

# DESIGN AND TECHNOLOGY

Paper 0445/01

Design

## General comments

**Question 1** was, by far, the most popular choice for candidates and in the majority of cases it was likely that they answered the question that was based on their syllabus option choice. There was no requirement for candidates to do this but they clearly chose the one with which they felt most comfortable. **Question 3** was the next most popular with a very small number of candidates opting for **Question 2**.

The majority of candidates made good use of the pre-printed answer sheets, which were being used for the first time in the November examination. It is important that candidates follow the instructions on the sheets and answer only in the spaces provided for each part of the chosen question. Some candidates evaluated their design ideas in part (c) although this should have been done in the space provided for part (d). Centres are asked to remind their candidates to respond to their chosen question only in the spaces corresponding to each part of the question.

## Comments on specific questions

### Question 1

Candidates appeared to understand the design requirements of this question and most went on to propose designs that would be appropriate to some degree. Some candidates designed carriers to accommodate the bags being carried by the pupils shown in the introductory drawing to the question while others developed ideas into which books and other equipment could be placed directly. As with any design question of this type all interpretations of the design situation were acceptable. Some design ideas were for rather large carriers that would have been quite difficult to store at school.

- (a) Candidates responded well to this introductory part of the question and functional aspects of the wheeled carrier, suggested by candidates, included: able to carry heavy items; stable in use; lightweight; easy to move; comfortable to pull; compact/foldable for easy storage at school; protect from rain and dirt; places for specific items, etc.
- (b) Most candidates were able to draw at least one type of temporary fixing although, unfortunately, some were confused between temporary and permanent. Appropriate responses included: bolts and nuts; screws; spring clips; rubber bands/straps; push in clips; pins, etc. Some candidates interpreted the question with response to temporary holding devices used when constructing and so items such as G-cramp and sash cramp were also accepted.
- (c) Responses to this part of the design questions have improved over recent examinations and the majority of candidates were able to suggest three or four different ideas. Candidates are expected to produce clear drawings using appropriate techniques so that design detail is clear to the viewer. Drawings can be enhanced in this respect through the use of shading or colour. Drawings should be more than just simple outlines if the general layout and form of the design concept is to be clear. Many candidates used annotation to good effect to provide more information. Marks are awarded for the quality of communication skills and the suitability of designs.

It is possible for candidates to achieve full marks by offering just three **different** ideas so long as the other requirements of the marking scheme are met. Marks are awarded pro-rata if fewer than three ideas are offered. It is suggested that candidates make full use of the space provided, on the answer sheets, for their response to this part of the question.

- (d) Most candidates evaluated each of their design ideas in turn and then identified the chosen idea with reasons for their choice. Candidates are expected to evaluate at least three design ideas and then to identify the chosen idea, giving reasons. As has already been mentioned, it is important that candidates carry out the evaluation in the space provided, and not alongside their design ideas as in part (c).
- (e) This part of the design question is still that answered least successfully. Many candidates produced good quality drawings but they overlooked the need to provide construction details, as asked for in the question, and therefore reduced the marks available to them. Candidates are not restricted to any particular type of drawing method so long as they can provide the required detail. Many do so through the use of good pictorial views. It is a requirement of this part of the question that important dimensions are also given on the drawings.
- (f) Most candidates were able to suggest some of the materials that might be used to construct their final product. As has been said many times before, it is vital that candidates suggest **specific** materials and the use of generic terms such as wood, metal and plastics cannot be awarded any marks. Reasons for the choice of material must obviously be relevant to the suggested design. For the award of full marks candidates are expected to identify at least two specific materials with sound reasons for choice.
- (g) Few candidates were able to outline the manufacture of one part of their suggested solution in a practical way as, unfortunately, techniques were often too general in description or not specific to the suggested product. Examiners are looking for simple step by step procedures with processes and tools identified in a meaningful way.

## Question 2

The requirement for a kit for a self-assembly cardboard model was intended for candidates following the Graphic Products option and it was anticipated that semi-resistant materials would be used in most cases. As has already been stated, this was the least popular question and in most cases candidates attempting the question failed to apply any degree of real creativity to their responses.

