

# DESIGN AND TECHNOLOGY

Paper 0445/01

Design

## General comments

The choice of questions on this paper is intended to reflect the specific syllabus optional subject content for which a candidate might have been entered. However, candidates are, in fact, free to select any one of the three questions and **Question 1**, designed to have a Resistant Material focus, was by far the most popular. **Question 2** was the next most popular, with the smallest number of candidates answering **Question 3**.

The Examiner is pleased to report that the majority of Centres now appear to be preparing their candidates to respond to the question of their choice on the pre-printed A3 answer sheets as intended. Where candidates' answers adhere to the size of the spaces provided on these sheets, then they give sufficient time to the requirements and expectations of each part of the question.

Centres are reminded that candidates must not respond with general functional requirements, when responding to **part (a)** of their chosen question, as these will not be marked positively. For example, 'safe in use' is not acceptable but this could be qualified as 'safely positioned so that children cannot reach it' which would be marked as correct.

## Comments on specific questions

### Question 1

Candidates appeared to understand fully the requirements of this question and the design need was clearly one with which they were familiar in their normal day-to-day experiences. Suggested outcomes covered the full range of materials with all types of wood, metal and plastic included.

- (a) Candidates responded well to this introductory part of the question and functional points additional to those set out in the question included: accessible in position; stable in use; portable (lightweight); easy to replace paper roll; allow roll to rotate, roll secure in use; hygienic (easy to clean); does not take up too much space; matches the design of kitchen, etc.
- (b) Very few candidates had difficulty in drawing two places in a kitchen where the roll storage device might be positioned. As anticipated, popular positions were: standing on a work surface; fixed to a wall; in a drawer; on the inside of a cupboard, etc.
- (c) Responses to this part of the design questions have improved considerably over recent examinations and the majority of candidates were able to draw three or four different ideas. Candidates are expected to produce clear drawings using appropriate techniques so that all design detail is clear to the viewer. Marks are awarded for the quality of communication techniques so drawings should be enhanced through the use of shading or colour and appropriate annotation added. Marks are also awarded for the suitability of designs and the detail included.

Centres are reminded that it is possible for candidates to be awarded full marks if they present just three **different** ideas so long as the other requirements of the mark scheme are met. Marks are awarded pro-rata if fewer than three ideas are shown. Candidates are advised to use all of the space provided for this part of the question.

- (d) The majority of candidates evaluated effectively each of their design ideas in turn and then identified the chosen idea with reasons for choice given. It is important that candidates carry out the evaluations in the space provided and not alongside their design ideas in **part (c)**. As has been mentioned in previous examinations, some candidates had been encouraged to produce a table so that each design idea could be compared to specification points. Unfortunately, the result was

often a set of boxes with ticks or crosses and no reasons or qualifications given. Centres are required to comment on good and bad points about their design ideas, so this type of approach can be awarded a maximum of only 3 marks for the evaluation of design ideas.

- (e) Centres have obviously taken heed of the Examiner's comments from previous examinations and responses to this part of the question have improved. There was evidence of good quality drawing and constructional detail was provided either as part of the main presentation or thorough annotation or other surrounding smaller drawings. As has been mentioned before, candidates can choose their own presentation style so long as all constructional detail is clear to the viewer and significant dimensions are included.
- (f) It is intended that candidates' responses to this part of the question follow on from the rest of the design process so, as such, materials suggested should be appropriate and match the design requirements already given. There were occasions when candidates mentioned materials that could not be used for the proposed design so; clearly, marks could not be awarded for these answers. Once again, Centres must be reminded that only **specific** materials will be awarded marks and 'wood', 'metal' and 'plastic' are not acceptable.
- (g) The Examiner was looking for a simple step-by-step approach to this final part of the question indicating that the candidate is familiar with constructional processes to be used for the proposed design. Unfortunately, processes and techniques presented were often too general in nature and description and not specific to the product to be made. Marks were awarded for the appropriateness of the process suggested and the tools/equipment used.

