

DESIGN AND TECHNOLOGY

Paper 9705/12
Written 1

Key messages

In **Sections A** and **B** where candidates were well prepared they were able to access the material. Process knowledge was generally good. Stronger candidates were able to demonstrate their understanding across the specification.

Section B part (d) analysis questions were often very well attempted but candidates did not always include relevant examples to show their understanding.

General comments

Generally candidates found the three questions in **Section C** accessible with some excellent answers. It is important that centres reiterate that the terms 'develop' and 'range' mean that candidates should give 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 well detailed in many responses.

Comments on specific questions

Section A

Question 1

- (a) This was generally well answered and most candidates achieved one mark, with pop-riveting being a popular response. Many candidates were awarded two marks with welding and self-tapping screws as further joining options.
- (b) (i) This was usually well answered but safety precautions were often not included. Checking accuracy of the bends afterwards was occasionally included in good answers.
- (ii) This part was also generally answered well. Candidates who had a good working knowledge of cutting and finishing aluminium gave very detailed answers.
- (c) Most candidates understood that changing the shape of the handle from flat to a round tube or bar would improve comfort a great deal. Occasionally candidates simply made changes to the scoop that had no relevance to improving comfort for the user.

Question 2

- (a) (i) Most candidates were able to name a suitable glue with Pritt and PVA often given as answers.
- (ii) Candidates demonstrated good knowledge of sheet materials with foamboard and corriflute often given as answers.
- (b) There were many good answers with some excellent three-dimensional views. Candidates often did not detail the window frames or door and also drew the house with gable ends rather than the hipped roof shown in the question.

- (c) (i) Marking out and cutting out with safety procedures was generally good. Candidates often did not actually attach the roof to the house.
- (ii) This was often answered well. The correct sequence of stages was important but was not always shown clearly.

Question 3

- (a) This question was generally well attempted but a significant number of candidates gave generic reasons such as plywood being cheaper or lighter rather than giving a specific reason.
- (b) (i) Many responses included a significant amount of detail with process well explained. There was good awareness of safety precautions. Cut outs were not always included.
- (ii) Screws were often used as a semi-permanent fixing method. Some candidates did not show how (b) would be actually made and also sometimes permanent fixing methods were also used. Candidates showed good awareness of safety precautions in this question.
- (c) This was generally answered well but some candidates did not understand the term ergonomic.

Section B

Question 4

- (a) Candidates often scored full marks and clearly understood the function of **X**.
- (b) Many candidates answered this question correctly, identifying the problems with the design of the free-standing sign.
- (c) This question clearly asked for both notes and sketches, but some candidates did not follow this instruction. Some candidates just used diagrams, which unfortunately did not fully explain the problems identified in (b). Those candidates who had correctly identified problems and subsequently followed the instructions gave some excellent answers.
- (d) Candidates often described three relevant issues but then did not explain them fully. Specific examples/evidence were rarely used to support conclusions. Where examples/evidence were used they were generally well linked within the question. Aesthetics and protection from corrosion were popular issues that were given.

Question 5

- (a) Most candidates understood the question and answered accurately.
- (b) This was generally answered well. Problems identified and clearly explained were sharp corners, a lack of draft angles and missing air holes. A small number of candidates explained injection moulding.
- (c) There were many good answers to this question.
- (d) Candidates focussed on repeatability of identical shapes, set up costs and colour changes. Explanations were mostly clear but examples were very rare.

Question 6

- (a) Terminology was not always clear but candidates did demonstrate a full understanding of what part **X** was and its function.
- (b) This was occasionally well answered with candidates describing the tilting of the TV and bending of bracket to offer the user more flexibility while watching the TV. Some candidates gave irrelevant problems.
- (c) Candidates found this section straightforward if (b) had been answered well. Sometimes diagrams were difficult to understand but when used effectively they really enhanced the answers.

- (d) Candidates often did not describe three relevant issues or did not explain them fully. Standardised components were often completely misunderstood. Specific examples/evidence were rarely used to support conclusions. Candidates who understood standardised components covered cheaper repairs, extending the lifespan of products and lowering costs for manufacturers well.