- (a) Candidates seemed to be aware of the requirements for a model of this type and suggested functional points for the kit such as: easy to assemble; colourful; good representation of vehicle; inclusion of maker's name; attract attention, etc.
- (b) Most candidates were familiar with temporary joints that could be used on card and produced recognisable drawings of: tabs/slots; stationary rivets; slotted corner pieces; 'Velcro'; adhesive tape, etc.
- (c) )
- (d) ) See **Question 1 (c) – (e)**
- (e) )
- (f) The majority of candidates had some knowledge of the use of computers in the design or manufacture of models and responses covered areas such as: CAD/CAM; the design and cutting of developments; trialling of colour; the preparation and printing of graphics generally, etc.
- (g) Candidates were generally able to design a box for the transportation of 50 model kits. Marks were awarded for the quality of the design, the quality of graphics and the appropriateness of the methods used to assemble the box and provide access to the contents.

**Question 3**

The examiners were pleased and reassured by the quality of responses to this question which was for candidates following the Systems and Control option. Although design solutions for the temporary shower were not always that sophisticated, candidates did show that they were aware of the inherent problems and produced some reasonably practical solutions.

- (a) Although some candidates seemed to overlook the temporary nature of the shower in their subsequent design ideas they did focus on this in the functional requirements which included: lightweight; easy to assemble; easy to control; stable once erected; hot and cold water required; easy to clean; privacy required; use of non corrosive materials, etc.
- (b) Most candidates were able to identify at least one appropriate way of providing suitable water pressure for the shower and suggestions included: overhead tank or bucket feed; electric/wind up/hand/petrol driven water pump; piped supply from higher stream, etc.
- (c) )
- (d) )
- (e) ) See **Question 1 (c) – (g)**
- (f) )
- (g) )

# DESIGN AND TECHNOLOGY

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Paper 0445/02  
Graphic Products

## General comments

This was the first November examination paper for the new syllabus. The A3 format proved to be popular. Candidates were required to complete all questions in **Section A (A1, A2 and A3)** and then go on to answer *either B4 or B5* from **Section B**. This instruction was not followed by all candidates. **Question B4** was the most popular of the option questions for candidates.

The standard of work was comparable to that of the previous year.

There are areas of the syllabus however, in which further improvements are needed. These include in particular, geometrical constructions for plotting curves and the correct method for projecting views in orthographic projection. The drawing of regular polygons and ellipses are also areas for improvement. With the syllabus change to 'Graphic Products' from 'Communication', Centres must focus their activities within the scope of the application of this subject area to Graphic Products.

Centres are advised **not** to secure the papers together with string or the use of a treasury tag. Candidate's sheets should be placed in the folder provided for despatch.

## Comments on specific questions

### **Question A1**

*Pre-School Nursery sign*

Of those who attempted this compulsory question on the paper, many scored high marks. Many candidates drew the rear wheel, rectangular engine and triangle correctly. The square tractor cab of 64 side was achieved by most candidates, whilst the semi-circular roof of the cab proved challenging for many candidates. The construction of the diamond chimney, given the diagonals, created many inaccurate drawings. Many candidates failed to get the wheelbase correct at the start and this resulted in a loss of marks.

### **Question A2**

*Direction sign 'ENTRANCE'*

This question was attempted by all candidates giving many the opportunity to show their expertise at lettering. The letter 'C' proved to be difficult for candidates who did not 'crate' the available space. One mark was awarded for each correctly shaped letter and one mark each for spacing and height alignment. Many candidates scored at least half of the available marks.

**Question A3***Card Tray*

Unfortunately not all candidates attempted this compulsory question losing the marks available.

- (a)(i) Many candidates entered an incorrect measurement on one of the dimension lines. The scale of the drawing was generally ignored. Only responses of 500, 250 or 125 were allowed to obtain the mark.
- (ii) An orthographic symbol was attempted by most candidates. Marks were awarded for the correct way round, and quality symbol in projection. Many candidates drew a correct symbol but not with instruments or in projection.
- (b) Many candidates drew the tray in the correct orientation with the long side going to the left from starter point A. Unfortunately the sides were not always to the correct dimension or scale
- (c) Many good ideas for locating and stacking the trays were seen. The sketching of these design ideas was not very well done and many had accompanying notes missing. A small number of candidates misread the question and drew in compartments within the tray as their response.