### Question 2

There was a mixed response to this Graphic Products question and some candidates missed the point that the shop display should be light in weight, as stated. As such, materials and constructions were not always those that might be linked to this area of the syllabus content. Centres are advised to give careful guidance to their candidates so that they make an appropriate choice of question.

- (a) Most candidates were able to suggest additional functional requirements of the shop display such as: stable when set up; attracts attention; includes real produce; all round view; easy to transport; movement does not consume too much energy, etc.
- (b) The majority of candidates were familiar with methods that might provide movement in a shop display and they were able to present clear drawings of: sliders; cams; cranks; pendulum; electric/clockwork motors; solenoids; rubber power, etc.
- (c) )
- (d) )
- (e) ) See **Question 1(c) – (g)**
- (f) )
- (g) )

### Question 3

The question was intended to encourage candidates to investigate devices that could be used to pick up litter from the ground. Unfortunately a few candidates spent their time looking at containers into which the litter might be placed. However, those who did direct their efforts as intended produced a good range of lightweight collection devices ranging from simple sweeping tools to sophisticated extendable grabbing devices.

- (a) Additional points about the function of the litter picking device included: simple to operate; light in weight; no bending down; picks up different shapes; single handed use; picks up more than one object, etc.
- (b) The identification and drawing of two moving joints presented few problems for candidates and suggestions included: hinges; pins; bolts/nuts/ rivets; screws; dowels, sliders, 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

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, the freehand drawing to scale of developments (nets) of real life Graphic Products. The drawing of enlargements by graphical methods is also an area 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. An experience of cutting out and making Graphic Products would benefit candidates taking this examination.

Centres are advised not to secure the papers together with string, staples or the use of a treasury tag. Candidate's sheets should be completed with their Name, Centre and candidate Number and placed in the folder provided for despatch.

## Comments on specific questions

### **Question A1**

#### *Headband with Bear Ear*

Most candidates attempted this question with many scoring more than 3 marks. The drawing of the headband to the correct width and to scale was achieved by many. The drawing of the ellipse to scale and in the correct orientation produced a wide range of marks. It must be noted that the question stated that the construction for the ellipse must be clearly shown. Candidates who used a 'trammel' and did not draw it on the paper or attach it with sticky tape lost 3 valuable marks for a 'clear construction'.

### **Question A2**

#### *Name Card*

This question was attempted by all candidates giving them the opportunity to show their expertise at lettering. The letter 'S' proved to be difficult for candidates who did not 'crate' the available space. A large number of candidates omitted the 'S'

One mark was awarded for each correctly shaped letter and one mark each for spacing and height alignment.

### **Question A3**

#### *Leaflet Holder*

Unfortunately not all candidates attempted this compulsory question losing the 10 marks available. Some candidates drew a development to the sizes given and not a pictorial view. Many candidates scored low marks on this compulsory question.

- (a) Very few candidates drew two slots in the 120 base of part **A**.
- (b) Many candidates drew the development (net) full size. Very few candidates drew the two parts correctly assembled and to the correct size.
- A small number of candidates did draw the two parts correctly assembled and in a reasonable pictorial view with the card **A** sloping slightly back.

Had the candidates experienced the cutting out and making of a leaflet holder such as this, they would know how the folding and slotting together of the two parts makes a rigid 3D Graphic Product.

#### Question B4

##### *Zenya's Birthday*

This was by far the most popular of the two choice questions. A full range of marks was seen for this question.

This question clearly showed the application of a 'Graphical Product' to a common event.

- (a) Many candidates drew a bar chart to represent the height on each birthday. A large number failed to read the requirement that the chart was to be to a scale of 1:10.
- (b) Many candidates produced a drawing showing the symbol for a child. The drawings were not always to scale or with the two legs to the same width. The best solutions were drawn by candidates who started by drawing the diameters first and then lining in appropriately.
- (c) Very few candidates drew a line from each end of the given left hand side of the symbol through the same point on the symbol in the question to find the vanishing point. Once this point had been established the completion of the full size calorie symbol is purely a matter of projection. Many candidates drew two arcs that were R24.

