system.

Most evaluations considered strengths and weakness with a few candidates describing modifications and improvements. Some evaluations were rewritten specifications with a tick or stated that the design complied with the original specification with no further qualification.

Question 12

Some responses to this question were of a very high standard, covering all requirements with functional and imaginative proposals. Many candidates explored ideas for the logo and reusable carrier, but not all candidates considered the free-standing display.

Acceptable specification points included:

- the name and logo for the service should be linked to the name of the supermarket and be vivid to attract and inspire customers
- the reusable carrier could be designed to have other functions, carrying other products/shopping
- the name and logo should be colour coordinated and represent an organic or natural theme
- the carrier should be designed as flat pack to enable ease of storage and distribution
- the free-standing display must be robust and stable enough to be placed at the entrance of the supermarket.

Some candidates made excellent use of high-quality developments/nets for the reusable carrier, with innovative handles/carrying methods included. Designs for the product name and logo were in some cases of a very good standard.

Some candidates did not consider appropriate materials or construction methods for the carrier for a batch of 1000. Few candidates completed proposals for a free-standing display.

DESIGN AND TECHNOLOGY

Paper 9705/04 Project 2
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Key messages

- Product development is a substantial and important stage in the development of the selected design idea and should be presented as evidence of practical design thinking rather than a collection of information on materials, constructions, finishes and other items.
- Product planning should show, through the use of drawings and diagrams, all the information and the sequence of operations required to make the product.
- High-quality photographic evidence should be used to show both the making processes and the completed product.
- Conclusions should be drawn from the testing and evaluation and used to make proposals for further improvement to the product.

General comments

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

Centres introduce this important part of the Design and Technology course to their candidates in slightly different ways, but it is important that evidence produced matches the requirements of the assessment criteria. Some centres set a common theme or topic to which candidates respond in their own way while others encourage each candidate to identify their own design problem which may be derived from interests, life at home or wider issues such as sustainability.

Outcomes were produced 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 or architectural models, there were a number of interesting outcomes relating to the sustainable use of materials or adaptation of existing products for a new purpose.

Centres are reminded of the requirement to include detailed photographic evidence of the model for Project 1 and the final realised product for Project 2.

Comments on specific assessment criteria

Question 1

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

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

Question 2

Product planning

Most candidates set out the sequence for the main stages of production and often produced a flow chart, Gantt chart or table showing the main stages and time required for each stage. There is no requirement for candidates to show how basic techniques will be carried out, but many candidates included details of the more complex methods of manufacture.

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

Question 3

Product realisation

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

The use of Computer Aided Manufacturing (CAM), often through the use of a laser cutter or 3D printer, was commonly seen but traditional construction methods were also evident in many folders.

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. These must be submitted as part of the project folio for moderation purposes.

Question 4

Testing and evaluation

Many candidates carried out meaningful testing and evaluation. This can only be achieved if the product is shown to be put to the use intended and the results compared to the original design brief and specification. It is always helpful when candidates include photographs of the product being used and tested in the intended environment.

The completion of questionnaires and the recording of views of others are only of use where the results can be collated and compared to the intended use of the product and some form of qualified judgement made and recorded.

Successful candidates clearly showed, using sketches and notes, proposals for further development of the product.