**Question B4***Direction Sign for Fast Food Outlet*

This was by far the most popular of the two choice questions. Few candidates scored more than half marks for their answers.

This question was derived from an actual 'Graphic Product'.

With the syllabus change to Graphic Products from 'Communication', Centres must focus their activities within the scope of the application of this subject area to Graphic Products.

- (a) Many candidates drew a semi-ellipse within the height and width parameters given. Marks were awarded for construction and some accurate responses were seen where there was no evidence of construction. If a trammel is used, this should be attached to the candidate's paper so that marks can be awarded.
- (b) Completing the remainder of the 'burger' appeared to be well done by most candidates. However, the construction of the two R10 arcs proved to be difficult for some candidates.
- (c) Many candidates failed to recognise that they had been given part of the outline of a square from which the semi-octagon can be constructed. Once a diagonal had been drawn, arcs centred on each corner can be swung down to give the correct length and position of each side of the half octagon. Most candidates lost marks on this part of the question.
- (d) The drawing of the base and one side of the cup was not always accurate by many candidates. The drawing of the straw to the correct height was achieved by many candidates.
- (e) The completion of the direction arrow was intended to be done by radiating lines from a vanishing point. Few candidates drew in the VP and many struggled to draw the arrow using calculations and parallel lines. Few candidates gained more than half of the available marks for this part of the question.

**Question B5***Packaging of sweets 'Shuttles'*

This question was attempted by very few candidates. The working and order of the instruction in the question should lead the candidate to the correct response. Where candidates followed these instructions, a correct solution was drawn for the Plan and Elevation and this could be projected to form the basis of the development. Where this requirement was followed, candidates scored high marks. Overall, candidates gained a wide range of marks for their answers.

This question was also derived from a real 'Graphic Product'. A cut-out and make activity using this question would benefit many candidates in the future.

- (a) Marks were awarded for a plan showing a regular hexagon with a  $\text{Ø}50$  hole and an end view in projection to the plan to the correct height, showing the sloping top. Many candidates failed to draw the thin card fin on the elevation.
- (b) Many candidates managed to roll out six sides of the development. Where candidates had aligned their end view with the given side **A**, this proved to be very accurate. Most candidates managed to draw the development with two sides to the left of the given side **A**. Many candidates failed to get the true length from the sloping sides of the end view to give the correct heights to the hexagonal lid.
- (c) A range of correct solutions was seen for attaching the fin to the body without using glue. Unfortunately the quality of pictorially sketching the design was not to a very high standard.

Of the candidates who attempted this question, a wide range of marks were scored.

# DESIGN AND TECHNOLOGY

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**Paper 0445/03**  
**Resistant Materials**

## General comments

### **Section A**

This section tests candidates' knowledge and understanding of materials, tools/equipment and processes involved in working with resistant materials: wood, metal and plastic. Generally, candidates answered wood based questions better than those concerned with metal or plastic.

### **Section B**

**Question 11** was the most popular question, answered by the majority of candidates, while **Question 12** was attempted by only a small minority of candidates. Candidates generally showed a better understanding of wood based techniques than those who answered the questions with a plastics or metal bias. The performance of candidates attempting **Question 12** was very poor. Candidates should understand that in those questions requiring design modifications for larger mark allocations, clear sketches and accurate written notes are essential to gain maximum marks.

## Comments on specific questions

### **Section A**

#### **Question 1**

Very few candidates could name a suitable saw to shape 1 mm thick copper but many were able to name a coping saw or an equivalent saw to shape 4 mm thick plywood.

#### **Question 2**

The majority of candidates provided vague answers when describing uses for contact and epoxy resin adhesives. The question required a specific use for both; for example, gluing a plastic laminate to a manufactured board and gluing a combination of materials together such as metal to wood and metal to glass respectively.