#### Question B5

##### *Packaging for a 'slice of Birthday Cake'*

This question was attempted by a small number of candidates.

- (a) A number of candidates managed to get the view from **A** and **B** in the correct position in 3<sup>rd</sup> angle projection. All candidates responses showed a 30° angle and with 150 long sides. The cut out was shown correctly in all cases. Candidates did not always draw the view from **B** correctly with the cut-outs at the bottom and the glue flap shown correctly.
- (b) Many candidates produced a one-piece development with the lines for the cut-out correctly shown and the glue flap in the correct orientation.
- (c) Many candidates drew a method of joining the two flaps but not all solutions would have held the two flaps together securely without glue or sticky tape.

Had the candidates experienced the cutting out and making of such a piece of packaging, they would understand the assembly of the main body and the slotting together of the two flaps to make 3D Graphic Products such as this.

# DESIGN AND TECHNOLOGY

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Paper 0445/03  
Resistant Materials

## General comments

### **Section A**

This section tests a very wide area of knowledge concerned with materials, tools and processes used when working with resistant materials. There were some marked gaps in candidates' knowledge and understanding of those areas of the syllabus dealing with plastics and more so with metals. If candidates want to achieve the highest marks it is essential that they are able to answer questions from all areas equally well.

### **Section B**

**Question 12** was largely concerned with metalworking practices and skills. Very few candidates attempted this question which is a reflection of the lack of knowledge and understanding of this syllabus area which also resulted in the poor performance of many candidates in **Section A**. Candidates are reminded to read the questions carefully and address what is required rather than provide the Examiner with information that is irrelevant to the particular question.

There were many excellent answers to parts of questions describing processes used for specific purposes. These were typified by good, large, clear sketches and accurate technical, detailed notes. Sometimes, however, it was variable quality of communication by way of sketches or written notes that meant candidates failed to achieve the maximum marks available for some questions.

## Comments on specific questions

### **Section A**

#### **Question 1(a)**

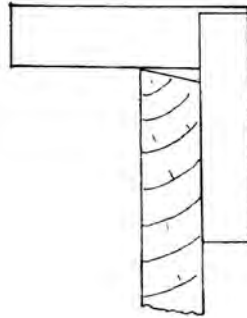
Many candidates gave a sensible reason for covering the vice jaws, the most common reason referring to the need for protection.

#### **Question 1(b)**

The named material was aluminium or tinfoil and not steel as was stated in many incorrect answers.

**Question 2**

The best answers showed the stock of the try square up against the side of the wood. While the majority of candidates appeared to understand the purpose of the try square, many failed to communicate this clearly by means of a sketch.

**Question 3**

Most candidates recognised the need for a wider area of acrylic to be heated and softened before bending than that provided by a strip heater or line bender.

**Question 4**

This question was very poorly answered. The best answers were to use pocket screwing, counter boring or the use of K-D fittings. Many candidates secured the top to the rail by screwing directly through the table top when the question stated that the heads of the screws must not be seen.

**Question 5**

There were many different meanings of the term 'malleable' provided. Candidates were able to secure 1 mark if they referred to the ability to be shaped by hammering and a second mark if they stated 'without breaking'.

**Question 6**

- (a) Many candidates could not name a suitable method of manufacture for the wheel made from wood, the best answer being woodturning.
- (b) Many candidates could not name a suitable method of manufacture for the wheel made from metal, the best answers being casting or die casting.
- (c) Many candidates could not name a suitable method of manufacture for the wheel made from plastic, the best answer being injection moulding.

**Question 7**

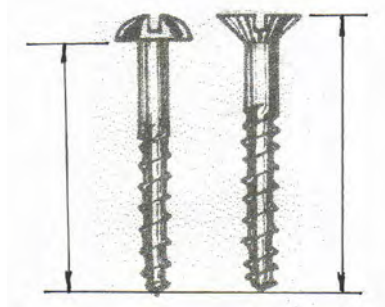
- (a) Very few candidates referred to 'short grain', the nearest being the 'lines along the wood' not being very strong. Candidates should understand what is meant by wood grain and its strengths and weaknesses when designing and making products using solid wood.
- (b) Without the knowledge of short grain in **part (a)** many candidates were unable to provide a solution to the problem in **part (b)**. Some candidates did correctly state that the wood should be replaced with the grain running vertically.