Section C

Question 7

- (a) There were many well-structured answers showing a range of ideas with sensible mechanisms detailed. However, in some answers there was limited development. A variety of methods of evaluation were given. The final solution was generally identified and with good detail. Evaluation ranged from generic commentary through to some excellent annotation of positive and negative points.
- (b) This question was often answered well.
- (c) Wheels were often attached and there were good levels of detail in answers to this question. Some candidates did not demonstrate how the wheels would be able to rotate.
- (d) This question was generally well answered and candidates showed a variety of rendering styles and quality. However, some candidates did not fully answer the question as they did not apply any render. There were some outstanding responses with superb three-dimensional drawings.

Question 8

- (a) Candidates often produced a range of ideas for the design of the box but unfortunately without showing the net. 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) Only stronger candidates answered this question well. Most candidates did not give a range of different ideas. The range of lettering was often very similar in style.
- (c) A limited range of designs was seen in answers. However, stronger candidates answered well.
- (d) This question was generally well answered and candidates showed a variety of rendering styles and quality. However, some candidates did not fully answer the question as they did not apply any render. There were some outstanding responses with superb three-dimensional drawings.

Question 9

- (a) Many candidates answered this well and most produced a range of ideas for viable solutions. Three ideas were regularly produced with some candidates showing very good development. Good responses also clearly detailed how to attach the back rest to the base of the chair. Evaluation ranged from generic commentary through to some excellent annotation of positive and negative points.
- (b) Stronger answers detailed innovative arm rests with clear attachment proposals to the frame of the chair.
- (c) There were some very stronger answers to this question that showed both innovation and functionality.
- (d) This question was generally well answered and candidates showed a variety of rendering styles and quality. However, some candidates did not fully answer the question as they did not apply any render. There were some outstanding responses with superb three-dimensional drawings.

DESIGN AND TECHNOLOGY

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

- Candidates are advised not to spend unnecessary time listing materials, construction methods, fittings and finishes in their responses to the Analysis of and Research into the Design Brief as this cannot be awarded marks in this section of the assessment. Data shown should relate to the Design Brief and not any anticipated product outcome.
- It is important that candidates consider all design specification points when responding to the Generation and Appraisal of Design Ideas.

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 homes or leisure time with friends, with candidates then identifying a design need or situation within the topic.

Many interesting design problems were considered with successful and useful outcomes of either models, prototypes or final products. Examples of these outcomes included: outdoor food smoker; laptop support; simple canoe; gymnasium layout; fishing tackle chest; sun lounger; football table; cake stand; drawing equipment storage; energy conservation themed café; laundry storage ironing board unit; bunkbed headboard; water purifier; temporary resting device; back scratcher; sprint starting block; motorcycle stand; elevated lighting system; kayak trailer; hydrofoil; mushroom drier; wheelchair height adjustment; stepladder chair; emergency shelter; fishing rod holder; dog kennel feeding station; lunchbox; backpack; motor scooter; meat drying cabinet; portable housing; wakeboarding winch; workshop trolley; bicycle rack.

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

Comments on Individual Assessment Criteria

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 included a detailed description of the need and identified the intended user(s).

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

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

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

Generation and Appraisal of Design Ideas

A wide range of ideas were seen and there was a high standard of communication technique used in the presentation of design proposals. This allowed the development of the candidates' thought process to be seen.

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 their ideas however practical or appropriate they appeared at the time. These were then appraised so that other ideas could develop and be drawn together to form the final design solution.

Modelling of Ideas

Modelling has a clear purpose in any design process and it is important that candidates pay 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. Candidates who considered this were able to achieve high marks.

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, relating to the model, can be carried out later.

DESIGN AND TECHNOLOGY

Paper 9705/32
Written 2

Key messages

- In **Section A**, some questions require the candidate to use notes and sketches to describe a process or the manufacture of a product. It would be advisable for the candidate to make a quick list of key stages before commencing the answer to ensure that a full answer is given.
- Candidates are generally well prepared for this paper. Many start the design questions in **Section B** with a generic scatter chart but do not go on to make specific reference to the design problem.
- Ensure that candidates who have been prepared for **Parts B** or **C** have access to a range of drawing equipment. Whilst constructional work is carried out accurately by most candidates, some present their answers in the answer booklet or roughly onto A4 or A3 paper which puts them at a great disadvantage.

General comments

There were many outstanding scripts this year with full and detailed responses to **Section A** and excellent design skills demonstrated in **Section B**.

Whilst many candidates followed the rubric correctly, time management continues to be an issue for some. Some candidates spent far too long on **Section B**, making very brief and limited attempts to questions in **Section A**. A significant number of candidates did not complete all parts of the design question.