#### **Question 3**

The majority of candidates completed a good sketch of a lap joint.

#### **Question 4**

Candidates demonstrated a very poor knowledge of plastics used in the manufacture a variety of products.

#### **Question 5**

Most candidates described using a try square to test for squareness but only a minority were able to give a second method: measuring the diagonal distances.

#### **Question 6**

Most candidates gained at least 1 mark for completing the sketch showing the construction of plywood. The best answers, achieving maximum two marks, showed clearly an odd number of layers with grain shown at 90° to each layer.

**Question 7**

Most candidates answered **part (a)** correctly, naming outside calipers or a micrometer. **Part (b)** was answered. The correct tool named by a minority of candidates was either a centre square or outside calipers.

**Question 8**

Many candidates could explain that the purpose of a knurled surface was to provide grip, but few described how a centre lathe and a knurling tool would be used to produce the knurled surface.

**Question 9**

Most candidates named a pencil, rule, try square, marking or mortise gauges as tools that could be used to mark out the joint shown.

**Question 10**

The majority of candidates named sash cramps correctly for **part (a)**. There were many excellent sketches showing the cramps in the correct position, i.e. two on top and one underneath or vice versa.

**Section B****Question 11**

- (a)(i) Most candidates named a suitable manufactured board for the cabinet, plywood being the most popular answer. Blockboard and laminboard were not suitable for the cabinet.
- (ii) Many candidates gave cheaper than solid wood as a good reason for using a manufactured board. A second reason proved difficult for many candidates, but there were good reasons given, including the stability of manufactured boards and their availability in larger sizes.
- (iii) Most answers were appropriate, within the range 15-21 mm.
- (b)(i) The vast majority of candidates named appropriate marking out tools to mark out the end panels and shelves for the cabinet. Some candidates confused set square for try square.
- (ii) Most candidates understood that the space between the marked out lengths was for the saw cut, some stated saw kerf and others gave sensible reasons relating to making sure that the required lengths were not made shorter when they were sawn.
- (iii) Only a minority of candidates named a jig saw or panel saw.
- (iv) There were some excellent descriptions of how splintering could be overcome when sawing manufactured boards. The best answers were to use scrap wood underneath to support the sawn surface or to use a knife to cut the fibres of the board.
- (c)(i) Most candidates achieved some marks for this question. The majority of correct answers included the use of blocks, dowel and screws. Unfortunately, many candidates did not consider the key word, 'temporarily' when showing how the shelf could be joined to the end panel.
- (ii) When joining the shelf 'permanently' a sound joint requiring the use of glue was required. Not every candidate included glue but there were many excellent sketches of housing joints, some of which were 'stopped'
- (d) There were many good answers showing how the drawer could run inside the cabinet. The best answers showed some form of runner applied to the side of the drawer and a groove into which the runner would slide. Some candidates used wheels but often the lack of clarity in the sketches meant that it was difficult to understand exactly how the drawer would be supported and run smoothly.

**Question 12**

- (a)(i) Very few candidates named polystyrene as a suitable plastic for vacuum forming. Disappointing as it is by far the most suitable and commonly used plastic for vacuum forming.
- (ii) A wide variety of products were available but candidates generally named products that would have been produced by injection moulding.
- (b) The drawing showed the former used to make the moneybox. The three features that candidates should have recognised were the sloping sides or draft angle, the rounded corners and edges and the holes to make sure that the air could be sucked out effectively. Very few candidates gave correct answers.
- (c) There were six marks available for candidates to show how the former could be made from the block of wood in Fig. 8. The best answers described
- how the block would be marked out on two faces and named appropriate marking out tools;
  - how the block could be held securely to a bench and sawn;
  - how the sides and edges could be planed, filed and/or glasspapered.
- Most candidates achieved some marks for this but none achieved maximum marks.
- (d) This question gave candidates the opportunity to demonstrate their knowledge and understanding of the vacuum forming process. Some candidates provided five sensible stages involved in the process while others clearly had no experience of the process.
- (e) There were six marks available for candidates to show modifications to the moneybox so that a base could be fitted. Most candidates achieved some marks for sensible solutions including the use of screws into a wooden base. Sometimes candidates failed to consider that the plastic used for the moneybox would only be 1-2 mm thick.
- (f) Most candidates understood that wood was a more durable material than plastic for the moneybox but were unable to give an advantage for using plastic. There were some vague answers referring to vacuum forming being a quick and easy process. This type of answer required some justification to achieve marks.