**Question 8**

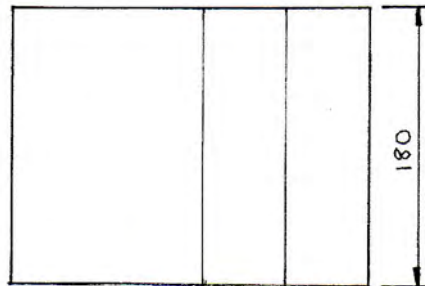
There were many different joints drawn, ranging from accurate stopped and through housings, dovetail housings, to joints that were simply incorrect. Candidates should be familiar with a variety of joints used in frame, stool and carcass construction.

**Question 9**

- (a) Many candidates recognised the round head and countersunk head screws.
- (b) The length of the round head screw is measured from underneath the head while the countersunk is measured along its entire length. Many candidates gained 1 mark for answering at least one part correctly.

**Question 10**

- (a) and (b) The vast majority of candidates were able to draw the positions of the bend lines on the acrylic development (net) and gave a sensible reason why the lines would be marked on using a felt marker rather than a scribe.

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

The majority of candidates chose to answer this question. There were some outstanding answers gaining maximum marks. These answers included accurate technical information relating to materials, tools and processes, accompanied by clear sketches drawn in a combination of 2D and 3D techniques and with excellent annotation.

- (a) (i) Most candidates named MDF correctly as a suitable manufactured board. Other correct answers included plywood and chipboard.
- (ii) Many candidates gave advantages of using a manufactured board rather than solid wood, the best answers referring to its stability and availability in wide boards.
- (b) Answers were generally disappointing considering how popular K-D fittings are today. There were a minority of answers showing a modesty block screwed to the sides of the post box.



- (c) (i) Most candidates named correct marking out tools for the slot.
- (ii) Many candidates showed clear stages involved in cutting out the slot. The main stages were drilling a hole to allow a saw blade to be inserted; the slot would then be cut and finished with a file and glasspaper.
- (d) (i) The main advantage of spray painting is not speed but the opportunity, with care, to produce an even finish free from brush strokes.
- (ii) Most candidates recognised the need for a mask to protect eyes and/or mouth and a well-ventilated room.
- (e) Many candidates provided some details about a lid, the most popular being a single piece of material with a hinge or lift-off design. Often, essential details about the choice of wood, fitting or important sizes were missing.
- (f) There were 3 essential details that candidates needed to provide to answer this question.
- some method of holding the work securely by means of a vice or clamp
  - use of a former or block around which the metal could be shaped
  - the method of force using a hammer or mallet

Candidates generally achieved some, but not usually all, of these in their answers.

### Question 12

This question was answered by very few candidates and performance was generally poor.

- (a) There were 3 essential details that candidates needed to provide to answer this question.
- use of a former for the bend
  - a method of holding one end to be pulled against
  - the method of force using a hammer or mallet
- (b) Candidates were unable to draw a recognisable lathe tool correctly positioned against the work.
- (c) (i) and (ii) Few candidates were able to name or show a centre drill in the correct position.
- (d) Few candidates were able to name a parting tool to cut the balance weights to length while on the lathe.
- (e) Some candidates named correct marking out tools: rule and scribe and the hacksaw to saw to length. The metal would be held in a vice securely ready to be sawn.
- (f) Knowledge of the brazing process was varied. Preparation included cleaning the joint with a file or emery cloth. There were numerous stages that candidates could have referred to, including application of flux, then heat from a blowtorch and application of spelter [brazing rod].
- (g) This part of the question was answered well in comparison to the previous parts. Candidates were familiar with the main features of the two-part epoxy resin adhesive; 'Araldite' often being named.

**Question 13**

Candidates answering this question did not generally achieve high marks. This question required knowledge about vacuum forming and the production of a former. Candidates were required to combine knowledge with some wood-based knowledge relating to joints and a 'catch' to be used to secure a lid of a box.