Many candidates used sketches exceptionally well to describe the stages of processes and support their answers to questions in **Section A**.

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

Candidates are reminded that if a question has an instruction 'discuss'; they should:

- examine critically the issues raised by the question
- explain and interpret these issues as appropriate
- introduce evidence wherever possible to support conclusions of arguments.

In **Section B**, candidates should be reminded to focus on their analysis of the design situation and not copy out the given details. Specifications are often generic statements or a single word. They should be clear and state the main functions and qualities of the product.

In **Section A**, **Part A** was the most popular. Most candidates attempted **Question 1** and **Question 2**. Very few candidates attempted questions from **Part B**.

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

Questions 10 and **12** were the most popular in **Section B**. **Question 10** was marginally the most popular.

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

Comments on specific questions

Section A

Part A – Product Design

Question 1

- (a) Compression moulding of the plug socket was the most popular choice with even numbers of candidates answering milling of the bracket and turning the wooden egg cup. Many candidates demonstrated a good knowledge of the compression moulding process; relatively few candidates produced fully detailed responses for milling and turning.

Most candidates made good use of annotated sketches to support their answer.

- (b) Most candidates explained why the process was suitable for the specific item and achieved high marks. Many candidates gave very brief or single word responses with no explanation, which did not achieve full credit.

Question 2

- (a) A wide range of appropriate, specific materials were stated and valid reasons for choice given for the handle. Although most candidates gave valid reasons for their choice, a few candidates listed properties of the material with no reference to the handle.

- (b) Most responses were full. However, many candidates did not give details of how the two parts of the handle could be joined and gave very limited or no detail of the M8 thread.

- (c) Most candidates changed materials and explained how the handle could be injection moulded. Whilst the process was generally fully described, relatively few candidates gave details of the mould required and how the M8 thread could be produced.

Question 3

Some candidates produced well-structured discussions focusing on the economic factors of each of the key components given; designing, manufacturing and marketing. A number did not select a product to base their discussion on and many gave no examples or evidence to support their answer.

Part B – Practical Technology

Question 4

- (a) Candidates had good knowledge of rotational and blow moulding but very few compared and contrasted the processes. All candidates gave appropriate examples.

- (b) Answers to this part were generally good. Candidates produced well written discussions covering appropriate issues of technological developments with appropriate supporting examples.

Question 5

- (a) Candidates correctly determined the magnitude and direction of the force.

- (b) Few candidates attempted this part. The terms effort and velocity ratio were understood.

- (c) (i) Most gave the correct answer of anti-clockwise.

- (ii) Very few correctly calculated the gear ratio.

- (d) There were some excellent responses to this part. Most identified wear and heat as drawbacks and braking as a benefit of friction in a car.

Question 6

There were few attempts to this question. Responses were generally fully detailed. Most components were clearly understood, only very few candidates knew the working of a Darlington Pair and Schmitt trigger

Part C – Graphic Products

Question 7

- (a) Most candidates accurately drew the given views to the correct scale, very few constructed the correct lines of intersection. Line quality was generally very good.
- (b) As a result of the incomplete or incorrect lines of intersection, the development was often incomplete or incorrect.

Question 8

- (a) Most candidates had a good knowledge of 2D and 3D modelling and made good reference to computer modelling. Many had knowledge of what scale models are, but a number did not describe how they are used by a designer.
- (b) Not all candidates explained two benefits of CAD specifically for graphic products. Most responses tended to be too brief to cover all aspects of the question. Few candidates included examples to support their answer.
- (c) This question was generally well answered. Most candidates demonstrated a clear understanding of the importance of researching existing products to inform of successful or unsuccessful features of similar products and gauge trends in the market.

Question 9

There were many excellent responses to this question.

Most candidates produced an estimated two-point presentation view of the shelter. All features were generally drawn accurately and in proportion. Relatively few candidates rendered the shelter to clearly show the wood cladding and represent the clear plastic panels.

Section B

The overall performance of candidates on this section continues to be generally good.

Most candidates made best use of their time and fully completed all requirements of the question. There was an increase in the numbers of innovative and creative responses for all the questions. However, some candidates produced very basic, similar design ideas, many of them of already existing products. They often had limited personal interpretation and exploration and consequently did not access the higher mark ranges.

There was a clear knowledge and understanding of appropriate materials and construction techniques in the annotation of ideas and development of most candidates.

Candidates should be reminded to focus on their analysis of the design situation and not copy out the given details. They should focus on the problem given and consider all factors required to prepare a specification and commence designing.