**Question 13**

- (a)(i) Most candidates named two marking out tools, the most common being rule, scribe and centre punch. Some named dividers but these would not be used to mark out the net shown in the question.
- (ii) Many candidates were unable to describe how a template could be used to mark out twenty lanterns with the most popular answer relating to it being faster. This only achieved one of the two marks available.
- (iii) Most candidates achieved some marks by adding tabs to the net of the lantern. Some candidates drew tabs on all eight sides which was unnecessary and sometimes the tabs drawn were not an appropriate shape. In both cases candidates were able to achieve only less than maximum marks.
- (b) Most candidates achieved one or two marks for naming an appropriate cutting tool. The most popular being hacksaw, tin snips and bench shears.
- (c)(i) There were many correct answers naming a three square or triangular file, but flat and hand files were also named. These would not file the inside corner of the sheet metal.
- (ii) To achieve maximum marks candidates needed to show the sheet metal clamped securely by means of a vice or clamped to a work bench and supported in a vice with folding bars or scrap wood.
- (iii) Many candidates achieved at least some marks for this question, but few achieved maximum four marks.

- (d) Very few candidates identified the danger of the sheet metal snagging, spinning around the drill and distorting the shape of the hole. Most gave answers relating to personal safety with reference to snagging.
- (e) The vast majority of candidates gave two sensible reasons for applying a painted finish; the best relating to improving appearance and to resist corrosion.
- (f) Few candidates achieved maximum marks for this question. Joining the sheet steel lantern top to the plastic base required screws or nuts and bolts. In addition, it was important that the top was held securely to the base either along two sides or at the ends.

# DESIGN AND TECHNOLOGY

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**Paper 0445/04**  
**Systems and Control**

## General comments

Good responses were characterised by the use of appropriate technological terminology and were supported by examples drawn from candidates' hands on experience of processes, components and project work. The use of annotated sketches was indicative of good responses. One area of very good practice was in 'Mechanisms' where responses showed clear evidence of good teaching, preparation and practical application of knowledge. Only a small number of candidates attempted the Electronics and Logic question but responses were characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of structures was less satisfactory.

## Comments on specific questions

### **Section A**

#### **Question 1**

Most candidates identified the tie to be experiencing tension.

#### **Question 2**

Most candidates identified the electrolytic capacitor and could give an appropriate application for it.

#### **Question 3**

Diagrams of the pear cam and flat follower were generally well conceived. Most candidates identified the chain and sprocket mechanism.

#### **Question 4**

Most candidates identified the second order lever and were able to give an appropriate application for it.

#### **Question 5**

- (a) Most candidates could draw an arrow showing the output in the opposite direction to the input.
- (b) Few candidates identified linear motion as the output motion.
- (c) Few candidates were able to identify the reversing function of this mechanism.

#### **Question 6**

Most candidates identified an appropriate application for the honeycomb cell structure. Most candidates identified the reinforced beam and were able to give an appropriate application.

#### **Question 7**

The NOT gate was generally identified correctly.

#### **Question 8**

- (a) Most candidates identified the LDR as a light sensor.
- (b) Most candidates identified an appropriate application for the LDR.

#### **Question 9**

Few candidates were able to give a specific use for a strain gauge.

**Question 10**

Most candidates identified two appropriate reinforcing methods for frame structures.