- (a) There were many different design considerations provided by candidates. The best answers referred to ease of access, the strength of the materials and attractive appearance.
- (b) Most candidates named a suitable plastic to vacuum form the tray; the most popular being polystyrene, PVC and acrylic.
- (c) Most candidates gave advantages of manufactured board over solid wood but failed to direct their answer specifically to the manufacture of the former. They received no marks for general advantages. The minority of candidates gave good responses relating to manufactured board not shrinking and, in the case of MDF, providing a better surface finish, free from grain texture.
- (d) (i) This question was about the rounding of corners and edges and of the draft angle needed for release of the former from the mould. Many candidates incorrectly stated the need for some type of release agent to prevent the former from sticking to the plastic.
- (ii) Many candidates did provide two correct stages in the vacuum forming process.
- (e) (i) This question referred to 'using' a plastic tray rather than its production. There were some excellent answers referring to the ability to clean the tray more easily and that it could be removed to provide more space.
- (ii) The most popular correct advantage of using separate wooden partitions related to the durability and robustness of the material.
- (f) (i) and (ii) This question was poorly answered because candidates were unable to give accurate details of the tools and equipment required to mark out then cut out a 45° mitre joint. The minority of candidates named a mitre square to mark out and the use of a mitre box to cut it out. Some reward was given for other recognisable marking out tools and sawing aids.
- (g) This question was poorly answered because candidates often failed to consider the instruction in the question: 'The edges of the base must not be seen'. This meant that the base of the box had to be inserted into a groove or rebate. Many candidates stuck the base on with the edges showing or simply pushed the base up inside the box with glue. Neither of these methods is correct.
- (h) Many candidates attempted to draw a suitable catch to secure the lid of the box and received some reward. The best answers involved the use of a magnetic or toggle catch followed by a less attractive hasp and staple. Some candidates could not secure the mark for the correct name and some candidates confused a 'catch' with a 'hinge'.

# 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. There was evidence too of good preparation of candidates for this paper in the way in which questions were selected and approached. One area of very good practice was in 'Mechanisms' where there was clear evidence of good teaching, preparation and practical application of knowledge. Though only a small number of candidates attempted the Electronics question, many responses were characterised by good levels of knowledge and understanding. Candidates' knowledge and understanding of structures was less satisfactory and few candidates attempted this question.

## Comments on specific questions

### **Section A**

#### **Question 1**

- (a) Most candidates correctly identified a man-made framework and a natural framework.
- (b) Shell structure was well known by candidates.

#### **Question 2**

- (a) Most candidates identified length as the change sensed by a strain gauge.
- (b) Detecting deflection in beams or strain on structural members were common examples of the use of a strain gauge.

#### **Question 3**

Candidates usually identified the PVC as an insulator and the copper as a conductor.

#### **Question 4**

This question proved difficult for, with few candidates being able to correctly explain the term mechanical advantage in terms of the cranked handle length acting at 90° to the shaft giving increased leverage.

#### **Question 5**

Most candidates correctly sketched the LED symbol but a few candidates drew a 3D sketch of the actual component.

#### **Question 6**

- (a) Most candidates were able to name an appropriate example of the use of bevel gearing such as a hand drill or food whisk.
- (b) The change of axial motion resulting from bevel gearing was generally well understood.

**Question 7**

Most candidates were able to give an appropriate example of the use of logic gates in control systems.

**Question 8**

- (a) Most candidates correctly sketched an I section beam.
- (b) This question was poorly answered with little understanding of, for example, the good strength to weight ratio.

**Question 9**

Most candidates correctly identified the Dial Test Indicator (DTI).

**Question 10**

Surprisingly, the level of understanding of voltage and current was poor.