Specifications are often generic statements or a single word. They should be clear and state the main functions and qualities of the product.

Most candidates produced an adequate range of annotated and different design ideas, an increasing number included the exploration of sub-problems.

Many candidates used tick lists to evaluate their ideas and select a solution for development. They are only appropriate if they are adequately qualified. It is important that candidates have evidence of their design thinking when deciding upon which features should be worked upon and taken forward.

The development of ideas section was generally good. Some candidates focused only on methods of manufacture. They needed to consider the reasoning and composition of ideas that leads to a single final design proposal to access the higher mark range.

Proposed solutions were generally functional and presented well. Many candidates included some dimensional detail and specific features such as materials, finishes and additional components of the final design.

Evaluations of the proposed solution were mostly too brief with some candidates using a tick list against the specification. High marks were awarded when candidates produced a valid evaluation of the proposed solution based on the specification which described the positive features, functional details and suggests possible improvements.

Question 10

A popular question which was generally well answered. There were many outstanding responses presenting a range of innovative solutions. Most candidates considered all the given design requirements, but a significant number of candidates focused on the washing and storage functions and paid less attention to the product's ability to stand on uneven ground.

Acceptable specification points included:

- the product could have an integrated water supply to ensure ease of use
- the product must be made from weather resistant materials or suitably protected as it may be used outdoors
- the product must hold plates, pans and cutlery after washing to allow them to drain/dry
- the product must be quick and easy to assemble and disassemble so that little time is wasted when camping
- the product must be able to be adjusted easily and fixed securely when standing on uneven ground.

Most candidates produced a range of possible solutions, selecting and justifying appropriate materials. Not all candidates considered the requirement to be able to stand on uneven ground.

Material and constructional detail was generally detailed and appropriate. Tubular aluminium frameworks were popular with vacuum formed washing and storage areas.

Final proposals were generally functional and described in enough detail.

Evaluations were generally good although many candidates produced tick lists with limited comment on strengths and weaknesses of the proposal.

Question 11

There were several outstanding responses with candidates exploring a wide range of well-engineered possibilities. Some candidates focused on very basic wheeled scoops and others used a range of mechanical systems to develop sophisticated handheld devices. Most methods proposed were functional.

Acceptable specification points included:

- the product should present no risk to children, trapping fingers etc.
- the product should include storage for up to 50 cones
- the product must be lightweight to manipulate easily and carry the added weight of cones
- the product must be adjustable to cater for use by different age groups
- the product should be very easy to operate and understand as it will be used by adults and children.

Question 12

This question had a wide range of responses. Many candidates explored ideas using resistant materials only when a wider range of options including different types of card may have been more suitable. Some of the proposed solutions were far too heavy and too expensive for the transportation of four pots of herbs.

Acceptable specification points included:

- the packaging could be laminated to prevent damage from moisture from over watered herbs
- the packaging should be stable and stand upright when being transported in the back of a car
- the name and logo should have a colour coordinated theme of natural shades and shapes
- the packaging should be designed as flat pack to enable ease of storage and distribution
- the packaging should have handles large enough to carry comfortably but prevent damage to the herb plants.

Some of the best responses focused on the design of easy to assemble card packaging that would securely hold four herb pots. Most candidates made excellent use of high-quality developments/nets, some having handles designed in, others designed to attach string or plastic handles. The designs for the product name and logo were in most cases of a very high standard.

Many candidates produced work where the design thinking, and decision making was clear from analysis to through to proposed solution.

DESIGN AND TECHNOLOGY

Paper 9705/04
Project 2

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

Comments on Individual Assessment Criteria

Product Development

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

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

Product Planning

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

Product Realisation

The made product forms the culmination and realisation of many hours of detailed design work for most candidates and it was evident that much care had been given to this stage of their project. It was obvious that many candidates had developed fairly advanced making skills whether this was through the use of resistant materials, graphics or other media. It was clear that most products were constructed and finished to the required standard for use and many very successful outcomes were seen.

Some 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.

Testing and Evaluation

Many candidates carried out meaningful testing and evaluation and showed evidence of this. This can only be completed successfully if the results of the testing are then compared to the original design specification.

Some candidates simply produced a list of the specification points and then completed a tick box alongside when they felt that a particular requirement had been met. This simplistic approach was insufficient for the award of high marks and candidates should be encouraged to evaluate critically with reasons and evidence to support their judgements.