**Section B****Question 11**

- (a) Few candidates were able to describe the change in axis of rotation from horizontal to vertical direction.
- (b)(i) Most candidates identified the bevel gear system.
- (ii) Most candidates identified the use of the gearing to increase the output speed.
- (iii) Few candidates were able to describe the need for the second gear wheel as a means of stabilising the gear system and maintaining engagement of the driver and driven gears.
- (c) Most candidates identified the use of a crank to improve the mechanical advantage and thus reduce the input effort needed.
- (d)(i) Few candidates were able to determine the 5:1 gearing ratio.
- (ii) Few candidates calculated the increase in output speed at 300 rpm.
- (e)(i) Most candidates identified the low slip and positive drive afforded by the toothed belt.
- (ii) Few candidates were able to explain how, with time, the rubber belt can lose elasticity, perish and eventually snap.
- (iii) Most candidates identified an appropriate use for the toothed belt.
- (iv) Most candidates identified the correct formula for Velocity Ratio.
- (f) Most candidates identified the use of 'V' belts used for the cone pulley system in a pillar drill.

**Question 12**

- (a)(i) Most candidates identified a frame structure from the Figure.
- (ii) Most candidates identified a shell structure from the Figure.
- (b) Few candidates were able to explain how a frame structure relies on a system of members to disperse load and how a shell structure dissipates load over its entire skin.
- (c) This part was not well answered. Few candidates explained how a structure supports its own mass and any applied loads. Few candidates explained the ability of structures to bridge a gap and carry a load across the gap. Few candidates were able to explain the ability of a structure to hold a load inside and protect it.
- (d) Few candidates were able to explain how a static load remains constant and stationary whereas a dynamic load fluctuates due to its movement.
- (e)(i) Few candidates were able to identify the parts:
- |   |         |
|---|---------|
| 1 | Column, |
| 2 | Beam,   |
| 3 | Brace.  |
- (ii) Most candidates identified a strut as experiencing Compressive loading.
- (iii) Few candidates were able to show how the triangulation within a structure promotes rigidity within a structure.
- (iv) Most candidates identified the use of a gusset plate and were able to support their responses with annotated diagrams.

- (f) Few candidates were able to explain how a redundant member has no effect on the integrity of a framework and that if removed the structure would still support the applied load.

**Question 13**

- (a) Few candidates were able to correctly draw the block diagram representation of the circuit operation.
  - (b)(i) Most candidates identified the relay.
  - (ii) Most candidates identified the interfacing function of the relay.
  - (iii) Most candidates identified the use of the diode to stop damage to the transistor from back emf generated by the coil of the relay.
  - (iv) Few candidates were able to explain how the VR is used to vary the sensitivity of the biasing for the LDR and the subsequent control of the OP Amp.
  - (v) Few candidates explained the use of the resistor to set the voltage for the lamp.
- (c) The potential divider controls the gain of the op amp.
- (d) Few candidates were able to explain how changing the position of LDR and the VR would enable the circuit to switch on when light is shining on the LDR.
- (e)(i) Most candidates successfully completed the truth table for the AND gate system.
  - (ii) Most candidates identified the AND logic gate.

# DESIGN AND TECHNOLOGY

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Paper 0445/05

School Based Assessment

## General comments

The majority of Centres submitted their coursework sample on time and in line with CIE's requirements. The work was generally well presented and appropriately labelled for identification purposes. However, a few Centres are reminded of the need to include the Coursework Assessment Summary Form 0445/05/CW/S/07 and the Moderator copy of MS1 with the sample of work. The latter is important, particularly where internal moderation has taken place, as the Moderator needs to check that the appropriate marks have been submitted to CIE on form MS1.

The Moderator is also pleased to report that only one or two Centres failed to use the new assessment criteria and, in these cases, marks were adjusted to make allowance for the revised mark scheme and total marks awarded.

As has generally been the case in the past, most candidates had chosen to solve design tasks linked to their own areas of interest or local needs. There was a wide range of outcomes and some of the more unusual products included: motor cycle ramp; portable reading light; football board game; minibus seating; rodent trap; camping cutlery holder; biltong cutter; bus loading aid; pedestrian crossing system; biscuit packaging; potato chopper; school information board; road signs; bill board; dog kennel; mechanisms teaching aid alongside the usual range of furniture, household and garden equipment.