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

- (a) The operation of the circuit was well explained by a few candidates, but there was considerable confusion in the minds of some candidates about the input required to make the alarm sound and how that input would be removed to stop the alarm sounding.
- (b) Most candidates correctly identified the pin numbering of the 555 I.C.
- (c) Most candidates correctly identified that electrolytic capacitors will not work if they are not connected according to their polarity.
- (d) The role of the 10k $\Omega$  VR in altering the frequency of the sound from the speaker was well understood.
- (e) and (f) It was well known that six cells make up a 9V battery and conversion of chemical energy into electrical energy within the cells was also generally understood.
- (g)(i) and (ii) Most candidates correctly sketched a slide switch but few could correctly sketch a toggle switch symbol.
  - (iii) Most candidates correctly identified the use of a motion detecting switch, e.g. a tilt switch, as a means of modifying the circuit.
- (h) This proved a difficult question. Marks were available for the switches and the gate correctly shown.

**Question 12**

- (a) Most candidates correctly identified rotary and reciprocating motions for the system shown.
- (b) Sketches of the cam and follower were clear and well labelled.
- (c)(i) and (ii) Many candidates were able to describe the motion created by the snail cam and were able to correctly label the direction of rotation.
- (d) The benefits and drawbacks for chain and sprocket and for pulley systems were well understood, but fewer candidates were able to fully compare gear systems to the other two systems. Sensible examples of all three transmission systems were given.
- (e) Most candidates correctly sketched and labelled a ratchet and pawl system and could name an appropriate application, such as in hoists and fishing reels.

- (f) The velocity ratio for the gear system shown was usually correctly calculated.

**Question 13**

- (a) Few candidates correctly identified ways of modifying the card structure shown. A simple reinforcement along the length was all that was required.
- (b)(i) Only a few candidates were able to give three benefits to the use of cellular door construction, with some struggling to give even one benefit. It was expected that candidates would give an appropriate alternative application, such as aircraft wings.
- (c) It was disappointing to see that few candidates were able to explain the use of ribbing to give added rigidity to a shell structure. Nor were they able to identify the roll over on the tray rim as a method of stiffening the shell.
- (d)(i) Most candidates correctly named the brace and were able to explain its use in reinforcing the framework.
- (ii) and (iii) Most candidates correctly sketched the gusset plate, but few were able to give one benefit of the use of gusset plates in terms of their ease and speed of fixing in awkward and dangerous situations.
- (e) All parts of (e) were answered poorly.
- (i) Few candidates were able to complete the table describing the loading and failure types of the various components of the bridge.
- (ii) Dynamic loading, as experienced by the bridge, did not seem to be understood.
- (iii) The pin would experience shear.
- (iv) Few candidates were able to explain how changing the cross sectional area of the pin would affect its ability to carry stress.

# DESIGN AND TECHNOLOGY

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**Paper 0445/05**

**School Based Assessment**

## General comments

The overall standard of work was comparable with previous years although there seemed to be more truly outstanding work this year. It is clear that there are many talented designers who have been well supported by their teachers.

The projects covered all of the material areas, although Resistant Materials type work was the most common and Systems and Control the least popular. A number of candidates submitted projects that involved the use of textiles or ceramics. Centres are reminded that these materials must not be the main focus of the project. For example, designing and making a dress from cotton is not an appropriate activity for this course.

The coursework samples were generally well presented and the Moderators were able to follow the sequence of the design folders in considering the marks awarded by centres. Centres are reminded of the need to include both the Coursework Assessment Summary Form 0445/05/CW/08 and the Moderator copy of form MS1 with the sample of work sent to CIE. Without these two documents moderation cannot proceed.

A significant number of arithmetical errors were found on the Coursework Assessment Summary Form. Centres must make sure the additions are checked before the marks are submitted.

Centres are reminded that where two or more groups study the subject, internal moderation must take place to establish a single rank order for the Centre.

The vast majority of projects were A3 in size. It is acceptable to use A4 size paper but a mixture of A3 and A4 sheets is discouraged. It is not necessary to send the practical work for moderation, but sufficient photographs to support the mark awarded for Product Realisation must be included.

The use of computer technology is a growing feature of work in design and technology. In the best cases it had been used, through CAD and CAM work, to produce excellent projects. In the worst cases it had only been used to enhance the appearance of design folders. All Centres are reminded that if they are fortunate enough to have access to computer technology it should be used appropriately to support the designing and making activity.