## Comments on specific assessment headings

### **Identification of a need or opportunity with a brief analysis leading to a Design Brief**

The vast majority of candidates were able to describe clearly the context of the design problem and how this affected the user. This was followed by a Design Brief stating in simple terms what the candidate was going to do. After reading this section of the folder there should be no doubt as to what will follow in terms of the context for the design process.

### **Research into the Design Brief resulting in a Specification**

Candidates used this section to consider the requirements of the design brief and to collect relevant information and other data. The majority also considered existing products to help inform themselves of the issues to be considered. Where candidates use the 'paste up' method to exemplify existing solutions it is important to annotate these and make qualified comment.

Unfortunately some Centres are still allowing their candidates to reproduce pages of information, often taken directly from textbooks, on materials, constructions, fittings, etc. at a stage when they have not even started to develop design ideas. The Moderator has brought this to the attention of Centres in the past and reminds them that content of this type cannot be marked positively at this stage of a design process.

Candidates are generally being quite specific in listing specification points and this is reassuring. However, it is important that they do not start to solve the design problem at this stage. For example, a candidate might identify the need for a product to be weatherproof, as it will be outside, but they should not state that: 'it will be varnished'. This would follow later in the Development when alternative finishes are considered.

## **Generation and Exploration of Design Ideas**

The Moderator never fails to be impressed by the range of design ideas presented by some candidates. They allow their minds to flow freely and record their thoughts through clear drawings and relevant annotations, linking back to the Specification points. There are no 'good' or 'bad' designs at this stage and everything should be recorded, however practical it appears at the time.

Candidates are free to use a range of drawing techniques in this section although successful candidates sensibly make use of pictorial sketches enhanced with colour and/or shading.

Unfortunately some candidates already have an idea of what they are going to produce and focus on just one or two ideas rather than thinking in an imaginative way. This approach cannot be awarded marks above the lowest mark range.

## **Development of Proposed Solution**

Candidates' developments tended to be based on one complete design idea identified from the previous section although there is no reason why there should not be an amalgam of different aspects from a range of ideas.

The purpose of this section is for candidates to consider alternatives and make decisions about form, materials, constructions, finishes and all other detail relating to the design. It is important that they give reasons for all decisions made.

It was pleasing to see that many candidates had carried out some form of testing or trialling, a requirement of the new assessment scheme. This often took the form of modelling so that the candidate could get some idea of form or proportion. Where modelling has taken place it is important that design folders include photographic evidence of the outcomes.

Where candidates simply make decisions about form, materials and constructions, without evidence of some investigation and giving valid reasons for choice, then they cannot be awarded marks above the lowest mark range in this section.

## **Planning for Production**

It is always obvious to the reader if this section is evidence of genuine planning and forethought or a record of what has already taken place. It is the former that is obviously required and the latter can only be awarded marks if there is evidence of some form of construction/working drawings. Centres are advised not to waste resources showing pages of photographic evidence of the candidate making the product.

Successful candidates had given an effective order for the stages in making the product together with detailed drawings giving all dimensions and information on layout, form and construction.

## **Product Realisation**

Many candidates had clearly taken a great amount of care in the production of their final solution to the design problem and outcomes were such that they should be proud of their efforts. It is important that candidates are given some guidance so that they do not attempt artefacts that are too large or complex and cannot be finished in the time available.

The majority of design folders included some photographic evidence of made products and the Moderator would like to thank those Centres who took the time to give overall views together with close up detail of different aspects of the artefacts.

## **Testing and Evaluating**

Testing has been given more emphasis in this section of the new assessment scheme and the Moderator is pleased to report that many folders included clear evidence that this had happened. Meaningful evaluation can really only take place when a product is tested against the original specification and the outcome recorded in an objective way. In most cases there will be one or two areas where it will be possible to make recommendations for improvement or modification.

Many candidates used a questionnaire to seek the views of others but, unfortunately, the observations were often wasted by simply recording the results in a tabular form with ticks and crosses. This was the result of inappropriate questions which should have focused in a more objective way on particular parts of the Specification.