Centres are to be congratulated on their contribution to the assessment process. Many Centres had their marks confirmed by the moderation process.

## Comments on specific questions

### **Identification of a need leading to a Design Brief**

Most candidates presented a clear Design Brief. In some Centres the brief had been determined from a given theme, such as security or storage. In other Centres the candidates had clearly been given more freedom to determine a design brief that related to their interests. Both approaches are acceptable, but timely teacher intervention may be necessary, particularly with the second approach, to prevent candidates embarking on inappropriate projects. There was less clear evidence of candidates having considered the design need or the needs of the user.

In the majority of cases the Centre assessment of this objective was accurate and few marks required adjustment.

## Research into the Design Brief resulting in a Specification

The quality of research was variable. The weaker candidates often collected large amounts of information that had little relevance to the design brief. In some cases this was presented as large amounts of photocopied pages or printouts from the Internet. This approach is to be discouraged. Candidates should be encouraged to identify the key areas that they need to research and then analyse the data they have collected in order to produce a design specification. The majority of candidates were able to identify relevant specification points but some were rather vague, such as *It must not be too big*. As a general rule, if the specification point can apply to almost anything it is not specific enough.

A number of Centres had their marks adjusted in this assessment objective. This was largely due to the collection of data being awarded high marks.

## Generation and exploration of Ideas

The range and quality of design ideas presented in this section of the design folders was impressive. However, it should be noted that it is important that candidates show a wide range of different ideas and do not allow themselves to focus on just one or two concepts with superficial variations. For the award of marks in the highest band it is important that candidates analyse the ideas and annotate them to show how aspects of the specification have been addressed. This can be achieved through ongoing evaluation and a final checklist against the specification.

In this assessment objective the majority of Centre assessments were broadly in line with the awarding body standard although there were a small amount of negative and positive adjustments.

## Development of Proposed Solution

This area was often the weakest in the design folders and in some cases it was difficult to differentiate it from the ideas. Candidates should be encouraged to select one idea that they then develop into a final product.

Whilst most candidates made some choices in the step from initial ideas to final product, unfortunately, these decisions were not always recorded. Centres may wish to focus on how decisions have been made to guide them in the award of this mark. For the highest marks candidates must have undertaken testing and trialling in order to make reasoned decisions about form materials and construction methods. It is, therefore, expected that candidates will have trialed a number of alternatives and then stated why they have chosen one.

Many Centres were realistic in their assessment of this objective. They recognised that it was perhaps the weakest area of the folders and awarded an appropriate mark. Where adjustments were necessary they were usually a reduction of the Centre mark.

## Planning for Production

This area was a real strength in most design folders. The quality of the working drawing (usually orthographic drawing) was very good and supported by an accurate materials list. An increasing number of candidates had used CAD packages to produce their working drawing. Most candidates also presented a clear sequence of the manufacturing process (often a Gantt chart) for their developed design. There was some evidence of retrospective planning (planning written after the making had taken place) and this is to be discouraged.

Very few Centres had their marks adjusted in this assessment objective.

## Product Realisation

Photographic evidence confirmed that many artefacts had been produced to a high standard and put to good use. It was pleasing to see that candidates had gained much satisfaction from the production of the solution. Unfortunately, a few Centres still fail to meet CIE's requirements regarding photographs of made artefacts. The photographs should include an overall view of the finished article together with detailed views of evidence that supports the marks awarded.

The majority of Centres were able to determine an appropriate mark for this assessment objective.

### Testing and Evaluation

Responses to this assessment objective were often a little disappointing and in some cases it appeared that this section had been completed rather hurriedly. Candidates should be encouraged to compare their product with the specification, carry out user testing and then suggest proposals for further development. Self evaluation is of little relevance. The weakest part of this objective was often the user testing. If the candidates have identified the users in objective 1, then testing the product with this group will follow quite naturally in the testing and evaluation.

A significant number of Centres had their marks for this assessment objective adjusted, usually downwards.